Water Quality Assessment Report

I-80/SR 65 Interchange Project

Placer County, California

Prepared for:

PLACER COUNTY TRANSPORTATION PLANNING AGENCY

CH2MHILL

Prepared by:

WRECO

January 2015

Water Quality Assessment Report

I-80/SR 65 Interchange Project
In Placer County Along I-80 Between Douglas Boulevard & Rocklin Road
And Along SR 65 Between Pleasant Grove Boulevard & I-80
03-Pla-80-1.9/6.1
03-Pla-65-R4.8/R7.3
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STATE OF CALIFORNIA
Department of Transportation

Prepared By: _____ Date: 1/14/15
Analette Ochoa, P.E.
(925) 941-0017
1243 Alpine Road, Suite 108, Walnut Creek, CA 94596
WRECO

Approved By: _____ Date: 6/29/2015
Luke McNeel-Caird, P.E.
(530) 823-4030
Placer County Transportation Planning Agency

Approved By: _____ Date: 6/30/15
Darrell S. Naruto, NPDES Coordinator
(530) 741-4239
Office of Environmental Engineering – South
California Department of Transportation, District 3

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Executive Summary

The Interstate 80/State Route 65 (I-80/SR 65) Interchange (Project) is within Placer County, in and near the cities of Roseville and Rocklin. The Project proposes to construct up to 4.2 miles of improvements along the I-80 corridor and 2.5 miles of improvements along the SR 65 corridor.

Three build alternatives are proposed to add capacity, a bi-directional HOV system, and high-speed connections. Local and regional circulation and access would be improved, as would weaving conditions along I-80 between Eureka Road/Atlantic Street and Taylor Road and along SR 65 between the I-80/SR 65 Interchange and Galleria Boulevard/Stanford Ranch Road. Other improvements would include widening the East Roseville Viaduct, replacing the Taylor Road Overcrossing, and realigning the existing eastbound I-80 to northbound SR 65 loop connector.

Alternative 1 would improve spacing and vehicle lane-weaving movements between interchanges on I-80. The two existing Taylor Road interchange ramps would be relocated to the east and reconstructed in a Type L-11/L-12 interchange configuration, providing two additional ramp connections and improving access between the local streets and freeway system. The interchange would be positioned within the I-80/SR 65 interchange footprint and utilize portions of the existing eastbound I-80 to northbound SR 65 loop connector as well as the existing southbound SR 65 to eastbound I-80 connector. The existing Taylor Road interchange ramps would be removed, and the area would be regraded.

Alternative 2 would improve spacing and vehicle lane-weaving movements between interchanges on I-80 by collecting and redirecting eastbound ramp traffic onto a collector-distributor ramp system. The collector-distributor system would provide eastbound access to Taylor Road and from Eureka Road at the Atlantic Street/Eureka Road interchange and would restrict local traffic from leaving or entering I-80 mainline until after the critical weave area between Eureka Road and the I-80/SR 65 interchange. The two existing Taylor Road interchange ramps would remain in their current location but would be reconfigured to accommodate the surrounding improvements.

Similar to Alternative 2, Alternative 3 would improve spacing and vehicle lane-weaving movements between interchanges on I-80 by collecting eastbound Eureka Road on-ramp traffic. Weaving on I-80 would be significantly improved because ramp traffic would be redirected to a collector-distributor system and restricted from entering and exiting I-80 mainline until after the critical weave area between Eureka Road and the I-80/SR 65 interchange. Unique to Alternative 3, the two existing Taylor Road interchange ramps would be eliminated, and access to the Taylor Road area would be accommodated by the adjacent local interchanges at the Atlantic Street/Eureka Road, Rocklin Road, and Galleria Boulevard/Stanford Ranch Road interchanges. The connector ramps serving I-80 and SR 65 are the same between Alternatives 2 and 3.

The analysis in this technical study assumes the currently proposed design alternatives, which include standard piers spaced evenly apart, to support the Eastbound I-80 to Northbound SR 65 connector (Alternative 1) and Collector-Distributor ramp (Alternatives 2 and 3). The initial geometry and spacing assumptions required that piers be placed in the wetted portions of the channel.

