INFORMATION HANDOUT

For Contract No. 04-2G9604

Identified by
Project ID 0412000010

PERMITS

- US Fish and Wildlife Service

MATERIALS INFORMATION

- Soil and Surface Water Investigation Report dated April 2010
- Materials Recommendations for Replacement Pavement (Revised) dated March 28, 2016
- Foundation Report (FR) dated May 11, 2016
- Borings record, Hole ID: R-13-001, and R-13-002

United States Department of the Interior

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

In Reply Refer to:
081420-
2015-F-0365-R001

MAY 0 1 2015

Ms. Melanie Brent, Office Chief
Caltrans District 4 Environmental Analysis
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Subject: Reinitiation of Consultation on the State Route 9 Storm Damage Repair Project, Santa Clara County, California (Caltrans EA 4S050)

Dear Ms. Brent:

This is in response to your letter dated February 2, 2015, requesting reinitiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the State Route 9 (SR-9) Storm Damage Repair Project, located in Santa Clara County, California. The original biological opinion was issued on August 1, 2014, (Service File No. 08ESMF00-2014-F-0365-1). Your request was received on February 5, 2015. Reinitiation of consultation was requested to address the addition of project activities that may result in effects to the threatened California red-legged frog (*Rana draytonii*) not considered in the August 1, 2014, biological opinion. This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation (23 U.S.C. 327) allows the Secretary of the U.S. Department of Transportation acting through the Federal Highway Administration (FHWA) to establish a Surface Transportation Project Delivery Pilot Program, whereby a State may assume the FHWA responsibilities under the National Environmental Policy Act (NEPA) for environmental review, agency consultation and other action pertaining to the review or approval of a specific project. Caltrans assumed these responsibilities for the FHWA on July 1, 2007 through a Memorandum of Understanding (MOU) within the State of California (http://www.dot.ca.gov/ser/downloads/MOUs/nepa_delegation/sec6005mou.pdf).

The following changes are made to the August 1, 2014, biological opinion:

1. Add the following to the **Consultation History** on page 2:

February 5, 2015	The Service received a request from Caltrans dated February 2, 2015, to reinitiate formal consultation to address changes to the project description that resulted in additional effects to the California red-legged frog.

August 7, 2014 - April 22, 2015	Electronic and phone correspondence between Caltrans, California Department of Fish and Wildlife (CDFW), and the Service.

2. Add the following to the Description of the Proposed Action on page 2:

The proposed action would occur at Post Mile (PM) 4.65 on SR-9, approximately 0.49-mile from the original project footprint occurring at PM 4.16. The new construction proposes to install a retaining wall downhill from SR-9 to repair storm-damage and improve drainage systems.

Soldier Pile Wall

Caltrans would construct an approximately 100-foot-long, 2-foot-wide, and approximately 15-foot-tall soldier pile wall along the westbound side of SR-9 to reinforce the roadway. The solider pile wall would consist of 18 steel piles. Each pile would be 2 feet in diameter and extend up to 45 feet in length. The piles would be installed in a drilled hole at 6-foot intervals and would be backfilled with concrete. Approximately 3,000 cubic feet of cut and fill would be required to install the soldier pile wall and associated piles.

Because of the very steep slopes adjacent to the road, all construction would be conducted from the westbound lane and shoulder, and no access below the road by vehicles or construction equipment would be necessary. An approximately 3-foot-wide bench below the wall would be graded to provide a path for foot traffic and wall inspection during construction. No equipment would be driven along the bench.

A Midwest Guardrail System would be installed along the 100-foot-long soldier pile wall, and approximately 25 feet east and west of the soldier pile wall. A 4-foot-wide choker would be added to accommodate the Midwest Guardrail System, and the road shoulder would be widened to 5 feet. Construction of the soldier pile wall and Midwest Guardrail System would require a 150-foot-long by 14-foot-wide work area on the north side of SR-9. However, the entire work area would not be more than 14 feet wide, because the work area would taper down at the ends to line up with the existing roadway.

Drainage System Improvements

To repair erosional damage on the uphill slope of SR-9, Caltrans would cut back the existing southern/uphill slope and remove vegetation as necessary to stabilize the hillside and improve the drainage conditions. Recontouring the hillside would require an approximately 75-foot-long by 10-footwide area of temporary disturbance, the placement of 1,000 cubic yards of fill, and the removal of three mature trees.

Caltrans would install an approximately 12-inch-diameter, 75-foot-long, corrugated steel drainage pipe uphill from SR-9, connecting the discharge pipe on private property to the culvert traveling underneath SR-9. This drainage pipe would be anchored to the newly re-contoured forest floor. A new connection would be made between the culvert outlet on the northern shoulder of SR-9 and an existing 12-inchwide metal pipe beneath the road.

In addition, Caltrans would install an 18-inch-diameter drainage pipe, parallel to SR-9 on the north side of the road. This drainage pipe would run east to the existing culvert outlet. Caltrans would excavate a 2-foot-wide, 2-foot-deep trench to install this drainage pipe underground.

Site Clean-up and Restoration
Following construction completion, all construction-related materials, including the Environmentally Sensitive Area (ESA) fencing and reinforced silt fencing, would be removed. The temporarily disturbed areas would be cleaned up, recontoured to original grade where feasible, and protected by implementation of erosion control measures. The areas uphill from SR-9 would be allowed to revegetate naturally because the area is highly shaded and any plantings would most likely fail. Areas downhill from SR-9 are largely free of native vegetation and would not be revegetated. Permanent erosion control, including soil stabilization measures (such as tackified mulch and coir netting), would be applied to all bare ground temporarily affected, to minimize erosion after construction.

Sequence of Activities
Caltrans anticipates that construction would occur in 2017 and would be completed in approximately 90 days. All construction work would occur during daytime hours and during the dry season work window from April 15 through October 15. Generally, construction work would occur in the following order:

- Setting up flagging and the one-way traffic control system;
- Installing ESA and reinforced silt fencing;
- Clearing and grubbing;
- Installing the soldier pile wall and implementing the roadway improvements;
- Recontouring the erosion-damaged drainage uphill from SR-9 and the drainage pipe;
- Installation of erosion control measures (i.e., tackified mulch and coir netting); and
- Delineating the roadway.

3. Change the Action Area on page 7 from:

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of the effects assessment, the action area encompasses 9.54 acres at PM 4.16 along SR-9 in Santa Clara County, California. Habitat within the action area consists of mixed evergreen forest, redwood forest, perennial stream (Saratoga Creek), and ephemeral drainages (Drainages 1 and 2). The action area is located on the eastern slopes of the Santa Cruz Mountains at an elevation of approximately 1,050 feet. Saratoga Creek flows east and parallel to the roadway through this segment of SR-9, approximately 200 feet downslope from the road.

To:

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of the effects assessment, the action area encompasses **11.67 acres comprising** 9.54 acres at PM 4.16 **and 2.13 acres at PM 4.65** along SR-9 in Santa Clara County, California. Habitat within the action area consists of mixed evergreen forest, redwood forest, perennial stream (Saratoga Creek), and ephemeral drainages (Drainages 1 and 2). The action area is located on the eastern slopes of the Santa Cruz Mountains at an elevation of approximately 1,050 feet. Saratoga Creek flows east and parallel to the roadway

through this segment of SR-9, approximately 200 feet downslope from the road **at PM 4.16 and 100 feet downslope of the road at PM 4.65**.

4. Change the second paragraph on page 14 under the Effects of the Action from:

Temporary effects comprise areas denuded, manipulated, or otherwise modified from their existing, pre-project conditions, thereby removing one or more essential components of a listed species' habitat as a result of project activities that include, but are not limited to, construction, staging, storage, lay down, vehicle access, parking, etc. Temporary effects must be restored to baseline habitat values or better within one year following initial disturbance. Areas subject to ongoing operations and maintenance are not considered temporary even if they are restored within one year following initial disturbance. Affected areas not fulfilling these criteria are considered permanent. The proposed action would result in the permanent loss and/or degradation of 0.16-acre of California red-legged frog upland, and dispersal habitat; and the temporary loss and/or degradation of 0.14-acre of California red-legged frog non-breeding aquatic, upland, and dispersal habitat. These effects will be minimized by installing environmentally sensitive area fencing to keep workers from straying into otherwise undisturbed habitat; erecting wildlife exclusion fencing to deter frogs from wandering onto the construction site; implementing storm water and erosion BMP's; educating workers about the presence of California red-legged frogs, their habitat, identification, regulatory laws, and avoidance and minimization measures; and requiring a Service-approved biologist(s) to be present to monitor project activities within or adjacent to suitable habitat

To:

Temporary effects comprise areas denuded, manipulated, or otherwise modified from their existing, pre-project conditions, thereby removing one or more essential components of a listed species' habitat as a result of project activities that include, but are not limited to, construction, staging, storage, lay down, vehicle access, parking, etc. Temporary effects must be restored to baseline habitat values or better within one year following initial disturbance. Areas subject to ongoing operations and maintenance are not considered temporary even if they are restored within one year following initial disturbance. Affected areas not fulfilling these criteria are considered permanent. The proposed action would result in the permanent loss and/or degradation of ~~0.16-acre~~ **0.22-acre** of California red-legged frog upland, and dispersal habitat; and the temporary loss and/or degradation of ~~0.14-acre~~ **0.17-acre** of California red-legged frog non-breeding aquatic, upland, and dispersal habitat. These effects will be minimized by installing environmentally sensitive area fencing to keep workers from straying into otherwise undisturbed habitat; erecting wildlife exclusion fencing to deter frogs from wandering onto the construction site; implementing storm water and erosion BMP's; educating workers about the presence of California red-legged frogs, their habitat, identification, regulatory laws, and avoidance and minimization measures; and requiring a Service-approved biologist(s) to be present to monitor project activities within or adjacent to suitable habitat

5. Change the second paragraph on page 14 under the Effects of the Action from:

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect due to their cryptic nature and wariness of humans. Losses of this species may also be difficult to quantify due to a lack of baseline survey data and seasonal/annual fluctuations in their numbers due to environmental or human-caused disturbances. Due to

the difficulty in quantifying the number of California red-legged frogs that will be taken as a result of the proposed action, the Service is quantifying take incidental to the proposed action as the mortality/injury of no more than one California red-legged frog and the harassment of all California red-legged frogs inhabiting or utilizing the 9.54 acre action area. The Service anticipates that take of juvenile and adult life history stages may be killed, harmed or harassed as a result of habitat loss/degradation, construction-related disturbance, or capture and relocation efforts. Take of eggs or larvae is not authorized based on the project design that avoids work within Saratoga Creek and the implementation of the proposed conservation measures. Therefore, take of eggs or larvae are not anticipated. Upon implementation of the following Reasonable and Prudent Measures, all juvenile and adult California red-legged frogs within the action area in accordance with the amount and type of take outlined above will become exempt from the prohibitions described under section 9 of the Act. No other forms of take are authorized under this opinion.

To:

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect due to their cryptic nature and wariness of humans. Losses of this species may also be difficult to quantify due to a lack of baseline survey data and seasonal/annual fluctuations in their numbers due to environmental or human-caused disturbances. Due to the difficulty in quantifying the number of California red-legged frogs that will be taken as a result of the proposed action, the Service is quantifying take incidental to the proposed action as the mortality/injury of no more than one California red-legged frog and the harassment of all California red-legged frogs inhabiting or utilizing the ~~9.54 acre~~ **11.67 acres** action area. The Service anticipates that take of juvenile and adult life history stages may be killed, harmed or harassed as a result of habitat loss/degradation, construction-related disturbance, or capture and relocation efforts. Take of eggs or larvae is not authorized based on the project design that avoids work within Saratoga Creek and the implementation of the proposed conservation measures. Therefore, take of eggs or larvae are not anticipated. Upon implementation of the following Reasonable and Prudent Measures, all juvenile and adult California red-legged frogs within the action area in accordance with the amount and type of take outlined above will become exempt from the prohibitions described under section 9 of the Act. No other forms of take are authorized under this opinion.

This concludes the reinitiation of formal consultation on the SR-9 Storm Damage Repair Project, located in Santa Clara County, California. The remainder of the August 1, 2014, biological opinion, as amended, is unchanged. If you have questions concerning this reinitiation, please contact Jerry Roe or Ryan Olah, Coast Bay Division Chief, at (916) 414-6600.

Sincerely,

E. Tattersall

for Cay C. Goude
Assistant Field Supervisor

cc:
Melissa Escaron, California Department of Fish and Wildlife, Napa, California

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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In Reply Refer to:
08ESMF00-
2014-F-0365-1

AUG 01 2014

Ms. Melanie Brent, Office Chief
Caltrans District 4 Environmental Analysis
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Subject: Biological Opinion on the Effects of the Proposed State Route 9 Storm Damage Repair Project, Santa Clara County, California (Caltrans EA 4S050)

Dear Ms. Brent:

This letter responds to a letter from the California Department of Transportation (Caltrans), dated March 13, 2014, which requested formal consultation for the proposed State Route 9 (SR-9) Storm Damage Repair Project in Santa Clara County, California. Your letter was received by the U.S. Fish and Wildlife Service (Service) on March 17, 2014 (Caltrans EA 4S050). This document represents the Service's biological opinion on the effects of the project on the threatened California red-legged frog (*Rana draytonii*). This letter issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act).

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation (23 U.S.C. 327) allows the Secretary of the U.S. Department of Transportation acting through the Federal Highway Administration (FHWA) to establish a Surface Transportation Project Delivery Pilot Program, whereby a State may assume the FHWA responsibilities under the National Environmental Policy Act for environmental review, agency consultation and other action pertaining to the review or approval of a specific project. Caltrans assumed these responsibilities for the FHWA on July 1, 2007 through a Memorandum of Understanding within the State of California (http://www.dot.ca.gov/ser/downloads/MOUs/nepa_delegation/sec6005mou.pdf).

The proposed action is not located within designated critical habitat for the California red-legged frog based on the revised critical habitat designation published on March 17, 2010 (75 FR 12816) (Service 2010). This biological opinion is based on: (1) the SR-9 Storm Damage Repair Project, Biological Assessment dated March 2014; (2) letter from Caltrans to the Service dated March 13, 2014; (3) email correspondence from Caltrans on December 13, 2013, and California Department of Fish and Wildlife (CDFW) on January 7 and January 10, 2014; (4) miscellaneous correspondence and electronic mail concerning the proposed action between Caltrans, CDFW, and the Service; and (5) other information available to the Service.

Consultation History

March 17, 2014	The Service received a letter requesting the initiation of formal consultation dated March 13, 2014, and a Biological Assessment for the SR-9 Storm Damage Repair Project.
July 29, 2014	The Service sent an email to Caltrans requesting area calculation for the action area and justification for not providing compensation for the effects of harm on the California red-legged frog.
July 30, 2014	The Service received an email response from Caltrans providing the area calculation for the action area and justification for not providing compensation for the effects of harm on the California red-legged frog.
December 13, 2013 - July 30, 2014	Electronic and phone correspondence between Caltrans, California Department of Fish and Wildlife (CDFW), and the Service.