Concurrent with the development of this technical study, the Project team has consulted with Caltrans and relevant resource agencies to identify design options to minimize and/or avoid impacts to listed species and riverine habitat within Secret Ravine. Based on these meetings, the Project team has designed an outrigger concept and/or shifted the bent spacing, which enables the placement of the bridge foundation outside of the channel.

Although not specifically analyzed in this study, the revised design constitutes either an A) improved condition over that analyzed, or B) a condition similar to that analyzed. Therefore, a separate analysis of the revised design is not included in this study.

The purpose of this Water Quality Assessment Report is to fulfill the requirements of the National Environmental Policy Act and the California Environmental Quality Act, and to provide information, for National Pollutant Discharge Elimination System (NPDES) permitting.

The proposed Project is adjacent to several bodies of water. The following table presents a cumulative list of creeks and streams through and adjacent to I-80 and SR 65 within the Project limits.

Existing Waterways of I-80 and SR65

Stream Name	Crossing Type	Approximate Station(s)
Antelope Creek	Bridge	126+00 (SR 65)
Highland Ravine	Culvert	191+00 (SR 65)
Miners Ravine	Bridge	58+90, 60+75, and 62+00 (I-80)
Secret Ravine	Longitudinal	113+30, 137+80, 145+90, 164+50, and 109+05 – 111+05 (I-80)
Tributary to South Branch of Pleasant Grove Creek	Culvert	156+35 (SKEW 121º), 162+72 (SKEW 78º), 168+25 (SKEW 64º), and 174+00 (SR65)
Sucker Ravine	Culvert	195+40 (I-80)

Source: FEMA and USGS

This Project would disturb more than one acre of soil and would be subject to the requirements stated within the State Water Resources Control Board, *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Order No, 2009-0009-DWQ, amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ, NPDES No. CAS000002). A Storm Water Pollution Prevention Plan (SWPPP) would be required for the Project. A component of the SWPPP includes performing a risk level determination; the Construction General Permit separates projects into risk levels 1 (low), 2 (medium), or 3 (high). Risk levels are calculated by determining the Project's sediment and receiving water risks. The following table identifies the risk levels and estimated disturbed soil area for each hydrologic sub-area within the Project limits.

Receiving Water Risk by Alternative and Hydrologic Unit within Caltrans R/W

Hydrologic Unit	Receiving Water Risk	Risk Level	Disturbed Soil Area (acre)		
			Alternative 1	Alternative 2	Alternative 3
Valley American-Lower American: Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine	High	2	117	120	123
Valley American-Pleasant Grove: Highland Ravine and South Branch of Pleasant Grove Tributary		2	30	31	33
Total Disturbed Soil Area			147	151	156

Receiving Water Risk by Alternative and Hydrologic Unit within City of Roseville R/W

Hydrologic Unit	Receiving Water Risk	Risk Level	Disturbed Soil Area (acre)		
			Alternative 1	Alternative 2	Alternative 3
Valley American-Lower American: Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine	High	2	13	13	21

Projects within the Caltrans R/W are required to adhere to Board Order 2012-0011-DWQ. The methods for evaluating the water quality impacts and discussion of avoidance, minimization and mitigation measures presented in this WQAR are based on the Order No. 2012-0011-DWQ and Order No. 2012-0006-DWQ.

For the areas of the Project outside of the Caltrans R/W, the Project is under a Phase II Municipal Separate Storm Sewer System (MS4), which would be subject to the Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Systems, effective on July 1, 2013.

This Project proposes work within or near water bodies that are identified as waters of the State and waters of the U.S.; therefore, a 404 Permit from the U.S. Army Corps of Engineers and a 401 Water Quality Certification from the Central Valley Regional Water Quality Control Board (CVRWQCB) are expected to be required for this Project. Additional permits for this Project may include, but are not limited to, a 1602 Streambed Alteration Agreement from the California Department of Fish and Wildlife, and a Biological Opinion from the U.S. Fish and Wildlife Service. Each of the permits or agreements would detail specific temporary and permanent impacts to the appropriate jurisdiction, required actions or best management practices (BMPs) to be used to avoid or minimize impacts to water resources, and specific mitigation efforts to enhance or restore water resources.

According to the *Delineation of Potential Waters of the United States, Including Wetlands* (ICF International 2014), a total of 6.7 acres (ac) of wetlands and other waters were identified in the delineation area. The primary potential impacts of the Project to both direct and stormwater runoff result from increased impervious area and disturbed soil area. The following table identifies the existing and added impervious areas for each hydrologic sub-area within the Caltrans R/W.

Impervious Area by Alternative and Hydrologic Unit within Caltrans R/W

Hydrologic Unit	Existing Impervious Area (acre)			Added Impervious Area (acre)		
	Alternative 1	Alternative 2	Alternative 3	Alternative 1	Alternative 2	Alternative 3
Valley American-Lower American	76	76	75	26	24	22
Valley American-Pleasant Grove	13	13	13	4	4	4
Total	89	89	88	30	28	26

Within the Caltrans R/W, Alternative 1 proposes the most impervious area with 30 ac. Alternative 2 proposes 28 ac of added impervious area. Alternative 3 proposes the least added impervious area with 26 ac. The following table identifies the existing and added impervious areas for the Valley American – Lower American hydrologic sub-area within the City of Roseville R/W.

Impervious Area by Alternative and Hydrologic Unit within City of Roseville R/W

Hydrologic Unit	Existing Impervious Area (acre)			Added Impervious Area (acre)		
	Alternative 1	Alternative 2	Alternative 3	Alternative 1	Alternative 2	Alternative 3
Valley American-Lower American	6	6	6	1	1	1

Within the City of Roseville R/W, all three alternatives have the same added impervious area of 1 ac.

The Project's overall design goal would be to avoid and minimize impacts to water resources to the maximum extent practicable, promote infiltration of stormwater runoff, maximize treatment of stormwater runoff, and reduce erosion by metering or detaining post-Project runoff. The Project would meet these goals by temporary constructions site BMPs, design pollution prevention and erosion control BMPs, and treatment BMPs.

This Project is expected to have less than significant impacts to water resources by meeting these goals, incorporating other applicable NPDES requirements, and complying with Project-specific permit or agreement requirements.

Acronyms

BMP	best management practices
Caltrans	California Department of Transportation
CGP	Construction General Permit
CEQA	California Environmental Quality Act
CWA	Clean Water Act
DSA	Disturbed Soil Area
EPA	Environmental Protection Act
ESA	environmentally sensitive area
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HOV	High-Occupancy Vehicle
LID	Low Impact Development
MS4	Municipal Separate Storm Sewer System
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PCTPA	Placer County Transportation Planning Agency
PID	Project Initiation Document
PPDG	Project Planning and Design Guide
RWQCB	Regional Water Quality Control Board
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	total maximum daily load
TSM	Transportation System Management
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WDR	Waste Discharge Requirement
WPCP	Water Pollution Control Program
WQAR	Water Quality Assessment Report

1 INTRODUCTION

1.1 Project Description

The California Department of Transportation (Caltrans), in cooperation with the Placer County Transportation Planning Agency (PCTPA), Placer County, and the cities of Roseville, Rocklin, and Lincoln, proposes to improve the Interstate 80/State Route 65 (I-80/SR 65) Interchange in Placer County, California.

The I-80/SR 65 Interchange Project (Project) is located in Placer County in the cities of Roseville and Rocklin at the I-80/SR 65 Interchange. The Project limits include I-80 from the Douglas Boulevard Interchange to the Rocklin Road Interchange (post miles [PM] 1.9 to 6.1) and SR 65 from the I-80 junction to the Pleasant Grove Boulevard Interchange (PM R4.8 to R7.3). The existing I-80/SR 65 Interchange is a type F-6 freeway-to-freeway interchange. See Figures 1 and 2 for Project location and vicinity maps, respectively.

The purpose of the Project is to reduce future traffic congestion, improve operations and safety, and comply with current Caltrans and local agency design standards.

Three alternatives are under consideration and were designed to satisfy the purpose and need, while avoiding or minimizing environmental impacts.