BIOLOGICAL OPINION

Description of the Proposed Action

The following project description, inclusive of the proposed compensation and proposed conservation measures, was provided by Caltrans and is an excerpt from the March 2014 Biological Assessment with minor modifications for reasons of clarity and accuracy provided by the Service.

Project Description

The purpose of the proposed project is to repair a storm-damaged slope along SR-9 in Santa Clara County at post mile (PM) 4.16 which if left unrepaired could affect the integrity of the roadway. This repair project would improve the integrity of the roadway by constructing a tieback retaining wall, modifying, and reconstructing drainage systems, improving roadway geometrics, and relocating utilities.

The existing roadway in the action area consists of two 11-foot lanes, separated by a solid double yellow stripe. Outside shoulders vary from 1 foot to 3 feet in width. The existing right-of-way (ROW) varies from approximately 17 to 30 feet south of the centerline and approximately 17 to 30 feet north of the centerline. A metal beam guardrail (MBGR) is in place along the length of the northern and southern shoulders. An existing ephemeral drainage (Drainage 1) crosses the action area near the western extent of the retaining wall. This drainage flows into a culvert along the southern side of SR-9, where it is then carried beneath the road and through an approximately 100-foot-long and 30-inch-wide culvert anchored to the surface of the forest floor; drainage is then discharged along the surface of the forest floor into Saratoga Creek. A second existing 18-inch-wide culvert (Drainage 2), anchored to the forest floor, collects surface run-off from SR-9 before discharging it along the slope above Saratoga Creek.

Construct Tieback Retaining Wall

Caltrans would cut back the existing north side slope (with cut ranging from 10 to 19.5 feet in width) and would install a 358-foot tieback retaining wall. The height of the proposed retaining wall is 10 feet. The distance from existing edge of pavement to the proposed retaining wall would vary from about 3 to 7.5 feet. An approximately 16-foot-wide area along the base of the new retaining

wall would be graded to facilitate construction access. After construction of the retaining wall is complete, this graded area would not be maintained for maintenance access and would be allowed to revegetate naturally.

Modify and Reconstruct Drainage Systems
The two existing drainage systems (Drainage 1 and Drainage 2) would be reconstructed and improved with modifications to incorporate the new wall construction. At both locations the headwalls would be reconstructed and the existing cross culverts would be abandoned and new cross culverts installed. New rock slope protection (RSP) would be placed at the end of each drainage outfall and adjacent to the reconstructed headwalls. A crane operating from the tieback wall construction area would place the RSP at the outfall locations. For Drainage 1, the headwall and outfall RSP pads measure approximately 7 feet by 15 feet. For Drainage 2, the headwall RSP pad measures approximately 12 feet by 2 feet, and the outfall RSP pad measures approximately 7 feet by 15 feet. Both outfalls are located approximately 50 feet upslope from Saratoga Creek. New inlets would be added to each drainage system behind the new retaining wall.

Improve Roadway Geometrics
The roadway geometrics and horizontal curvature would be improved and outside shoulders would be constructed with a minimum width of 4 feet. Improvements to the existing pavement will consist of a combination of reconstruction and overlay to meet new proposed roadway geometry. Along the 358-foot section of the new retaining wall, the existing MBGR would be removed. In addition, a new MBGR would be installed to shield the most easterly edge of the retaining wall.

Relocate Utilities
A utility pole is located at the northwestern-most edge of the action area. The utility pole would be relocated approximately 60 feet west within the ROW, where it would be installed below the new retaining wall. A utility box is located at the northeastern-most edge of the action area. This utility box is empty and would be abandoned during project construction.

Access, Staging, and Laydown
All construction activities would occur within the existing Caltrans ROW, within the permanent drainage easements, and within the temporary construction easement. Caltrans will use previously developed and disturbed areas for staging and access. Caltrans will use one-way traffic control and lane closures to accomplish construction activities. A 560-foot portion of the existing lane adjacent to the retaining wall would be enclosed with K-Rail. The available room in the road and road shoulder behind the K-rail would be used for constructing the wall and any necessary temporary staging or access.

Sequence of Construction Actions
Caltrans anticipates that construction would occur between April 15, 2015, and October 15, 2015, and would be completed in approximately 120 days. Generally, construction work would occur in the following order:

- Set up of temporary K-rail lane closure and a one-way traffic control system;
- Install ESA fencing;
- Clear and grub;
- Relocation of utilities;
- Roadway excavation and cut back of slopes;
- Construction of the retaining wall and roadway improvements;

- Removing the temporary K-rail and one-way traffic control system;
- Installation of erosion control measures (i.e., tackified mulch and coir netting); and
- Roadway delineation.

Site Clean-up and Restoration
All construction-related materials, including the ESA fencing, would be removed after construction activities are complete. The temporarily disturbed areas would be cleaned up, re-contoured to original grade where feasible, and protected by implementation of erosion control measures. Permanent erosion control, including soil stabilization measures (such as tackified mulch and coir netting), would be applied to all bare ground temporarily affected to minimize erosion after construction.

Proposed Conservation Measures
General Conservation Measures
To reduce potential effects to sensitive biological resources, Caltrans proposes to incorporate construction Best Management Practices (BMPs) and avoidance and minimization measures into the proposed roadway construction project. These measures will be communicated to the contractor through the use of special provisions included in the contract bid solicitation package. These measures include the following:

1. **Seasonal Avoidance**. Construction actions will be scheduled to minimize effects on listed species and habitats. Except for limited vegetation clearing necessary to minimize effects to nesting birds, work will be conducted between April 15 and October 15 in all vegetated areas.

2. **Environmentally Sensitive Areas (ESA)**. Prior to the start of construction, ESAs – defined as areas containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed – will be clearly delineated using high visibility orange fencing. Construction work areas include the active construction site and all areas providing support for the proposed action including areas used for vehicle parking, equipment and material storage and staging, access roads, etc. Approximately 1,060 feet of ESA fencing would be installed along the north and south sides of SR-9 to protect Saratoga Creek, riparian areas, and other sensitive habitats. The ESA fencing will remain in place throughout the duration of the proposed action, while construction activities are ongoing, and will be regularly inspected and fully maintained at all times. The final project plans will depict all locations where ESA fencing will be installed and will provide installation specifications. The bid solicitation package special provisions will clearly describe acceptable fencing material and prohibited construction-related activities including vehicle operation, material and equipment storage, access roads and other surface-disturbing activities within ESAs.

3. **Environmental Awareness Training**. Prior to the start of construction, a qualified biologist will conduct an educational training program for all construction personnel including contractors and subcontractors. The training will include, at a minimum, a description of the California red-legged frog, migratory birds, and their habitat within the action area; an explanation of the status of the species and protection under state and federal laws; the avoidance and minimization measures to be implemented to reduce take of this species; communication and work stoppage procedures in case a listed species is observed within the action area; and an explanation of the ESAs and Wildlife Exclusion

Fencing (WEF) and the importance of maintaining these structures. A fact sheet conveying this information will be prepared and distributed to all construction personnel. Upon completion of the program, personnel will sign a form stating that they attended the program and understand all the avoidance and minimization measures and implications of the Act and Migratory Bird Treaty Act.

4. **Avoidance of Entrapment**. To prevent inadvertent entrapment of animals during construction, all excavated, steep-walled holes or trenches more than 1-foot deep will be covered with plywood or similar materials at the close of each working day or provided with one or more escape ramps constructed of earth fill or wooden planks. The Service-approved biologist shall inspect all holes and trenches at the beginning of each workday and before such holes or trenches are filled. All replacement pipes, culverts, or similar structures stored in the action area overnight will be inspected before they are subsequently moved, capped, and/or buried. If at any time a listed species is discovered, the Resident Engineer and Service-approved biologist will be notified immediately and the Service-approved biologist shall implement the species observation and handling protocol outlined in the Terms and Conditions of this biological opinion.

5. **Best Management Practices**. Storm Water Pollution Prevention Plans (SWPPP) and erosion control BMPs will be developed and implemented to minimize any wind or water-related erosion and will be in compliance with the requirements of the Regional Water Quality Control Board. The SWPPP will reference the Caltrans Construction Site BMPs Manual. This manual is comprehensive and includes many other protective measures and guidance to prevent and minimize pollutant discharges and can be found online at http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm. Protective measures will include, at a minimum:

    a. No discharge of pollutants from vehicle and equipment cleaning is allowed into any storm drains or watercourses.
    b. Vehicle and equipment fueling and maintenance operations must be at least 50 feet away from watercourses, except at established commercial gas stations or established vehicle maintenance facilities.
    c. Concrete wastes are collected in washouts and water from curing operations is collected and disposed. Neither will be allowed into watercourses.
    d. Spill containment kits will be maintained onsite at all times during construction operations and/or staging or fueling of equipment.
    e. Dust control measures will include use of water trucks and dust palliatives to control dust in excavation-and-fill areas, covering temporary access road entrances and exits with rock (rocking), and covering of temporary stockpiles when weather conditions require.
    f. Coir rolls or straw wattles that do not contain plastic or synthetic monofilament netting will be installed along or at the base of slopes during construction to capture sediment.
    g. Protection of graded areas from erosion using a combination of silt fences, fiber rolls, etc. along toes of slopes or along edges of designated staging areas, and erosion control netting (such as jute or coir) as appropriate on sloped areas. Erosion control materials that use plastic or synthetic monofilament netting will not be used within the action area. This includes products that use photodegradable or biodegradable synthetic netting, which can take several months to decompose. Acceptable materials include natural fibers such as jute, coconut, twine or other similar fibers.

h. Permanent erosion control measures such as bio-filtration strips and swales to receive storm water discharges from the highway, or other impervious surfaces will be incorporated to the maximum extent practicable.
i. All grindings and asphaltic-concrete waste will be stored within previously disturbed areas absent of habitat and at a minimum of 50 feet from any aquatic habitat, culvert, or drainage feature.

6. **Construction Site Management Practices**. The following site restrictions will be implemented to avoid or minimize effects on listed species and their habitats:

a. A speed limit of 15 miles per hour in the project footprint in unpaved areas will be enforced to reduce dust and excessive soil disturbance.
b. Construction access, staging, storage, parking areas, and temporary construction easements will be located within the project Caltrans ROW outside of any designated ESA. Access routes and the number and size of staging and work areas will be limited to the minimum necessary to construct the proposed project and will be limited to existing paved surfaces. Routes and boundaries of roadwork will be clearly marked prior to initiating construction or grading.
c. Routes and boundaries of roadwork will be clearly marked prior to initiating construction or grading.
d. To the maximum extent practicable, any borrow material will be certified to be non-toxic and weed free.
e. All food and food-related trash items will be enclosed in sealed trash containers and properly disposed of off-site.
f. No pets from project personnel will be allowed anywhere in the action area during construction.
g. No firearms will be allowed on the project site except for those carried by authorized security personnel, or local, State or Federal law enforcement officials.
h. A Spill Response Plan will be prepared. Hazardous materials such as fuels, oils, solvents, etc. will be stored in sealable containers in a designated location that is at least 100 feet from hydrologic features.
i. All equipment will be properly maintained and free of leaks. Servicing of vehicles and construction equipment including fueling, cleaning, and maintenance will occur at least 100 feet from any hydrologic features unless it is an existing gas station.

7. **Vegetation Removal**. Any vegetation that is within the cut and fill line or growing in locations where permanent structures will be placed (e.g., road alignment, shoulder widening, soil nail walls, etc.) will be cleared. Vegetation will be cleared only where necessary and will be cut above soil level except in areas that will be excavated for roadway construction. This will allow plants that reproduce vegetatively to resprout after construction. All clearing and grubbing of woody vegetation will occur by hand or using light construction equipment such as backhoes. If clearing and grubbing occurs between February 1 and August 31, a qualified biologist(s) will survey for nesting birds within the area(s) to be disturbed including a perimeter buffer of 100 feet for passerines and 300 feet for raptors before clearing activities begin. All nest avoidance requirements of the Migratory Bird Treaty Act and California Fish and Game Code Sections 3503 and 3503.5 will be observed. All cleared vegetation will be removed from the project footprint to prevent attracting animals to the project site. The contractor will be responsible for obtaining all permits, licenses, and environmental clearances for properly disposing of such materials. A Service-approved biologist will be present during all vegetation clearing and grubbing activities. Prior to

vegetation removal, the Service-approved biologist shall thoroughly survey the area for California red-legged frogs. Once the Service-approved biologist has thoroughly surveyed the area, clearing and grubbing may continue without further restrictions on equipment; however, the Service-approved biologist shall remain onsite to monitor for California red-legged frogs until all clearing and grubbing activities are complete. After project completion, all temporarily affected areas shall be returned to original grade and contours to the maximum extent practicable, protected with proper erosion control materials, and revegetated with native species appropriate for the region and habitat communities on site.

8. **Reduce Spread of Invasive Species**. To reduce the spread of invasive non-native plant species and minimize the potential decrease of palatable vegetation for wildlife species, Caltrans will comply with Executive Order 13112. This order is provided to prevent the introduction of invasive species and provide for their control in order to minimize the economic, ecological, and human health impacts. In the event that high- or medium-priority noxious weeds, as defined by the California Department of Food and Agriculture or the California Invasive Plant Council, are disturbed or removed during construction-related activities, the contractor will contain the plant material associated with these noxious weeds and dispose of it in a manner that will not promote the spread of the species. The contractor will be responsible for obtaining all permits, licenses, and environmental clearances for properly disposing of materials. Areas subject to noxious weed removal or disturbance will be replanted with fast-growing native grasses or a native erosion control seed mixture. If seeding is not possible, the area should be covered to the extent practicable with heavy black plastic solarization material until the end of the project.

9. **Replant, Reseed, and Restore Disturbed Areas**. All slopes or unpaved areas that are temporarily affected by the proposed action will be restored to pre-project conditions or better to the maximum extent practicable. Slopes and bare ground will be treated with tackified mulch to stabilize and prevent erosion. The site would be allowed to re-vegetate naturally. Temporary effects comprise areas denuded, manipulated, or otherwise modified from their existing, pre-project conditions, thereby removing one or more essential components of a listed species' habitat as a result of project activities that include, but are not limited to, construction, staging, storage, lay down, vehicle access, parking, etc. Temporary effects must be restored to baseline habitat values or better within one year following initial disturbance. Areas subject to ongoing operations and maintenance are not considered temporary even if they are restored within one year following initial disturbance. Affected areas not fulfilling these criteria are considered permanent.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of the effects assessment, the action area encompasses 9.54 acres at PM 4.16 along SR-9 in Santa Clara County, California. Habitat within the action area consists of mixed evergreen forest, redwood forest, perennial stream (Saratoga Creek), and ephemeral drainages (Drainages 1 and 2). The action area is located on the eastern slopes of the Santa Cruz Mountains at an elevation of approximately 1,050 feet. Saratoga Creek flows east and parallel to the roadway through this segment of SR-9, approximately 200 feet downslope from the road.

Analytical Framework for the Jeopardy Determinations

Jeopardy Determination
In accordance with policy and regulation, the jeopardy analyses in this biological opinion relies on four components: (1) the *Status of the Species*, which evaluates the California red-legged frog range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the California red-legged frog in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the California red-legged frog; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the California red-legged frog; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the California red-legged frog.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the California red-legged frog current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of this species in the wild.

The jeopardy analyses in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the California red-legged frog and the role of the action area in the survival and recovery of the California red-legged frog as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Status of the Species and Environmental Baseline

California Red-legged Frog
Listing Status: The California red-legged frog was listed as a threatened species on May 23, 1996 (61 FR 25813) (Service 1996). Critical habitat was designated for this species on April 13, 2006 (71 FR 19244) (Service 2006) and revisions to the critical habitat designation were published on March 17, 2010 (75 FR 12816) (Service 2010). At this time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). A recovery plan was published for the California red-legged frog on September 12, 2002 (Service 2002).

Description: The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Distribution: The historic range of the California red-legged frog extended from the vicinity of Elk Creek in Mendocino County, California, along the coast inland to the vicinity of Redding in Shasta County, California, and southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The species was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002). California red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the central California coast. Isolated

populations have been documented in the Sierra Nevada, northern coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular Ranges, but is still present in Baja California, Mexico (CDFW 2014).

Status and Natural History: California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation (Jennings and Hayes 1994, Bulger *et al.* 2003, Stebbins 2003). However, they also inhabit ephemeral creeks, drainages, and ponds with minimal riparian and emergent vegetation. California red-legged frogs breed from November to April, although earlier breeding records have been reported in southern localities. Breeding generally occurs in still or slow-moving water often associated with emergent vegetation, such as cattails, tules, or overhanging willows (Storer 1925, Hayes and Jennings 1988). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or near the surface of the water (Hayes and Miyamoto 1984).

Habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer including vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees (Fellers 2005). Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and includes any landscape feature that provides cover, such as animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or haystacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adults are often associated with permanent bodies of water. Some individuals remain at breeding sites year-round, while others disperse to neighboring water features. Dispersal distances are typically less than 0.5 mile, with a few individuals moving up to 1-2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger *et al.* (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred from one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger *et al.* (2003) reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover, *i.e.*, California blackberry, poison oak, and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25 mile to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment in eastern Contra Costa County, Tatarian (2008) noted that 57 percent of frogs fitted with radio transmitters in the Round Valley study area stayed at their breeding pools, whereas 43 percent moved into adjacent upland habitat or to other aquatic sites. Her study reported a peak seasonal terrestrial movement occurring in the fall months associated with the first 0.2 inch of precipitation and tapering off into

spring. Upland movement activities ranged from 3 to 233 feet, averaging 80 feet, and were associated with a variety of refugia including grass thatch, crevices, cow hoof prints, ground squirrel burrows at the base of trees or rocks, logs, and under man-made structures; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1 to 4 days; however, one adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Upland refugia closer to aquatic sites were used more often and were more commonly associated with areas exhibiting higher object cover, *e.g.*, woody debris, rocks, and vegetative cover. Subterranean cover was not significantly different between occupied upland habitat and non-occupied upland habitat.

California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Egg masses containing 2,000 - 5,000 eggs are attached to vegetation below the surface and hatch after 6 - 14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand resulted in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3.5 - 7 months following hatching and reach sexual maturity at 2 - 3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). California red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations can fluctuate from year to year; favorable conditions allow the species to have extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, the animal may temporarily disappear from an area when conditions are stressful (*e.g.*, during periods of drought, disease, etc.).

The diet of California red-legged frogs is highly variable and changes with the life history stage. The diet of the larvae is not well studied, but is likely similar to that of other ranid frogs, feeding on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b, 1997). Hayes and Tennant (1985) analyzed the diets of California red-legged frogs from Cañada de la Gaviota in Santa Barbara County during the winter of 1981 and found invertebrates (comprising 42 taxa) to be the most common prey item consumed; however, they speculated that this was opportunistic and varied based on prey availability. They ascertained that larger frogs consumed larger prey and were recorded to have preyed on Pacific chorus frogs, threespine stickleback, and, to a limited extent, California mice, which were abundant at the study site (Hayes and Tennant 1985, Fellers 2005). Although larger vertebrate prey was consumed less frequently, it represented over half of the prey mass eaten by larger frogs suggesting that such prey may play an energetically important role in their diets (Hayes and Tennant 1985). Juvenile and subadult/adult frogs varied in their feeding activity periods; juveniles fed for longer periods throughout the day and night, while subadult/adults fed nocturnally (Hayes and Tennant 1985). Juveniles were significantly less successful at capturing prey and all life history stages exhibited poor prey discrimination, feeding on several inanimate objects that moved through their field of view (Hayes and Tennant 1985).

Threats: Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range. Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990, Twedt 1993), red swamp crayfish, signal crayfish, and several species of warm water fish including

sunfish, goldfish, common carp, and mosquitofish (Moyle 1976; Barry 1992; Hunt 1993; Fisher and Schaffer 1996). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult California red-legged frogs as well. Bullfrogs may also have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with California red-legged frog reproduction by eating adult male California red-legged frogs. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990, Jennings 1993, Twedt 1993). Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also affected the threatened amphibian. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and bullfrogs. Diseases may also pose a significant threat, although the specific effects of disease on the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Chytridiomycosis and ranaviruses are a potential threat because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson *et al.* 2003; Lips *et al.* 2006). Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also presented in sympatric threespine sticklebacks in northwestern California. Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.* 2006). Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (*i.e.*, contaminated boots, waders, or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in the listed species being more susceptible to the effects of disease.

Recovery Plan: The recovery plan for the California red-legged frog identifies eight recovery units (Service 2002). The establishment of these recovery units is based on the determination that various regional areas of the species' range are essential to its survival and recovery. The status of the California red-legged frog was considered within the small-scale recovery units as opposed to their overall range. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of its range. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations. Thus when combined with suitable dispersal habitat, will allow for the long-term viability within existing populations. The management strategy identified within the Recovery Plan will allow for the recolonization of habitats within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

Environmental Baseline

California Red-legged Frog
The action area is located 2 miles east of the South San Francisco Bay Core Area (Alameda Creek Hydrologic Sub-Area) and is within the Central Coast Recovery Unit (Service 2002, 2006). The recovery action guidelines provide recommendations for minimizing the effects of various land and water uses, non-native species/predators, and air and water contamination in addition to outlining recommendations for habitat preservation. These recommendations assist in the conservation and recovery of the species, protect high quality habitat within core areas and priority watersheds, increase opportunities for dispersal, population expansion, and recolonization, and provide connectivity between core areas and occupied watersheds. The conservation needs for the South San Francisco Bay Core Area are: (1) protect existing populations; (2) control non-native predators; (3) increase connectivity between populations; (4) reduce erosion; (5) implement guidelines for recreation activities to reduce impacts; (6) implement forest practice guidelines; and (7) reduce impacts of urbanization.

The project is located within the known range of the California red-legged frog. The mixed evergreen forest, redwood forest, and perennial stream vegetation communities within the action area are part of a larger mosaic of essential habitat features sustaining a viable population (i.e., sheltering, foraging, and dispersal) within the Santa Cruz Mountains. Based on the biological assessment provided by Caltrans and the evaluation performed by the Service no known or potential breeding habitat is present within the project footprint; however, Saratoga Creek provides potential breeding habitat for California red-legged frogs and is located within the action area, approximately 200 feet downslope from the project footprint.

The entire action area is within dispersal distance of known and potential breeding sites and all vegetation communities with the exception on paved roadways and road shoulders within the action area are considered suitable upland habitat with the exception of paved roadways. The two ephemeral drainages provide seasonal non- breeding aquatic habitat. No focused frog or roadkill surveys were conducted in preparation of the biological assessment. Caltrans identified 10 reported occurrences within 10 miles of the action area and 2 occurrences less than 2 miles from the action area. Occurrence number 211 was reported in 1997 from Saratoga Creek, 1.6 miles downstream from the action area and comprised of a single juvenile frog under a board in a seep adjacent to Saratoga Creek (CDFW 2014). The second reported occurrence (#961) is located 1.5 miles north of the action area from Calabasas Creek consisting of one adult and three tadpoles in 2007 (CDFW 2014).

The Service believes that the California red-legged frog is reasonably certain to occur within the action area because: (1) the project is located within the species' range and current distribution, and within 2 miles of the South San Francisco Bay Core Area; (2) there is suitable non-breeding aquatic, upland, and dispersal habitat within the action area and potential breeding habitat nearby; (3) the habitat within the action area is similar to that which is found in nearby areas with confirmed California red-legged frog occupancy; (4) there are no significant barriers to California red-legged frog movement between confirmed occupied areas and the action area; (5) the lack of significant disturbance or history of significant threats to the species in the general vicinity; and (6) the biology and ecology of the animal.

Effects of the Action

California Red-legged Frog

The proposed project will likely adversely affect the threatened California red-legged frog by killing, injuring, harming, and/or harassing juveniles and adults inhabiting suitable non-breeding aquatic, upland, and dispersal habitat within the action area. The aspects of the proposed action most likely to affect the California red-legged frog are largely confined to the construction phase of the project associated with vegetation clearing and grubbing, the construction of the tieback retaining wall, reconstructing the two existing drainages, constructing the two RSP and headwalls, roadway geometric improvements, and relocating of utilities.

The construction of the tieback retaining wall will create a vertical hazard for California red-legged frogs and will present a movement barrier where existing vegetated slopes currently provide access to habitats on either side of SR-9. The retaining wall will affect the ability of frogs to disperse across SR-9 and may result in individuals spending more time on the road and roadside verge in an attempt to reach habitat on the other side of the highway, thereby subjecting them to increased risk of mortality or harm from vehicle strikes.

Construction noise, vibration, and increased human activity may interfere with normal behaviors – feeding, sheltering, movement between refugia and foraging grounds, and other essential behaviors of the California red-legged frog – resulting in avoidance of areas that have suitable habitat but intolerable levels of disturbance. Short-term temporal effects will occur when vegetative cover and upland foraging and refugia habitat is removed during project construction. Caltrans proposes to minimize these effects, in part, by locating construction staging, storage and parking areas outside of sensitive habitat in existing paved areas; clearly marking construction work boundaries to prevent crews from affecting more habitat than is absolutely necessary, and restoring all temporary disturbed areas to pre-project conditions or better.

The proposed construction activities could result in the introduction of chemical contaminants to the site. California red-legged frogs using the action area could be exposed to any contaminants that are present at the site. Exposure pathways could include inhalation, dermal contact, direct ingestion, or secondary ingestion of contaminated soil, plants, or prey species. Exposure to contaminants could cause short- or long-term morbidity, possibly resulting in reduced productivity or mortality. Caltrans proposes to minimize these risks by implementing a SWPPP, erosion control BMPs and a Spill Response Plan, which will consist of refueling, oiling or cleaning of vehicles and equipment a minimum of 100 feet from aquatic resources; installing coir rolls, straw wattles and/or silt fencing to capture sediment and prevent runoff or other harmful chemicals from entering the wetland; and locating staging, storage and parking areas away from aquatic habitats.

Preconstruction surveys and the relocation of individual California red-legged frogs by a Service-approved biologist will minimize the likelihood of serious injury or mortality; however, capturing and handling frogs may result in stress and/or minor injury during handling, containment, and transport. Death and injury of individuals could occur at the time of relocation or later in time subsequent to their release. Although survivorship for translocated amphibians has not been estimated, survivorship of translocated wildlife, in general, is low because of intraspecific competition, lack of familiarity with the relocation site with regards to breeding, feeding, and sheltering habitats, risk of contracting disease in foreign environment, and increased risk of predation. Caltrans proposes to minimize these effects by using qualified Service-approved biologists, limiting the duration of handling, and relocating amphibians to suitable nearby habitat.

Biologists and construction workers traveling to the action area from other project sites may transmit diseases by introducing contaminated equipment. The chance of a disease being introduced into a new area is greater today than in the past due to the increasing occurrences of disease throughout amphibian populations in California and the United States. It is possible that chytridiomycosis, caused by chytrid fungus (*Batrachochytrium dendrobatidis*), may exacerbate the effects of other diseases on amphibians or increase the sensitivity of the amphibian to environmental changes (e.g., water pH) that reduce normal immune response capabilities (Bosch et al. 2001, Weldon et al. 2004). Implementing proper decontamination procedures prior to and following aquatic surveys and handling of frogs and salamanders will minimize the risk of transferring diseases through contaminated equipment or clothing.

Temporary effects comprise areas denuded, manipulated, or otherwise modified from their existing, pre-project conditions, thereby removing one or more essential components of a listed species' habitat as a result of project activities that include, but are not limited to, construction, staging, storage, lay down, vehicle access, parking, etc. Temporary effects must be restored to baseline habitat values or better within one year following initial disturbance. Areas subject to ongoing operations and maintenance are not considered temporary even if they are restored within one year following initial disturbance. Affected areas not fulfilling these criteria are considered permanent. The proposed action would result in the permanent loss and/or degradation of 0.16-acre of California red-legged frog upland, and dispersal habitat; and the temporary loss and/or degradation of 0.14-acre of California red-legged frog non-breeding aquatic, upland, and dispersal habitat. These effects will be minimized by installing environmentally sensitive area fencing to keep workers from straying into otherwise undisturbed habitat; erecting wildlife exclusion fencing to deter frogs from wandering onto the construction site; implementing storm water and erosion BMP's; educating workers about the presence of California red-legged frogs, their habitat, identification, regulatory laws, and avoidance and minimization measures; and requiring a Service-approved biologist(s) to be present to monitor project activities within or adjacent to suitable habitat.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. No other State, Tribal, local or private actions are anticipated in the action area within the foreseeable future.