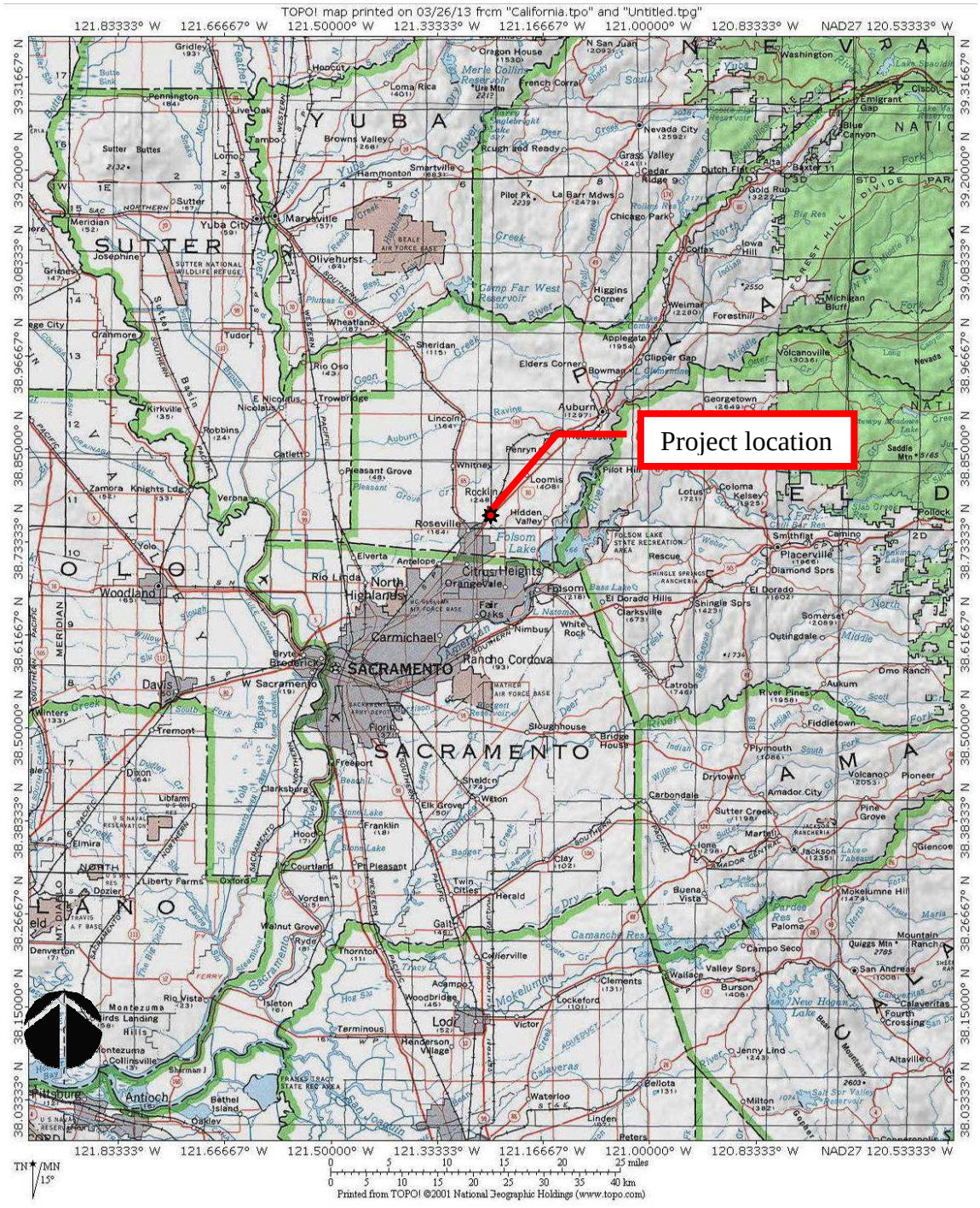

Figure 1. Project Location Map

Source: United States Geological Survey

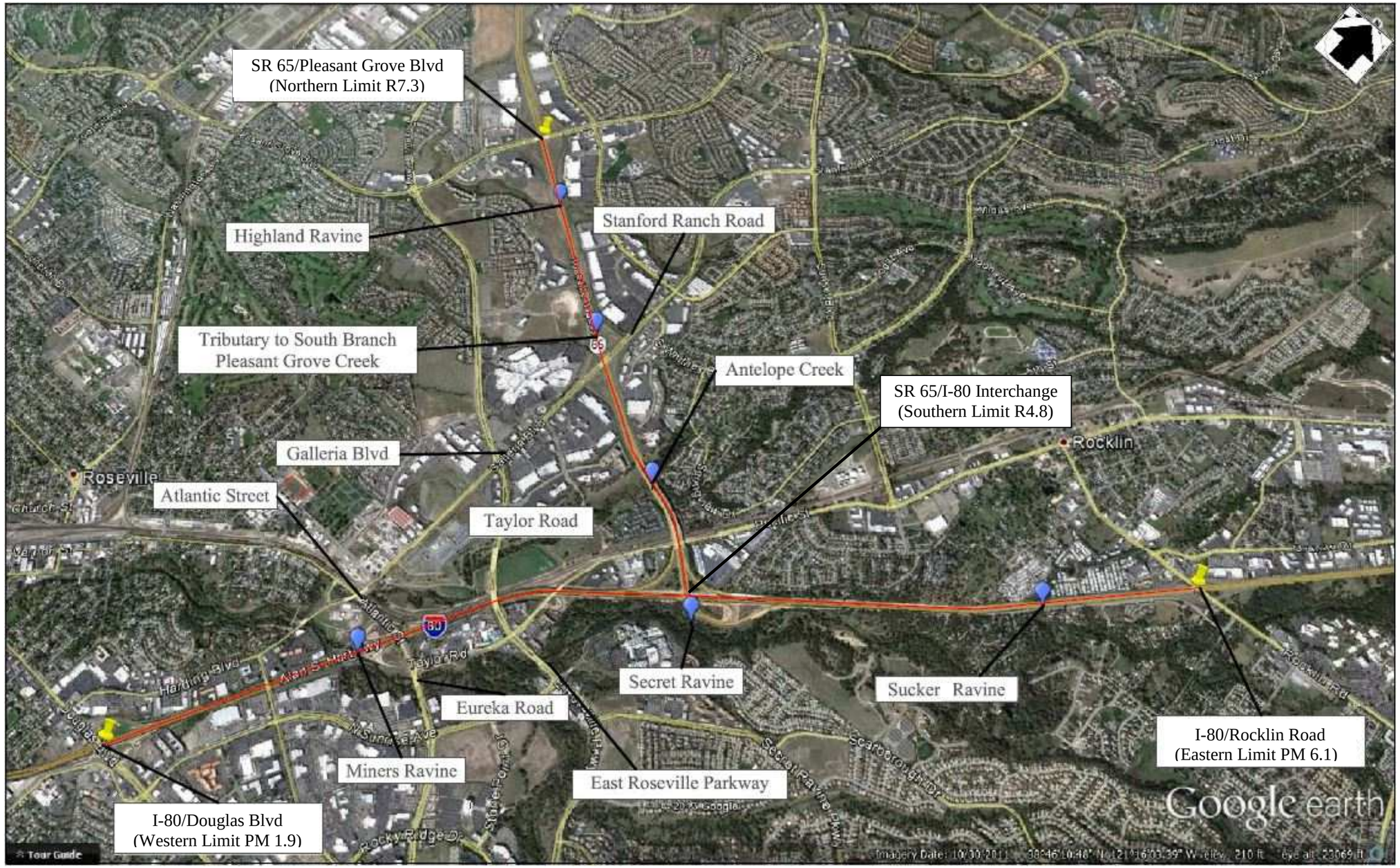

Figure 2. Project Vicinity Map

1.1.1 Build Alternatives

All of the build alternatives propose to add capacity, a bidirectional high-occupancy vehicle (HOV) system, and high-speed connector ramps. Local and regional circulation and access would be improved, as would vehicle lane-weaving conditions along I-80 between Eureka Road/Atlantic Street and Taylor Road and along SR 65 between the I-80/SR 65 interchange and Galleria Boulevard/Stanford Ranch Road. Other improvements would include widening the East Roseville Viaduct, replacing the Taylor Road overcrossing, and realigning the existing eastbound I-80 to northbound SR 65 loop connector.