The global average temperature has risen by approximately 0.6 degrees centigrade during the 20th Century (International Panel on Climate Change 2001, 2007; Adger et al 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (International Panel on Climate Change 2001, 2007; Adger et al. 2007), and that it is "very likely" that it is largely due to increasing concentrations of greenhouse gases (carbon dioxide, methane, nitrous oxide, and others) in the global atmosphere from burning fossil fuels and other human activities (Cayan 2005, EPA Global Warming webpage http://yosemite. epa.gov; Adger et al. 2007). Eleven of the twelve years between 1995 and 2006 rank among the twelve warmest years since global temperatures began in 1850 (Adger et al. 2007). The warming trend over the last fifty years is nearly twice that for the last 100 years (Adger et al. 2007). Looking forward, under a high emissions scenario, the International Panel on Climate Change estimates that global temperatures will rise another four degrees centigrade by the end of this Century; even under a low emissions growth scenario, the International Panel on Climate Change estimates that the global temperature will go up another 1.8 degrees centigrade (International Panel on Climate Change 2001). The increase in global average temperatures affects certain areas more than others. The western United

States, in general, is experiencing more warming than the rest of the Nation, with the 11 western states averaging 1.7 degrees Fahrenheit warmer temperatures than this region's average over the 20th Century (Saunders et al. 2008). California, in particular, will suffer significant consequences as a result of global warming (California Climate Action Team 2006). In California, reduced snowpack will cause more winter flooding and summer drought, as well as higher temperatures in lakes and coastal areas. The incidence of wildfires in the Golden State also will increase and the amount of increase is highly dependent upon the extent of global warming. No less certain than the fact of global warming itself is the fact that global warming, unchecked, will harm biodiversity generally and cause the extinction of large numbers of species. If the global mean temperatures exceed a warming of two to three degrees centigrade above pre-industrial levels, twenty to thirty percent of plant and animal species will face an increasingly high risk of extinction (International Panel on Climate Change 2001, 2007). The mechanisms by which global warming may push already imperiled species closer or over the edge of extinction are multiple. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (International Panel on Climate Change 2001, 2007; California Climate Action Team 2006; Lenihan et al. 2003). Extreme events, in turn may cause mass mortality of individuals and significantly contribute to determining which species will remain or occur in natural habitats.

Conclusion

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area; the effects of the proposed SR-9 Storm Damage Repair Project and the cumulative effects; it is the Service's biological opinion that the project, as proposed, is likely to adversely affect this species, but is not likely to jeopardize its continued existence. This determination is based on our opinion that the magnitude of the effects of this action does not appreciably reduce the likelihood of both the survival and recovery of this species in the wild.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by Caltrans so that they become binding conditions of any grant or permit issued to Caltrans, as appropriate, in order for the exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If Caltrans (1) fails to require Caltrans to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

California Red-Legged Frog

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect due to their cryptic nature and wariness of humans. Losses of this species may also be difficult to quantify due to a lack of baseline survey data and seasonal/annual fluctuations in their numbers due to environmental or human-caused disturbances. Due to the difficulty in quantifying the number of California red-legged frogs that will be taken as a result of the proposed action, the Service is quantifying take incidental to the proposed action as the mortality/injury of no more than one California red-legged frog and the harassment of all California red-legged frogs inhabiting or utilizing the 9.54 acre action area. The Service anticipates that take of juvenile and adult life history stages may be killed, harmed or harassed as a result of habitat loss/degradation, construction-related disturbance, or capture and relocation efforts. Take of eggs or larvae is not authorized based on the project design that avoids work within Saratoga Creek and the implementation of the proposed conservation measures. Therefore, take of eggs or larvae are not anticipated. Upon implementation of the following Reasonable and Prudent Measures, all juvenile and adult California red-legged frogs within the action area in accordance with the amount and type of take outlined above will become exempt from the prohibitions described under section 9 of the Act. No other forms of take are authorized under this opinion.

Effect of the Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the California red-legged frog.

Reasonable and Prudent Measures

The Service has determined that the following reasonable and prudent measure is necessary and appropriate to minimize impacts of incidental take of California red-legged frog:

1. Minimize the effects to the California red-legged frog.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Caltrans must comply with the following terms and conditions, which implement the reasonable and prudent measure, described above and outline required reporting/monitoring requirements. These Terms and Conditions are nondiscretionary.

The following Terms and Conditions implement the Reasonable and Prudent Measure number 1:

1. **Compliance with Biological Opinion.** Caltrans shall include Special Provisions that include the Conservation Measures and the Terms and Conditions of this biological opinion in the solicitation for bid information for all contracts for the project that are issued by them to all contractors. Caltrans shall require all contractors and subcontractors to comply with the Act in the performance of the proposed action and shall perform the action as outlined in the Project Description of this biological opinion as provided by Caltrans in the Biological Assessment dated March 2014, and all other supporting documentation submitted to the Service in support of the action. Changes to the Project Description or performance of work outside the scope of this biological opinion are subject to the requirements of reinitiation of formal consultation.

2. **Implementation of Biological Opinion.** Caltrans shall ensure the Resident Engineer or their designee shall have full authority to implement and enforce all Conservation Measures and Terms and Conditions of this biological opinion. The Resident Engineer or their designee shall maintain a copy of this biological opinion onsite whenever construction is in progress. Their name(s) and telephone number(s) shall be provided to the Service at least 30 calendar days prior to groundbreaking at the project.

3. **Wildlife Exclusion Fencing.** Prior to the start of construction, WEF will be installed at the edge of the project footprint in all areas where California red-legged frogs could enter the construction area. The location of the fencing shall be determined by the Resident Engineer and Service-approved biologist in cooperation with the Service prior to the start of staging or surface disturbing activities. The location, fencing materials, installation specifications, and monitoring and repair criteria shall be approved by the Service prior to start of construction. Caltrans shall include the WEF specifications on the final project plans. Caltrans shall include the WEF specifications including installation and maintenance criteria in the bid solicitation package special provisions. The WEF shall remain in place throughout the duration of the project and shall be regularly inspected and fully maintained. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion the WEF shall be completely removed, the area cleaned of debris and trash, and returned to natural conditions.

4. **Biological Monitor Approval and Stop Work Authority**. The qualifications of all proposed Service-approved biological monitors shall be presented to the Service for review and written approval at least 30 calendar days prior to project initiation. The Service-approved biological monitors shall keep a copy of this biological opinion in his/her possession when onsite. The Service-approved biological monitors shall communicate through the Resident Engineer or their designee, verbally, by telephone, email, or hardcopy with Caltrans personnel, construction personnel or any other person(s) at the project site or otherwise associated with the project to ensure that the terms and conditions of this biological opinion are met. The Service-approved biologist(s) through communication with the Resident Engineer shall have oversight over implementation of the Terms and Conditions in this Biological Opinion, and shall have the authority to stop project activities if they determine any of the requirements associated with these Terms and Conditions are not being fulfilled. If the Service-approved biologist(s) exercises this authority, the Service shall be notified by telephone and email within 24 hours. The Service contact is Coast-Bay/Forest Foothills Division Chief of the Endangered Species Program, Sacramento Fish and Wildlife Office at telephone (916) 414-6600.

5. **Biological Monitoring Records**. The Service-approved biologist(s) shall maintain monitoring records that include: (1) the beginning and ending time of each day's monitoring effort; (2) a statement identifying the listed species encountered, including the time and location of the observation; (3) the time the specimen was identified and by whom and its condition; and (4) a description of any actions taken. The Service-approved biologist(s) shall maintain complete records in their possession while conducting monitoring activities and shall immediately surrender records to the Service, CDFW, and/or their designated agents upon request. If requested, all monitoring records shall be provided to the Service within 30 of the completion of monitoring work.

6. **Agency Access**. If verbally requested through the Resident Engineer or Construction Inspector, before, during, or upon completion of ground breaking and construction

activities, Caltrans shall ensure the Service or their designated agents can immediately and without delay, access and inspect the project site for compliance with the proposed project description, conservation measures, and terms and conditions of this Biological Opinion, and to evaluate project effects to the California red-legged frog and its habitat.

California Red-Legged Frog Protective Measures

7. **Inclement Weather Restrictions**. No work shall occur during or within 24 hours following a rain event exceeding 0.2-inch as measured by the NOAA National Weather Service for the Los Gatos, CA (LSGC1) base station available at: http://www.wrh.noaa.gov/mesowest/getobext.php?wfo=mtr&sid=LSGC1&num=72&raw=0. Service-approval to continue work during or within 24 hours of a rain event shall be considered on a case-by-case basis.

8. **Proper Use of Erosion Control Devices**. To prevent California red-legged frogs from becoming entangled, trapped, or injured, erosion control materials that use plastic or synthetic monofilament netting will not be used within the action area. This includes products that use photodegradable or biodegradable synthetic netting, which can take several months to decompose. Acceptable materials include natural fibers such as jute, coconut, twine or other similar fibers.

9. **Biological Monitoring**. A Service-approved biologist(s) shall be onsite during all activities that may result in take of California red-legged frogs as determined by the Service. A minimum of one Service-approved biologist shall be on-site throughout the project duration. However, an adequate number of Service-approved biologists to monitor the effects of the project on the California red-legged frog. The Service will consider the implementation of specific project activities without the oversight of an on-site Service-approved biologist on a case-by-case basis.

10. **Preconstruction and Daily Surveys**. Preconstruction surveys shall be conducted by a Service-approved biologist immediately prior to the initiation of any ground disturbing activities and vegetation clearing that may result in take of California red-legged frogs as determined by the Service. All suitable aquatic and upland habitat including refugia habitat such as dense vegetation, small woody debris, refuse, burrows, etc., shall be thoroughly inspected. The Service-approved biologist(s) shall conduct clearance surveys at the beginning of each day and regularly throughout the workday when construction activities are occurring that may result in take of California red-legged frogs as determined by the Service. If a California red-legged frog is observed, the Service-approved biologist shall implement the species observation and handling protocol outlined below.

11. **Protocol for Species Observation and Handling**. If a California red-legged frog is encountered in the action area, work activities within 50 feet of the individual shall cease immediately and the Resident Engineer and Service-approved biologist shall be notified. Based on the professional judgment of the Service-approved biologist, if project activities can be conducted without harming or injuring the California red-legged frog, it may be left at the location of discovery and monitored by the Service-approved biologist. All project personnel will be notified of the finding and at no time shall work occur within 50 feet of the frog without a Service-approved biologist present. If it is determined by the Service-approved biologist that relocating the California red-legged frog is necessary, the following steps shall be followed:

a. Prior to handling and relocation, the Service-approved biologist will take precautions to prevent introduction of amphibian diseases in accordance with the *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (Service 2005). Disinfecting equipment and clothing is especially important when biologists are coming to the action area to handle amphibians after working in other aquatic habitats.

b. California red-legged frogs shall be captured by hand, dipnet or other Service-approved methodology, transported by hand, dipnet or temporary holding container, and released as soon as practicable the same day of capture. Handling of California red-legged frogs shall be minimized to the maximum extent practicable. Holding/transporting containers and dipnets shall be thoroughly cleaned, disinfected, and rinsed with freshwater prior to use within the action area.

c. California red-legged frogs shall be captured by hand, dipnet, or other Service-approved methodology, transported and relocated to nearby suitable habitat outside of the work area and released in a safe area on the same side of SR-9 where it was discovered. The individual(s) shall be released within the Caltrans right-of-way only if suitable habitat exists and would not pose a risk to the animal's survival or well-being. Otherwise, they shall be released at a location subject to the approval of the property owner. If suitable habitat cannot be identified, the Service shall be contacted to determine an acceptable alternative. The Service shall be notified within 24 hours of all capture, handling, and relocation efforts.

Reporting Requirements

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, Caltrans shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, Caltrans must reinitiate formal consultation as per 50 CFR 402.16.

1. The Service must be notified within one (1) working day of the finding of any injured or dead listed species or any unanticipated damage to its habitat associated with the proposed project. Notification will be made to the Coast-Bay/Forest Foothills Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600, and must include the date, time, and precise location of the individual/incident clearly indicated on a U.S. Geological Survey 7.5 minute quadrangle or other maps at a finer scale, as requested by the Service, and any other pertinent information. When an injured or dead individual of the listed species is found, Caltrans shall follow the steps outlined in the Disposition of Individuals Taken section below.

2. Other pertinent reporting information such as monitoring reports (if not included as a term and condition), notification of project completion/implementation, etc. including when this information is due to the Service.

Disposition of Individuals Taken

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a

freezer located in a secure site, until instruction s are received from the Service regarding the disposition of the dead specimen. The Service contact persons are the Coast-Bay/Forest Foothills Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600; and the Resident Agent-in-Charge of the Service's Office of Law Enforcement, 5622 Price Way, McClellan, California 95562, at (916) 569-8444.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. Caltrans District 4 should work with the Service to develop a conservation strategy that would identify the current safe passage potential along Bay Area highways and the areas where safe passage for wildlife could be enhanced or established.

2. Caltrans should assist the Service in implementing recovery actions identified in the *Recovery Plan for the California Red-legged Frog* (Service 2002).

3. Caltrans should consider participating in the planning for a regional habitat conservation plan for the California red-legged frog and other listed species.

4. Caltrans should consider establishing functioning preservation and creation conservation banking systems to further the conservation of the California red-legged frog and other appropriate species. Such banking systems also could possibly be utilized for other required mitigation (i.e., seasonal wetlands, riparian habitats, etc.) where appropriate. Efforts should be made to preserve habitat along roadways in association with wildlife crossings.

5. Roadways can constitute a major barrier to critical wildlife movement. Therefore, Caltrans should incorporate culverts, tunnels, or bridges on highways and other roadways that allow safe passage by the California red-legged frog and other listed species. Efforts should be made to establish upland culverts designed specifically for wildlife movement rather than accommodations for hydrology. Transportation agencies should also acknowledge the value of enhancing human safety by providing safe passage for wildlife in their early project design.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION--CLOSING STATEMENT

This concludes formal consultation on the SR-9 Storm Damage Repair Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or

critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any additional take will not be exempt from the prohibitions of section 9 of the Act, pending reinitiation.

If you have any questions regarding this biological opinion on the proposed SR-9 Storm Damage Repair Project, Santa Clara County, California, contact Jerry Roe or Ryan Olah at the letterhead address or at (916) 414-6600.

Sincerely,

Jennifer M. Norris
Field Supervisor

cc:
Melissa Escaron, California Department of Fish and Wildlife, Napa, California

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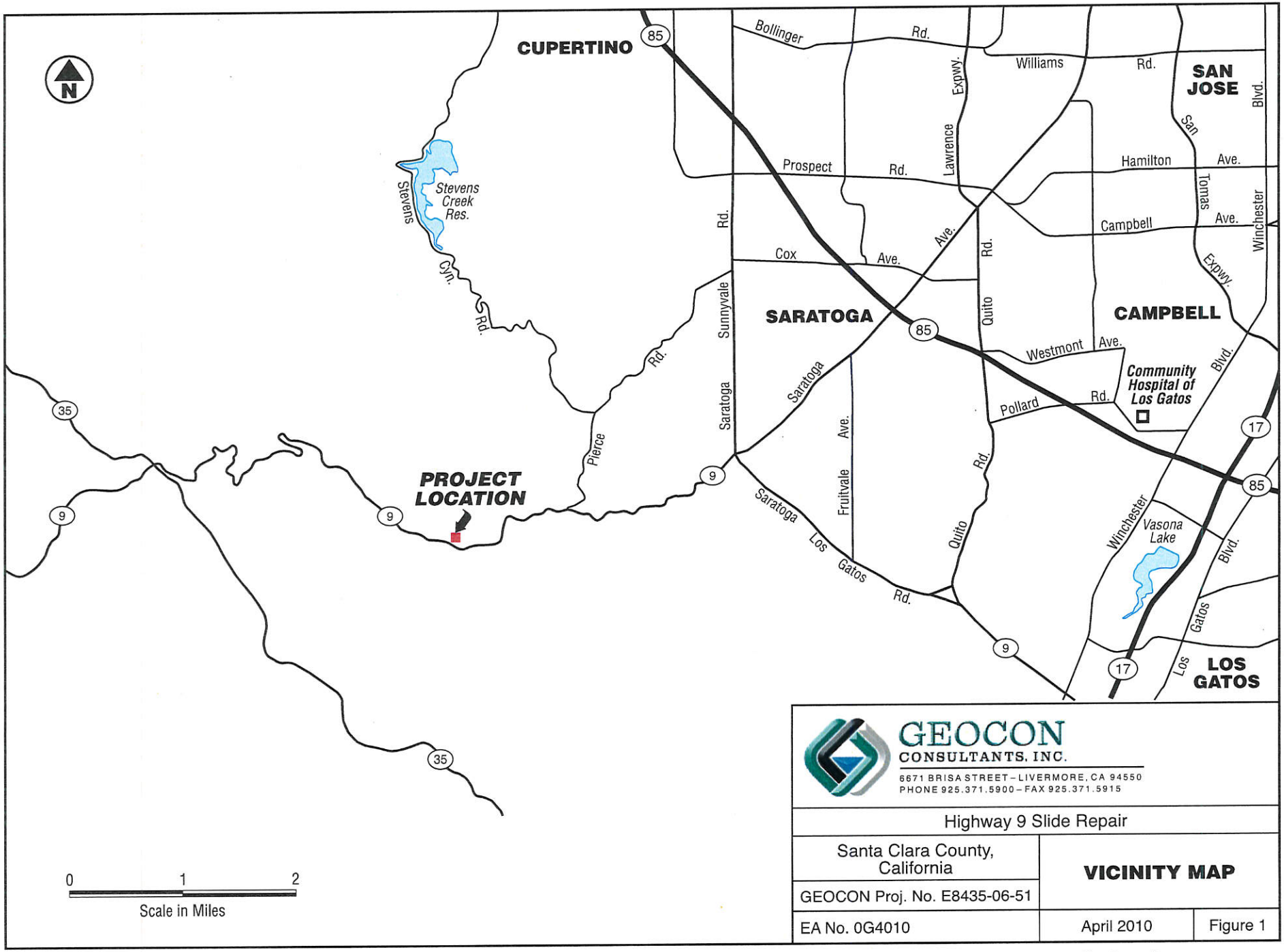
CALTRANS EA 0G4010

APRIL 2010

For EA 04-2G9601



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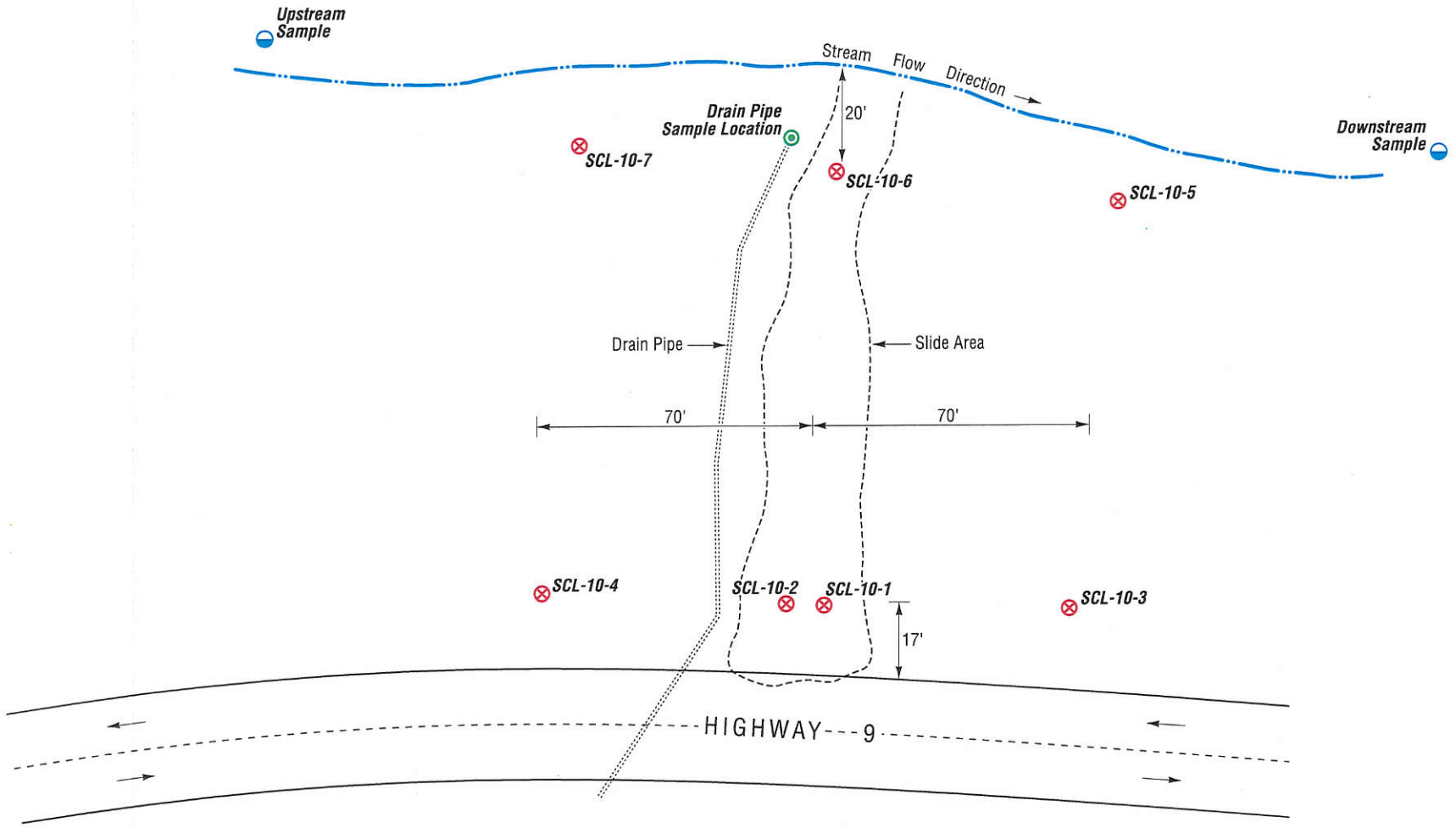
Highway 9 Slide Repair		
Santa Clara County, California	**VICINITY MAP**	
GEOCON Proj. No. E8435-06-51		
EA No. 0G4010	April 2010	Figure 1

For EA 04-2G9601



LEGEND:

- SCL-10-2 — Approximate Hand-Auger Sample Location
- Downstream Sample — Approximate Water Sample Location
- Drain Pipe Sample Location — Approximate Drain Pipe Sample Location

NOT TO SCALE

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Highway 9 Slide Repair

Santa Clara County, California

GEOCON Proj. No. E8435-06-51

EA No. 0G4010

SAMPLE LOCATION MAP

April 2010

Figure 2

TABLE 1
Summary of Lead and pH Results - Soil
SR-9, PM 4.6
Santa Clara County, California

Sample ID	Sample Depth (feet)	Estimated Pre-slide Sample Depth (feet)	Total Lead (mg/kg)	WET / DI-WET Lead (mg/l)	pH
SCL-10-1-0.5	0.5	6.5	10	---	---
SCL-10-1-1.5	1.5	7.5	9.9	---	6.9
SCL-10-2-0.5	0.5	6.5	11	---	---
SCL-10-2-1.0	1	7	14	---	---
SCL-10-2-2.0	2	8	130	4.2 / <0.25	---
SCL-10-2-2.5	2.5	8.5	12	---	---
SCL-10-2-3.5	3.5	9.5	7.7	---	6.3
SCL-10-2-4.0	4	10	7.1	---	---
SCL-10-3-0.5	0.5	0.5	25	---	---
SCL-10-3-1.0	1	1	8.2	---	---
SCL-10-3-2.0	2	2	7.1	---	---
SCL-10-3-2.5	2.5	2.5	5.5	---	5.8
SCL-10-3-3.0	3	3	6.5	---	---
SCL-10-3-4.0	4	4	9.6	---	---
SCL-10-4-0.5	0.5	0.5	34	---	---
SCL-10-4-1.5	1.5	1.5	19	---	6.5
SCL-10-4-2.0	2	2	23	---	---
SCL-10-5-0.5	0.5	0.5	11	---	---
SCL-10-5-1.5	1.5	1.5	12	---	6.5
SCL-10-5-2.5	2.5	2.5	---	---	6.3
SCL-10-5-3.0	3	3	10	---	---
SCL-10-6-0.5	0.5	4.5	10	---	---
SCL-10-6-1.5	1.5	5.5	11	---	6.7
SCL-10-7-0.5	0.5	0.5	21	---	---
SCL-10-7-1.5	1.5	1.5	20	---	6.1

Notes:

mg/kg = Milligrams per kilogram

mg/l = Milligrams per liter

WET / DI-WET = Waste Extraction Test / Deionized Water Waste Extraction Test

--- = Not analyzed

< = Not detected above the stated laboratory reporting limit

TABLE 3
Summary of Total Petroleum Hydrocarbons Results - Soil
SR-9, PM 4.6
Santa Clara County, California

Sample ID	Sample Depth (ft)	Estimated Pre-slide Sample Depth (ft)	TPHg (mg/kg)	TPHd (mg/kg)
SCL-10-1-1.5	1.5	7.5	<1.0	2.3
SCL-10-2-1.0	1	7	---	<1.0
SCL-10-2-2.0	2	8	<1.0	---
SCL-10-2-4.0	4	10	<1.0	1.8
SCL-10-3-1.0	1	1	---	5.5
SCL-10-3-2.0	2	2	<1.0	---
SCL-10-3-4.0	4	4	<1.0	1.4
SCL-10-4-1.5	1.5	1.5	<1.0	2.3
SCL-10-5-3.0	3	3.0	<1.0	1.4
SCL-10-6-1.5	1.5	5.5	<1.0	3.6
SCL-10-7-1.5	1.5	1.5	<1.0	1.6
		ESLs		
		Residential	83	83
		Commercial/Industrial	83	83
		Construction Worker Exposure	4,200	4,200

Notes: ---

mg/kg = Milligrams per kilogram

TPHg = Total petroleum hydrocarbons as gasoline

TPHd = Tptal petroleum hydrocarbons as diesel

--- = Not analyzed

< = Not detected above the stated laboratory reporting limit

ESLs = Environmental Screening Levels, Tables A and K-3, SFRWQCB, May 2008

TABLE 4
Summary of NOA Results - Soil
SR-9, PM 4.6
Santa Clara County, California

Sample ID	Sample Depth (feet)	Estimated Pre-slide Sample Depth (ft)	Asbestos Content (% dry weight)
SCL-10-1-1.0	1	7	None Detected
SCL-10-2-1.5	1.5	7.5	None Detected
SCL-10-2-3.0	3	9	None Detected
SCL-10-3-1.5	1.5	1.5	None Detected
SCL-10-3-3.5	3.5	3.5	None Detected
SCL-10-4-1.0	1	1	None Detected
SCL-10-4-2.5	2.5	2.5	None Detected
SCL-10-5-1.0	1	1	None Detected
SCL-10-5-2.0	2	2	None Detected
SCL-10-6-1.0	1	5	None Detected
SCL-10-7-1.0	1	1	None Detected

Note:
None Detected = Not detected above 25% target analytical sensitivity

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Flex your power!
Be energy efficient!

To: GHULAM POPAL
Senior Transportation Engineer
Design North/SHOPP

Attn: Emarnan Pongpairoj

Date: March 28, 2016

File: Project ID 0412000010
EA: 04-2G9601
04-SCL- 9 PM 4.6/4.7
Storm Damage Repair

From: SAMIA ARA, P.E.
Materials Design Engineer
Engineering Services – Materials B

Concurred by: RICHARD M. CHAN, P.E.
District Materials Engineer
Branch Chief, Materials B

Lic. 10 [illegible]
Exp. 6/30/16
STATE OF CALIFORNIA

Subject: Materials Recommendations for Replacement Pavement (Revised)

This memo is in response to your request for materials recommendation for a slide repair project located in Santa Clara County near City of Saratoga on Route 9, at 0.3 miles south of Sanborn Road. The project proposes to repair existing pavement damage and repair the road embankment slide by constructing a lightweight concrete retaining wall.

From a review of proposed improvement plans prepared by Caltrans Geotechnical and provided by your office we understand that the proposed slide repair will involve excavation of the existing geogrid reinforced embankment of westbound Route 9, starting from 4 feet from the centerline to a depth of 10' below existing pavement surface, and reconstructing the embankment with lightweight cellular concrete backfill to minimize the on-going pavement settlements at this location. New asphalt pavement will be constructed over this cellular concrete backfill extending the entire excavation width which will include outer 8 feet of westbound travelled way and shoulder. The scope of proposed project also includes overlay of remaining existing pavement outside of the excavated area. As stated by your office, the total length of slide repair for this project is estimated to be on the order of 100 feet.

Route 9 within the project limits is a winding two lane undivided highway with narrow shoulders. Soft median barrier consisting of centerline rumble strip is present within the project extent. As observed on the Google Street View Maps, existing asphalt patch indicating continuous settlement within the slide area is present within most of the westbound pavement at the slide location. The asphalt surface outside of the existing patch also shows distress including longitudinal cracks.

From a review of available as-built plans we identify that;

- Slide repair of this area was performed by reconstructing the embankment slope with geosynthetic reinforcement in 2010 (Contract #04-0G4014, as-built dated 11/03/2010). As

part of this project, new pavement structure was constructed for majority of westbound pavement using 0.5' HMA (A)/1.0' AB (2).
- Centerline rumble strip was installed in 2009 (Contract #04-3A0704, as-built dated 06/04/2009).
- The project location was overlaid with 0.10' OGAC in 2005 (Contract #04-2R2904, as-built dated 01/03/2005).

As stated above, the new pavement for this project will be placed on the cellular concrete and include approximately 8' of outer westbound travelled way and a narrow shoulder. Considering the limited extent of new pavement for this project and limited width of proposed shoulder, we recommend using same pavement section for travelled way and shoulder.

To calculate the pavement structural section for travelled way and shoulder, we have used a traffic index of 8.5 (provided by your office). The proposed lightweight cellular concrete underneath the pavement structure will act as the subgrade material to support the new pavement structure.

We recommend the proposed new pavement structure for travelled way and shoulder be constructed using 0.65' thick full depth Hot Mix Asphalt - Type A (HMA-A).