The alternatives under consideration are:

- Build Alternative 1—Taylor Road Full Access Interchange
- Build Alternative 2—Collector–Distributor System Ramps
- Build Alternative 3—Taylor Road Interchange Eliminated

Alternative 1 would improve spacing and vehicle lane-weaving movements between interchanges on I-80. The two existing Taylor Road interchange ramps would be relocated to the east and reconstructed in a Type L-11/L-12 interchange configuration, providing two additional ramp connections and improving access between the local streets and freeway system. The interchange would be positioned within the I-80/SR 65 interchange footprint and utilize portions of the existing eastbound I-80 to northbound SR 65 loop connector as well as the existing southbound SR 65 to eastbound I-80 connector. The existing Taylor Road interchange ramps would be removed, and the area would be re-graded (See Figure 3).

Alternative 2 would improve spacing and vehicle lane-weaving movements between interchanges on I-80 by collecting and redirecting eastbound ramp traffic onto a collector-distributor ramp system. The collector-distributor system would provide eastbound access to Taylor Road and from Eureka Road at the Atlantic Street/Eureka Road interchange and would restrict local traffic from leaving or entering I-80 mainline until after the critical weave area between Eureka Road and the I-80/SR 65 interchange. The two existing Taylor Road interchange ramps would remain in their current location but would be reconfigured to accommodate the surrounding improvements (see Figure 4).

Similar to Alternative 2, Alternative 3 would improve spacing and vehicle lane-weaving movements between interchanges on I-80 by collecting eastbound Eureka Road on-ramp traffic. Weaving on I-80 would be significantly improved because ramp traffic would be redirected to a collector-distributor ramp system and restricted from entering and exiting I-80 mainline until after the critical weave area between Eureka Road and the I-80/SR 65 interchange. Unique to Alternative 3, the two existing Taylor Road interchange ramps would be eliminated, and access to the Taylor Road area would be accommodated by the adjacent local interchanges at the Atlantic Street/Eureka Road, Rocklin Road, and Galleria Boulevard/Stanford Ranch Road interchanges. The connector ramps serving I-80 and SR 65 are the same between Alternatives 2 and 3 (See Figure 5).

1.1.2 No-Build Alternative

This alternative would not make any improvements to the I-80/SR 65 interchange or adjacent transportation facilities to satisfy the purpose and need. HOV and auxiliary lanes proposed on SR 65 north of Galleria Boulevard/Stanford Ranch Road, and other local improvements separately proposed and identified in the Metropolitan Transportation Plan, would be implemented according to their proposed schedules.

1.1.3 Transportation System Management Alternative

Transportation System Management (TSM) would attempt to manage the design-year traffic volumes without increasing capacity or modifying the current interchange configuration and surrounding transportation facilities within the Project area. The Project footprint impacts would be significantly lower than with the build alternatives. However, although TSM measures alone could not satisfy the purpose and need of the Project, the following TSM features have been incorporated into the build alternatives for this Project.

Common to all Build Alternatives:

- Freeway auxiliary lanes in both directions on SR 65 between I-80 and the Galleria Boulevard/Stanford Ranch Road interchange.
- Ramp widening for storage and HOV bypass lane on the southbound Galleria Boulevard on-ramp.

1.1.4 Outrigger Concept/Shifted Bent Spacing

The analysis in this technical study assumes the currently proposed design alternatives, which include standard piers spaced evenly apart, to support the Eastbound I-80 to Northbound SR 65 connector (Alternative 1) and Collector-Distributor ramp (Alternatives 2 and 3). The initial geometry and spacing assumptions required that piers be placed in the wetted portions of the channel.

Concurrent with the development of this technical study, the Project team has consulted with Caltrans and relevant resource agencies to identify design options to minimize and/or avoid impacts to listed species and riverine habitat within Secret Ravine. Based on these meetings, the Project team has designed an outrigger concept and/or shifted the bent spacing, which enables the placement of the bridge foundation outside of the channel.