Existing pavement to remain, outside of excavation for proposed slide repair, should be overlaid with 0.25' HMA-A. This 0.25' overlay is chosen to match the 0.25' thick notch at structure slab above the proposed retaining wall. Prior to overlay, existing asphalt surface should be cold planned for the same thickness. This will maintain the existing profile grade and also remove the exiting OGAC surface layer prior to new overlay (a D-4 practice). This overlay should be placed in conjunction with the top 0.25' HMA-A layer for the new pavement over slide repair area.

Please note that the recommended cold planning and overlay operations within the slide repair area will remove the existing centerline rumble strip. Hence, to maintain the present safety situation, the centerline rumble strip should be re-installed following new asphalt overlay.

Prior to overlay, a field review should be conducted to locate specific areas of severe failure such as rutting greater than ½", extensive alligator and transverse cracking, and/or loose or spalled pavement. These areas should be dug-out by removing the existing asphalt up to a maximum depth of 0.5' and backfilled with new HMA-A.

If you have any questions, please call Samia Ara at 622-8794.

c: RChan, SAra, Route File, Daily File
SA/SCL 9 – Storm Damage Repair

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Serious drought
Help Save Water!

To: MR. RICHARD MELKO
Office of Structures Design

Date: May 11, 2016

Attention: R. Candiotti
R. Guraya

File: 4-SCL-09- PM 4.64
04 – 2G9604
E-FIS 0412000010
Special Design L-Shaped
Retaining Wall- Storm Damage

From: HOOSHMAND NIKOUI, PE
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

RONALD KARPOWICZ, CEG
Engineering Geologist
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: **FOUNDATION REPORT (FR)**

This revised Foundation Report (FR) is prepared to provide geotechnical recommendations for the proposed retaining wall to mitigate a storm damage on State Route 9 at PM 4.64 just north of the city of Saratoga in Santa Clara County. Please refer to Figure 1 for location map. This FR supersedes the FR dated October 13, 2015. Please discard the October 13, 2015 report.

1. SCOPE OF WORK

The following tasks were performed for the preparation of this FR:

- Field Inspection
- Review of the Geotechnical Files
- Preparation of this Foundation Report (FR)

2. PROJECT DESCRIPTION/HISTORY

In 2010, a combination of Rock Slope Protection (RSP) and Geosynthetic Reinforced Embankment (GRE) was constructed to mitigate a severe washout at this exact location. The combination of RSP and GRE was constructed (but not according to the plans) and roadway was open to traffic. However, during construction, when the GRE reached about 10 feet below the finished roadway elevation, it was noticed that the proposed roadway hinge point will be missed drastically, if continue using the same slope angle of 1.3H:1V.

It was decided in construction without consultations with this office (Geotechnical Design West) and the Project Management to sharpen the slope (the top 10 ft) of the GRE to about 1:1 or

possibly steeper which unfortunately still was not enough to provide the required 4 - 5 feet shoulder. Due to the lack of shoulder, a K-rails was placed alone the edge of the pavement at the hinge point by Maintenance forces to protect the traffic. Due to the sharpness of the slope and other factors such as inadequate compaction and inadequate embedment depth of geogrid, the roadway within the GRE limits has settled about an inch and may continue settle in the future.

After a site visit with all parties involve, and discussed several options such as soldier pile wall, bridge and viaduct, this office recommended to excavate and remove the existing GRE to a maximum depth of 10 to 12 feet and construct an L-shaped concrete retaining wall (specially designed) with lightweight cellular concrete backfill. The advantages of this earth retaining system over other options mentioned are as follows:

1. Removing the entire inadequately modified portion of the GRE during construction;
2. Constructing a much more economical earth retaining system which do not required deep foundation going through the existing geogrid layers;
3. The use of lightweight cellular concrete backfill would reduce the total weight of the structure over the remaining GRE and eliminate any future settlement;
4. Lightweight cellular concrete backfill is self-standing and will exert none to very minimal active pressure against the wall;
5. The proposed cross culvert replacement can easily be constructed through the proposed L-Shaped retaining wall's system;
6. Will provide enough room for the required shoulder width; and
7. More economical than other options considered.

3. EXCEPTION TO POLICY

There is no known exception to Department policy relating to the investigation of the structure.

4. FIELD INVESTIGATION AND TESTING PROGRAM

Two borings where drilled, one west of the existing GRE on the turnout area and one near the centerline of the roadway in the middle but outside of the GRE zone. No foundation explorations were necessary for the proposed wall foundation since the entire retaining wall will be constructed on engineered Geosynthetic Reinforced Embankment (GRE) with adequate bearing capacity. For more information regarding these two borings refer to Section 7 of this report.

5. GEOLOGIC SETTING

5.1 Regional Geologic Overview

The project is located in the Coast Range Geomorphic Province of Central California, a series of northwest-trending mountain ranges (2,000 to 4,000, occasionally 6,000 feet elevation above sea level), and intermountain valleys, bounded in the east by the Great Valley and to the west by the Pacific Ocean. The Coast Ranges are composed of thick Cenozoic sedimentary and volcanic strata overlying Mesozoic metamorphic basement rock. The northern and southern ranges are separated by a depression containing the San Francisco Bay. The Coast Range is sub parallel to the active San Andreas Fault, which is more than 600 miles long, extending from Pt. Arena to the Gulf of California.

5.2 Site Geology

The site is located in the foothills of the Santa Cruz Mountains, a northwest-trending range within the California Coast Ranges geomorphic province. The site is situated along the northeast flank of a northwest trending rift valley at an approximate elevation of 940 feet above mean sea level. According to the Geologic Map of the Palo Alto 30' x 60' quadrangle (Brabb and others, 2000) the site is located in an area underlain by Eocene age (approximately 33.7 to 41.3 million years old) unnamed sedimentary rocks (Tu). The relevant portion of the geologic map is included as Figure 2, Vicinity Geologic Map.

5.3 Geologic Hazards

The site may be affected by activity along any of the active faults discussed above. Earthquake induced hazards can be categorized as primary and secondary seismic effects.

Primary seismic effects such as ground rupture or surface deformation resulting from differential movement along a fault trace are not expected to occur on the site since there are no active faults mapped within the project limits.

Secondary seismic effects result from various soil responses to ground acceleration. These effects result from activity of any nearby active faults.

- Liquefaction of Natural Ground – Liquefaction is a process by which soil deposits below the water table temporarily lose strength and behave as a viscous liquid rather than a solid, typically during a moderate to large earthquake. In general, very loose to medium dense, clean fine- to medium-grained sand, and very soft to firm, low plasticity silts that are relatively free of clay are most susceptible to liquefaction. Earthquake-induced ground

shaking can cause these loose or soft materials to densify, resulting in increased pore water pressures and an upward movement of groundwater that may result in a liquefied condition. Depending on the weight of the structure, the depth to the liquefied stratum and the nature of the overlying soils, structures situated above such temporarily liquefied soils may sink or tilt, causing significant structural damage. According to the Liquefaction Susceptibility Map, the project is not located in an area with a potential for liquefaction. (See Figure 3, Liquefaction Susceptibility Map).

- Cracking – Lurch cracks may develop in the silty and clayey soil overlying the site. The potential for lurch cracking will be higher in the rainy periods when the soil is saturated. The hazard from cracking is considered minimal.

- Differential Settlement – During moderate to large earthquakes, soft or loose soil can densify and consolidate, often unevenly across a site. The hazard from differential settlement is considered minimal given that the project will be constructed in accordance with the recommendations of this report.

- Ground Shaking - As noted in the Seismicity Section above, moderate to large earthquakes are probable along several active faults in the greater Bay Area. Therefore, strong ground shaking should be expected at some time during the design life of the proposed development. The improvements should be designed in accordance with current earthquake resistant standards.

- Shrink Swell - The expansion and/or contraction of clayey soil can cause foundations to shift and roadways to crack. Due to the lack of clayey soil at the site, the potential for shrink swell to impact the project is considered low.

6. REGIONAL SEISMICITY AND FAULTS

6.1 Faulting and Seismicity

The San Francisco Bay Area is one of the most active seismic regions in the United States. Three major faults trend northwest through the Bay Area and have generated about 12 earthquakes per century large enough to cause significant structural damage. These earthquakes occur on any of the numerous faults that are part of the San Andreas Fault system that extends for at least 700 miles along the California Coast.

The U. S. Geological Survey concluded that there is a 62 percent probability for at least one "large" earthquake of magnitude 6.7 or greater in the Bay Area before 2032. There could also be more than one earthquake of this magnitude and that numerous "moderate" earthquakes of about

magnitude 6 are probable before 2032. The San Andreas Fault is estimated to have a 21 percent probability of producing a magnitude 6.7 or larger earthquake by the Year 2032 (WGCEP, 2003). The probability of the Hayward, Calaveras, and Greenville Faults producing a similar size earthquake during the same time period is 27 percent, 11 percent and 3 percent, respectively (See Figure 4, San Francisco Bay Region Earthquake Probability Map).

6.2 Site

According to the latest California Seismic Hazard Map Version 2.0.4 (USGS, 2008), which is based on the United States Geological Survey (USGS) and California Geological Survey (CGS) maps, the nearest active faults are the Calaveras, Concord, and Mt Diablo Thrust faults. The site is not located in an Alquist-Priolo Earthquake Fault Zone. The San Andreas fault (Santa Cruz Mts) is a strike slip fault, has a Maximum Magnitude (Mmax) of 8, and is located approximately 0.3 miles to the southwest of the project. The San Andreas fault (Peninsula) is a strike slip fault, has a Mmax of 8 and is located approximately 2.7 miles northwest of the site. The Cascade fault is a reverse fault, has a Mmax of 6.7 and is located approximately 4.5 miles northeast of the site. The fault distances were measured on Google Earth and represent the horizontal distances from the fault traces or surface projections of the top of rupture planes to the project site.

6.3 Site Ground Motions

Since geophysical testing, including shear wave velocity, was not performed at the site, we determined the Vs30 based on the description of the subsurface material from the geologic map. Vs30 refers to the average shear wave velocity in the upper 30 meters of the soil/rock profile and is a measure of the near surface soil stiffness. As noted in the Site Geology section, the geologic map for the area indicates that the site is underlain by sedimentary bedrock. Based on the conditions described by the geologic map, we assigned a NEHRP class C to the site, which correlates to a shear wave velocity (Vs30) of 560 m/s, very dense soil and soft rock.

We generated Acceleration Response Spectrum (ARS) curves with the Caltrans Deterministic Seismic Hazard Analysis (DSHA) and Probabilistic Seismic Hazard Analysis (PSHA) version 2.0.4 using a 975-year return period (5% probability of exceedance in 50 years). The probabilistic and deterministic data generated from the curves are listed in table 1 below.

Table 1: Fault Data[1]

Fault Name	Distance: Miles	Fault ID:	Fault Type:	Maximum Magnitude (MMax):	Peak Ground Acceleration (g)	Hazard Analysis Type
San Andreas (Santa Cruz Mts) 2011 CFM	0.3	158	Strike-Slip	8	0.58	DSHA
San Andreas (Peninsula) 2011 CFM	2.7	134	Strike-Slip	8	0.47	DSHA
Cascade	4.5	153	Reverse	6.7	0.61	DSHA
Probabilistic Model USGS Seismic Hazard Map(2008) 975 Year Return Period					0.87	PSHA

7. SUBSURFACE INVESTIGATION

No foundation exploration for the wall foundation was necessary since the entire proposed retaining wall will be constructed on Geosynthetic Reinforced Embankment (GRE) which is compacted to 90% relative compaction.

As stated previously two borings (R-13-001 and R-13-002) were drilled outside of the proposed retaining wall limit and outside of the existing GRE zone. Both borings were drilled on September 2013 to depths ranging from 40 to 50 feet. The borings were advanced using continuous sampling methods. Soil samples were collected with split-spoon samplers that were driven with a 140-pound hammer repeatedly dropped from a height of 30 inches. The sampler consisted of a 2-inches outside diameter (OD) Standard Penetration Test (SPT) sampler.

We logged the borings in general in accordance with the CalTrans Soil and Rock Logging, Classification and Presentation Manual, 2010. The boring logs show our interpretation of the subsurface conditions at the location and on the date indicated and it is not warranted that these conditions are representative of the subsurface conditions at other locations and times. In addition, the stratification lines shown on the logs represent approximate boundaries between various soil materials and the transitions may be gradual.

Boring R-13-001 was excavated on the roadway directly above the existing GRE zone and Boring R-13-002 was excavated in the shoulder on the west side of the landslide. In general, our exploratory borings encountered fill, colluvial soil, and bedrock from the surface to the full depth explored of 50 feet. Both borings encountered fill consisting of medium dense gravel with clay

[1] http://dap3.dot.ca.gov/ARS_Online/index.php

from the ground surface to depths of approximately 7.5 to 10.5 feet. Below the fill, the borings encountered a 2-3 foot thick layer of colluvium consisting of medium dense clayey gravel. Below colluvium, all borings encountered Franciscan Mélange bedrock. The Franciscan Mélange bedrock consists of a highly variable mixture of relatively soft shale with random inclusions of relatively hard blocks of sandstone varying in size and distribution.

The log of test boring records will be submitted as part of Materials Information (no LOTBs were prepared) and the core boxes will be available for the contractors bid inquiries if requested.

In addition to the above boring information, the exposed surface of the landslide (which occurred in early February 2009 and repaired with RSP and GRE) was examined in February 2009. Based on the visual observation of the landslide scarp which was extended slightly into the WB lane, the upper 15 feet of material was composed of fill and colluvium consisting of silty sand and silty clay with gravel. Below the fill and colluvium, bedrock consisting of fractured siltstone and sandstone was exposed at the lower portion of the head scarp.

Groundwater was expected to be below the bottom level of the proposed wall and would not affect the wall construction.

8. FOUNDATION RECOMMENDATIONS

We recommend the following to permanently mitigate the slipout and to widen the roadway to provide adequate shoulder:

- Excavate to a depth of 12 feet (maximum) and as required (based on the wall height) below the roadway surface. Excavation on the roadway should be a minimum 3 feet from the roadway centerline as shown on the attached Exhibit A. Shoring will likely be required and may remain in place. The top 3 feet of the shoring below the roadway elevation must be removed.
- Scarify the exposed soil at the bottom of the proposed retaining wall to a depth of 8 inches moisture condition and re-compact to 95% relative compaction.
- Excavate for the retaining wall shear key.
- Construct the proposed L-Shaped retaining wall. The face of the wall should be positioned to provide at least a 3 feet wide bench at its base with 2 feet minimum cover.
- Excavate an underdrain trench (1.5' wide, 2' deep) adjacent to the proposed retaining's wall shear key and place filter fabric in the trench.
- Backfill the trench with 6 inches thick Class 3 Permeable Material (PM-3) and then place a 6 inches diameter perforated plastic pipe (PPP) over the PM-3.
- Place 2 feet wide strips of geo-composite drains at 5-6 feet center-center intervals on the face of the shoring and the excavated slope and extend and connect them to the underdrain trench.

- Backfill the remaining underdrain trench with Class 3 Permeable Material (PM-3) and cover with filter fabric. Then, place a 3.5 wide layer of geo-membrane to completely cover the top of the underdrain trench.
- Backfill the entire excavated area over and behind the retaining wall and against the shoring with lightweight cellular concrete as per the attached NSSP. Class III Cellular concrete with minimum compressive strength of 80 psi, the maximum unit weight of 36 pcf is recommended.
- Construct the Concrete Barrier Type 736 and roadway pavement.

Structure Design has provided foundation data and structure loads for the proposed L-Shaped retaining wall with cellular concrete backfill as shown in Table 2 and 3. The subsurface material directly below the proposed wall is engineered Geosynthetic Reinforced Embankment (GRE). Given that the top 8 inches of the engineered fill will be scarified, moisture conditioned and compacted to 95% relative compaction, we have estimated that the allowable bearing pressure of the foundation soil is about 5900 psf which substantially more than the gross uniform bearing stress of 2832 psf provided by Structure.

Please note the extreme limit state was considered not applicable since cellular concrete is a self-standing backfill material and produce no active pressure behind the wall. Also the service limit state was considered not applicable since cellular concrete weigh only about 35 pcf and after removing the heavy GRE and replacing it with the L-Shaped wall with cellular concrete backfill, no future settlement is expected.

Table 2. Retaining Wall Foundation Design Recommendations

District ERS ID	Segment (ft)		Strength I Limit State			Extreme I Limit State Factored			Extreme II Limit State Factored		
	Begin Station	End Station	Effective Foundation Width (ft)	Gross Uniform Bearing Stress (psf)	Factored Bearing Resist. φq_n, φ = 0.45 (psf)	Effective Foundation Width (ft)	Gross Uniform Bearing Stress (psf)	Factored Bearing Resist. $\varphi\ q_n\ \varphi$ = 1.0 (psf)	Effective Foundation Width (ft)	Gross Uniform Bearing Stress (psf)	Factored Bearing Resist. $\varphi\ q_n\ \varphi$ = 1.0 (psf)
37E0123	101+90	102+60	4.32	2832	5900	NA	NA	NA	NA	NA	NA

Table 3. Foundation Data Table

District ERS ID	Segment (ft)		Design Height (max) (ft)	Service Limit State Permissible Net Contact Stress (ksf)	Strength Gross Nominal Bearing Resistance for Controlling Load Case, φ_b = 0.45 (ksf)	Extreme Event Gross Nominal Bearing Resistance φ_b = 1.00 (ksf)
	Begin Station	End Station				
37E0123	101+90	102+60	10.75	NA	5.9	NA

The proposed L-Shaped retaining wall shall be designed based on the following:

Bearing Capacity

The allowable bearing capacity of the foundation soil is estimated to be about 5.9 ksf.

Lateral Earth Pressures

Although Cellular concrete is self-standing and would not produce active pressure behind the wall, for design purposes use the following for active earth pressure against the wall:

Internal friction angle ϕ=45 degrees and unit weight γ =35 pcf.

For traffic surcharge, use 240 psf.

For passive pressure use ϕ=30 and unit weight γ =120 pcf

9. CONSTRUCTION CONSIDERATIONS AND REQUIREMENTS

The following construction considerations and requirements should be included in the design and construction specifications for the proposed wall:

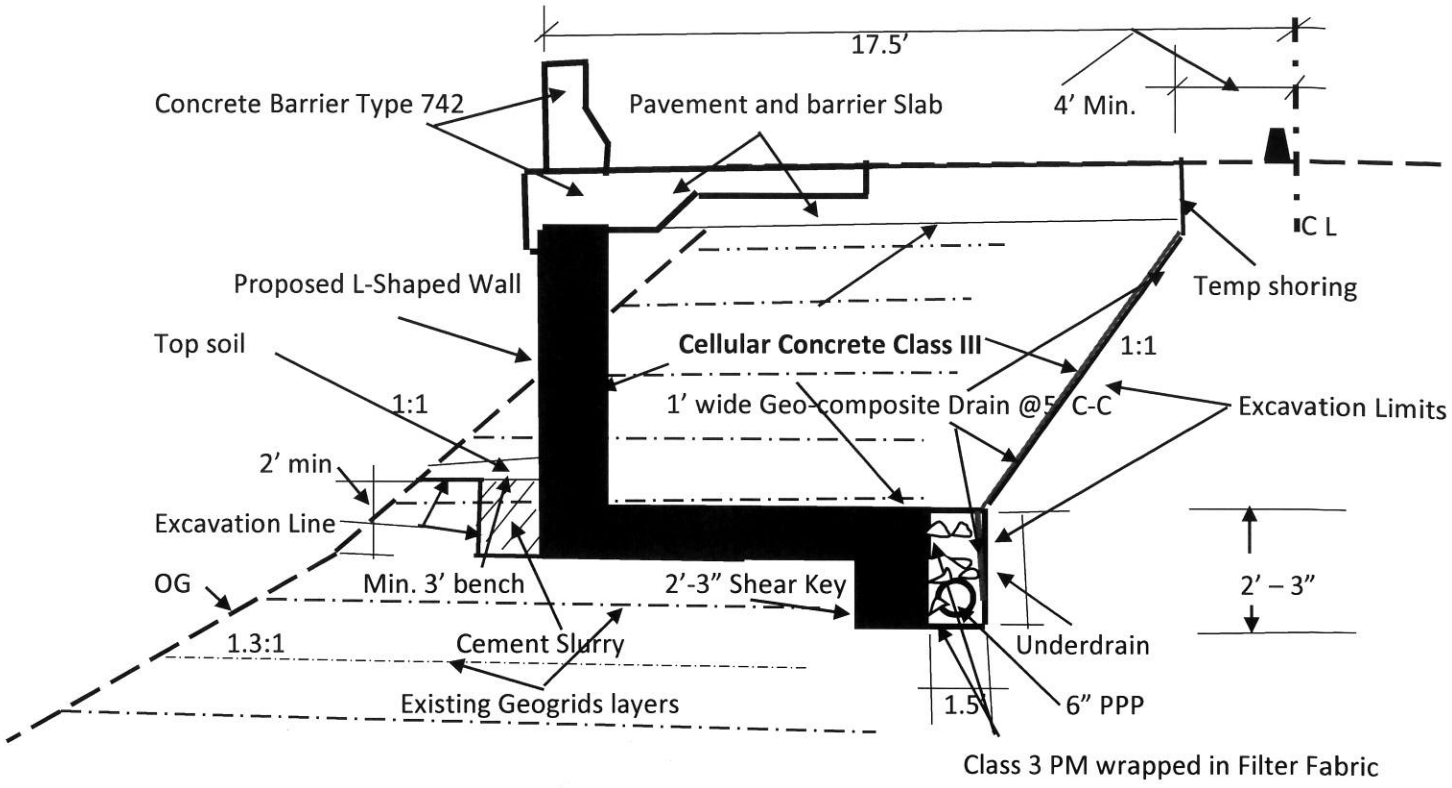
- The excavated material contain geosynthetic materials and may cause excavation difficulties.
- The bottom of the excavation must be inspected by representative of our Office before proceeding with retaining wall construction.
- Shoring will likely be required during excavation. There is none to very low possibility that the shoring will encounter geosynthetic (Geogrid) layers.
- For suggested backfill in front of the wall please refer to the attached Exhibit A.

* * * * *

Should you have any questions, please call Hooshmand Nikoui at (510) 286-4811.

c: TPokrywka, HNikoui, RKarpowicz, Slide File, Daily File

HNikoui/mm



Note 1: The exposed height of the temporary shoring to be determine based on geometry to achieve 1:1 temporary cut slope. The temporary shoring must remain in place only the top 3 feet needs to be removed.

Note 2: 3.5' wide strip of geomembrane must be placed and centered on top of the underdrain to prevent cellular concrete seeping through filter fabric into Class 3 PM.

Note 3: the Underdrain should be constructed after the footing and the shear key is constructed and cured. The underdrain shall be 2'- 3"deep and 1.5' wide.

Underdrain Details

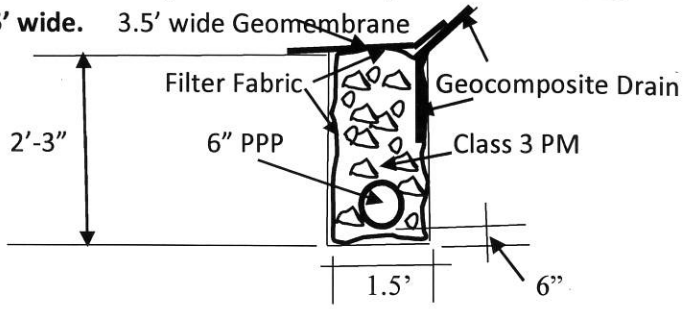


EXHIBIT A

Typical X-Section for L-Shaped Retaining Wall with Cellular Concrete Backfill

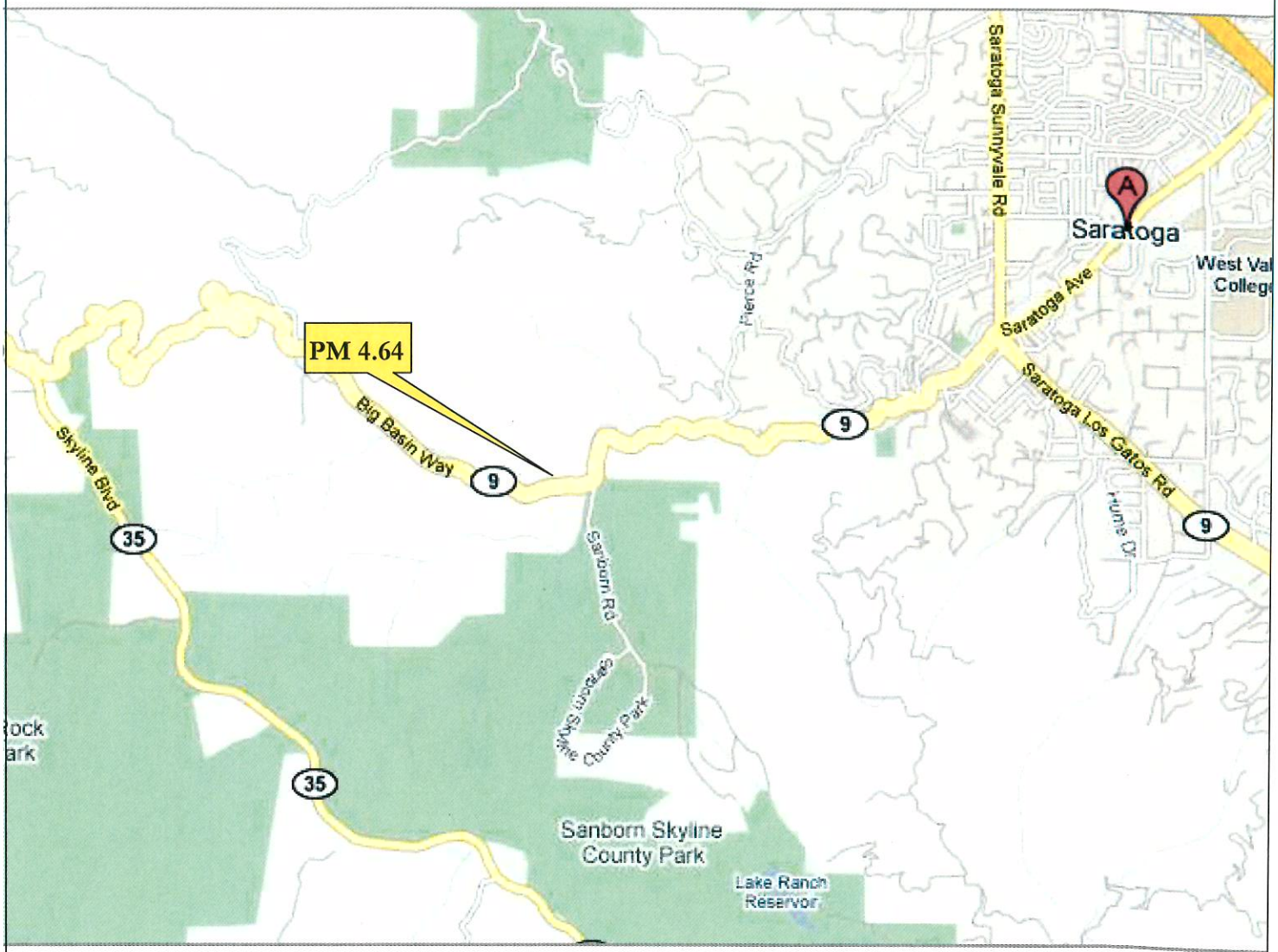
Conceptual Design

Not to Scale

SCL-9 PM 4.64

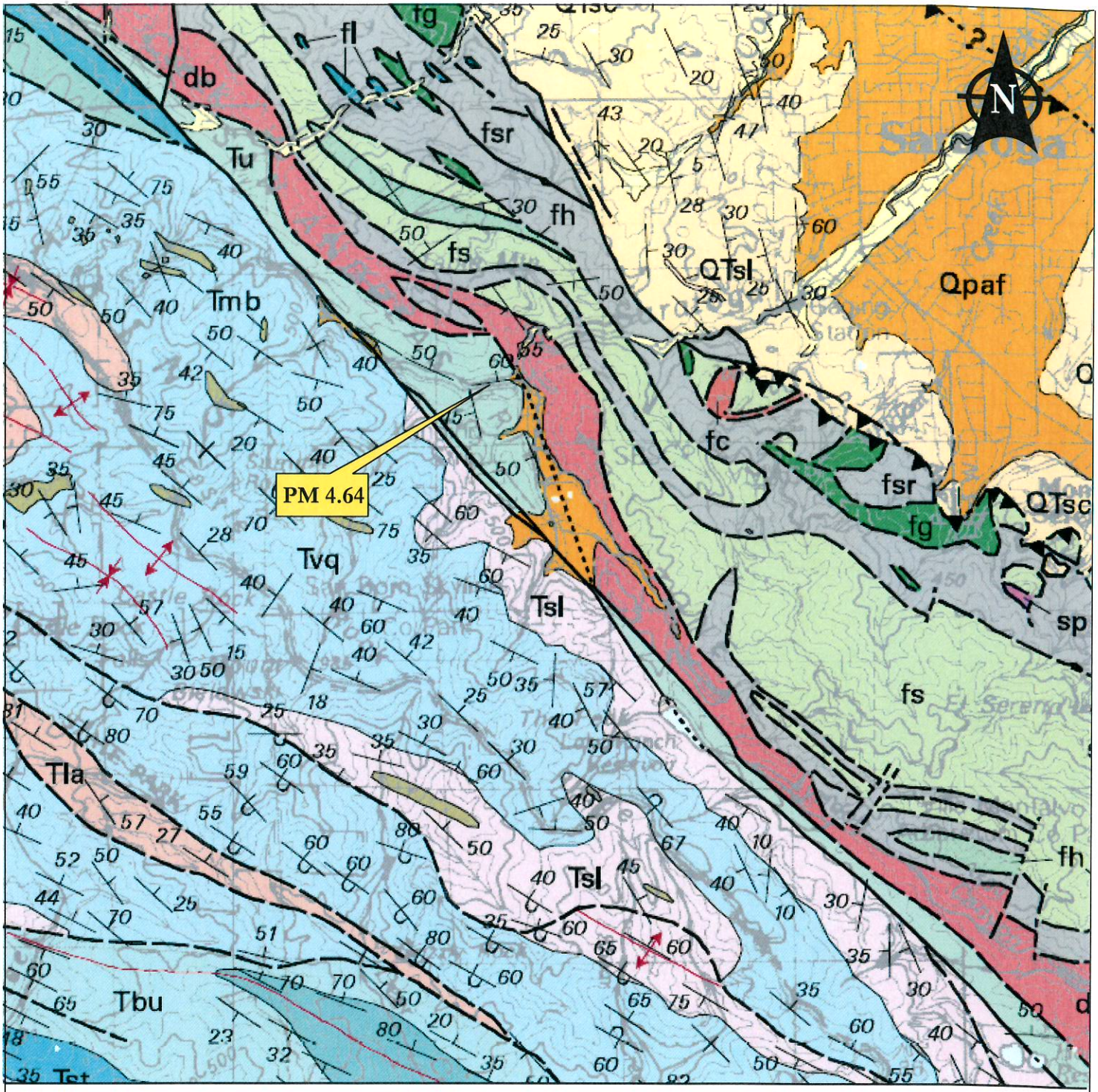
04-2G904, 0412000010

By: Hooshmand Nikoui, PE



Base: Google Maps

Caltrans	**STORM DAMAGE** **HIGHWAY 9, POST MILE 4.64** **SANTA CLARA COUNTY, CALIFORNIA**	**VICINITY MAP**
	OCTOBER 2015	**FIGURE 1**



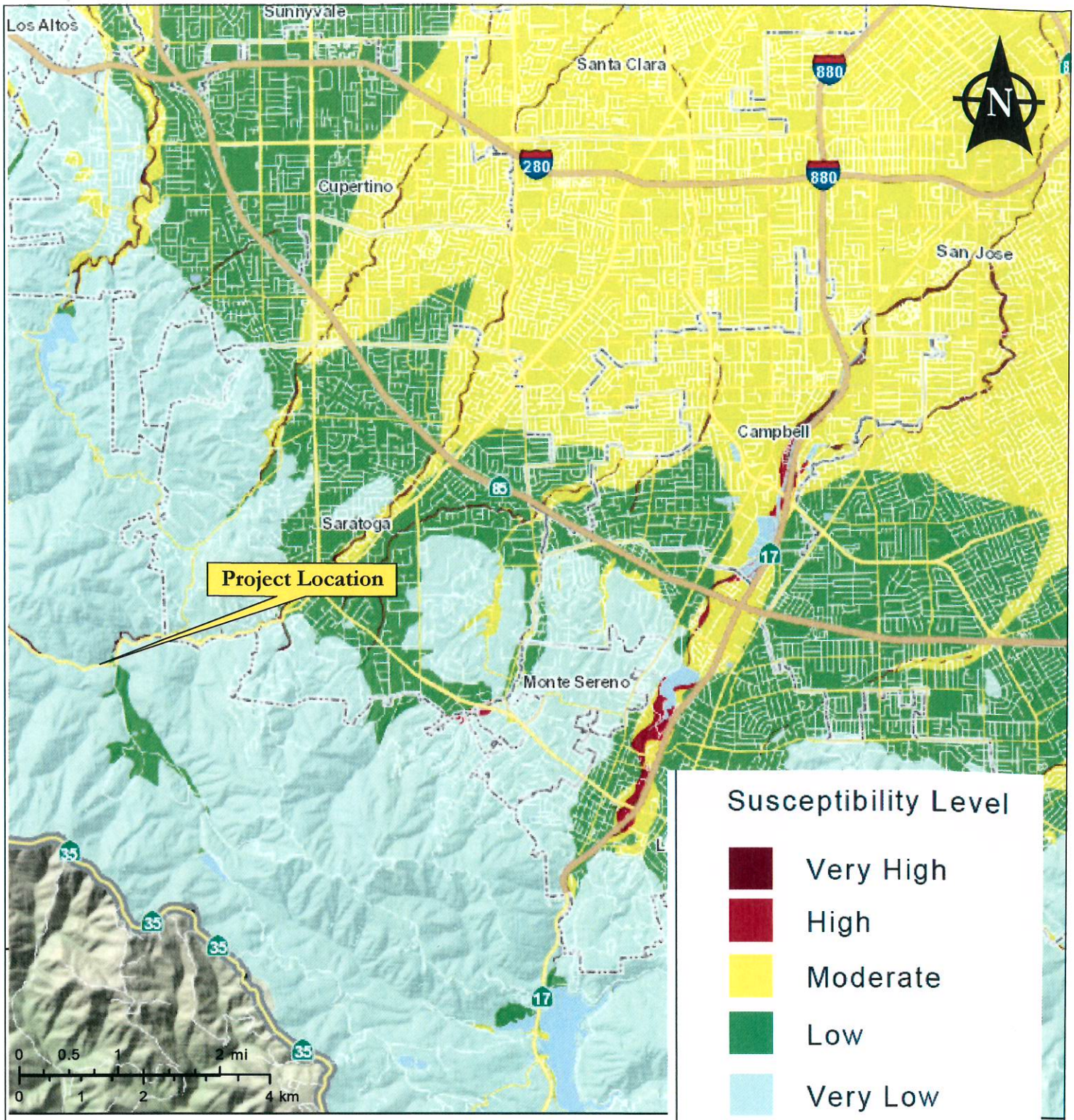
LEGEND

Tu	Unnamed Sandstone
db	Diabase or gabbro
fc	Franciscan Chert

Base: Geologic Map of the Palo Alto 30' x 60' quadrangle (Brabb and others, 2000)

Scale: 1:100,000

Caltrans	STORM DAMAGE HIGHWAY 9, POST MILE 4.64 SANTA CLARA COUNTY, CALIFORNIA	VICINITY GEOLOGIC MAP
	OCTOBER 2015	FIGURE 2

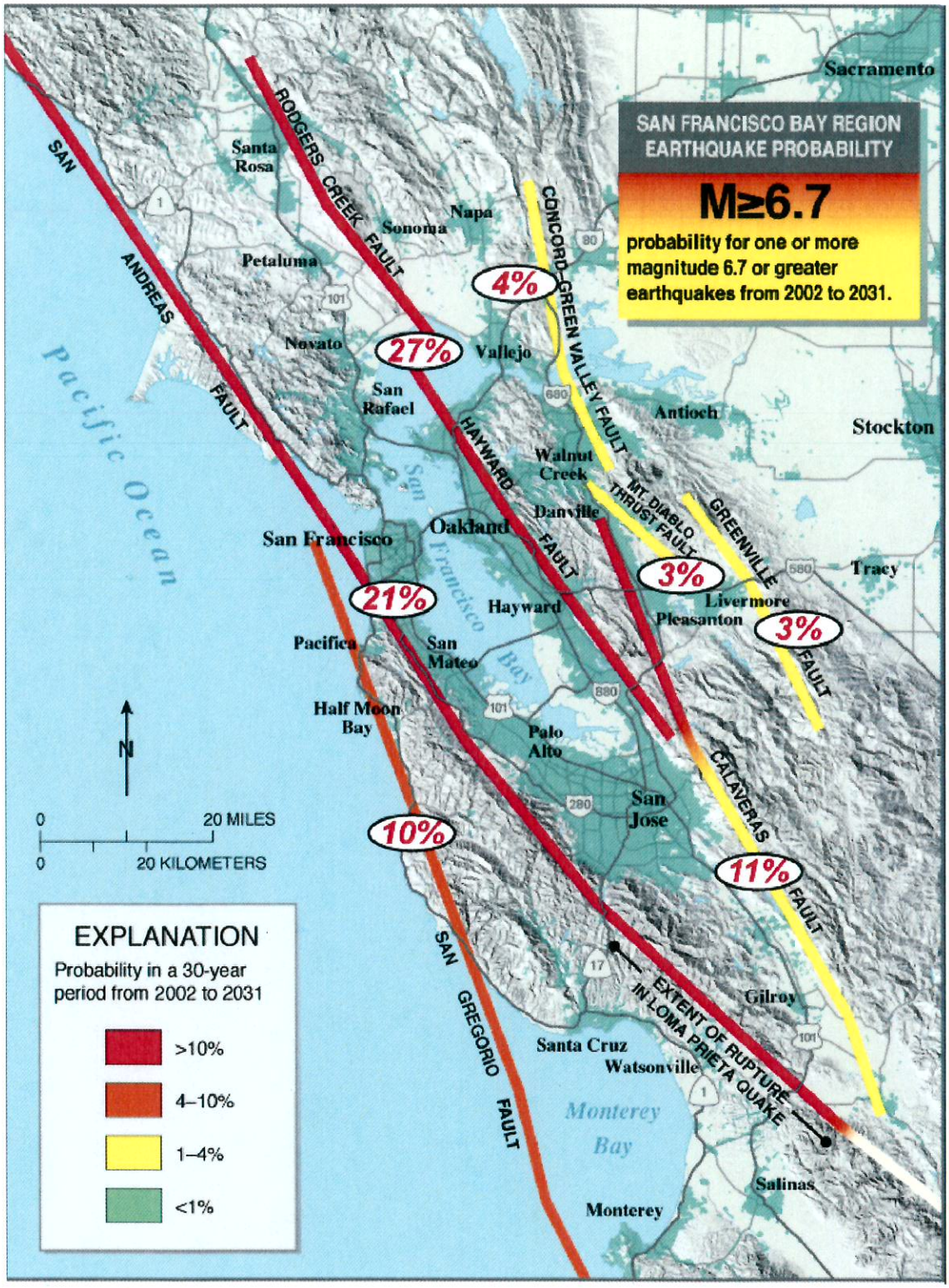


LEGEND

Base: ABAG Liquefaction Susceptibility Map

Scale as shown

Caltrans	**STORM DAMAGE** **HIGHWAY 9 PM 4.64** **SANTA CLARA COUNTY, CALIFORNIA**	**LIQUEFACTION SUSCEPTIBILITY MAP**
	OCTOBER 2015	**FIGURE 3**



Caltrans	STORM DAMAGE HIGHWAY 9 PM 4.64 SANTA CLARA COUNTY, CALIFORNIA	SF BAY REGION EARTHQUAKE PROBABILITY
	OCTOBER 2015	FIGURE 4

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Vahid Khata-0-Khaotan		**9-11-13**		**R-13-001**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Wash			**Acker AD2**	**4 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT			**Auto Trip 140 lb 30 in**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Backfilled			**not measured due to rotary wash**	**50.0 ft**

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
	0		- (GRAVELLY lean CLAY) (CL); brown; moist; Fine to medium grained gravel, some angular 1/2" shale and sandstone fragments, poor cementation. (Artificial Fill).												
	2		- (CLAYEY GRAVEL) (GC); medium dense; pale brown; moist; Fine to coarse gravel, homogeneous (Colluvium).												
	6		SEDIMENTARY ROCK (SANDSTONE) thickly bedded with moderate interbeds of; SANDSTONE; fine gravel; thinly bedded; dusky yellowish brown; moderately weathered; hard; intensely fractured; dusky yellowish brown; (NATIVE).												
	20		SEDIMENTARY ROCK (SANDSTONE) thickly bedded with moderate interbeds of SHALE; SANDSTONE; fine gravel; thickly bedded; dusky yellowish brown; moderately weathered; very hard; intensely fractured; SHALE; dusky yellowish brown; intensely weathered; soft; intensely fractured.												
	25														

(continued)

Department of Transportation
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REPORT TITLE				HOLE ID
BORING RECORD				**R-13-001**
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
04	**SCL**	**9**	**4.7**	**04-12000010**
PROJECT OR BRIDGE NAME				
Storm Damage				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	Karpowicz		**9-11-13**	**1 of 2**

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
	25		SEDIMENTARY ROCK (Sandstone) *(continued)*.												
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														
	46														
	47														
	48														
	49														
	50		Bottom of borehole at 50.0 ft bgs												
	51														
	52		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.												
	53														
	54														
	55														

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REPORT TITLE				HOLE ID
BORING RECORD				**R-13-001**
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
04	**SCL**	**9**	**4.7**	**04-12000010**
PROJECT OR BRIDGE NAME				
Storm Damage				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	Karpowicz		**9-11-13**	**2 of 2**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Vahid Khata-0-Khaotan		**9-24-13**		**R-13-002**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Wash			**Acker AD2**	**4 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT			**Auto Trip 140 lb 30 in**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Backfilled			**not measured due to rotary wash**	**40.0 ft**

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
	0		- (GRAVELLY lean CLAY) (CL); brown; moist; Fine to medium grained gravel, some angular 1/2" shale and sandstone fragments, poor cementation. (Artificial Fill).												
	5		- (CLAYEY GRAVEL) (GC); medium dense; pale brown; moist; Fine to coarse gravel, homogeneous (Colluvium).												
	9		SEDIMENTARY ROCK (SANDSTONE) thickly bedded with moderate interbeds of SHALE; SANDSTONE; fine gravel; thinly bedded; dusky yellowish brown; moderately weathered; hard; intensely fractured; SHALE; dusky yellowish brown; moderately weathered; soft; intensely fractured; (NATIVE).											
	25														

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**R-13-002**
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
04	**SCL**	**9**	**4.7**	**04-12000010**
PROJECT OR BRIDGE NAME				
Storm Damage				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	Karpowicz		**9-24-13**	**1 of 2**

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
	25		SEDIMENTARY ROCK (Sandstone) *(continued)*.												
	30		SEDIMENTARY ROCK (SANDSTONE); fine gravel; massive; dusky yellowish brown; moderately weathered; very hard; intensely fractured; (NATIVE).												
	40		Bottom of borehole at 40.0 ft bgs												

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.

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REPORT TITLE **BORING RECORD**				HOLE ID **R-13-002**
DIST. **04**	COUNTY **SCL**	ROUTE **9**	POSTMILE **4.7**	PROJECT ID **04-12000010**
PROJECT OR BRIDGE NAME **Storm Damage**				
BRIDGE NUMBER	PREPARED BY **Karpowicz**		DATE **9-24-13**	SHEET **2 of 2**