Although not specifically analyzed in this study, the revised design constitutes either an A) improved condition over that analyzed, or B) a condition similar to that analyzed. Therefore, a separate analysis of the revised design is not included in this study.

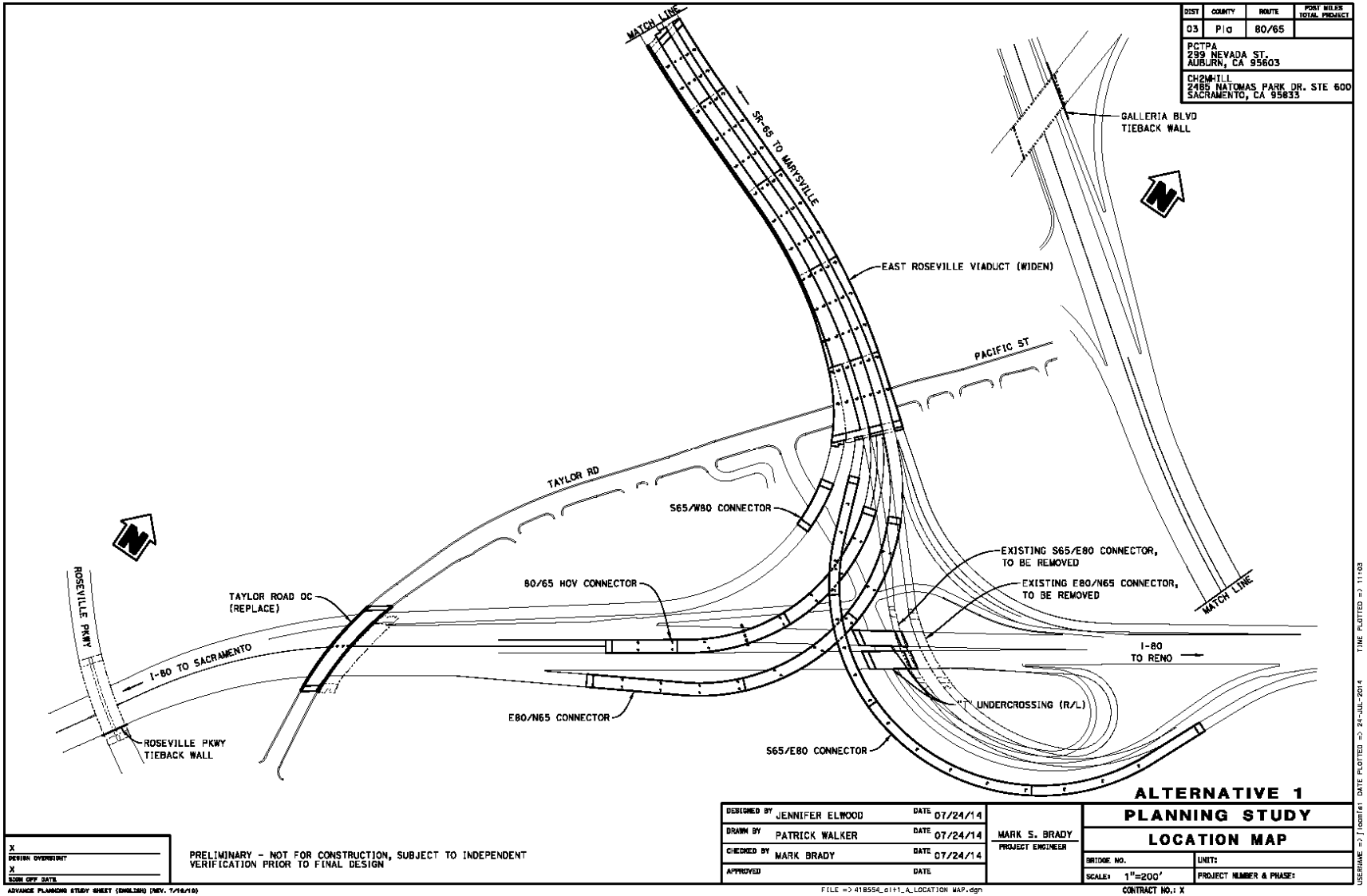

Figure 3. Alternative 1 Layout

Source: CH2M Hill

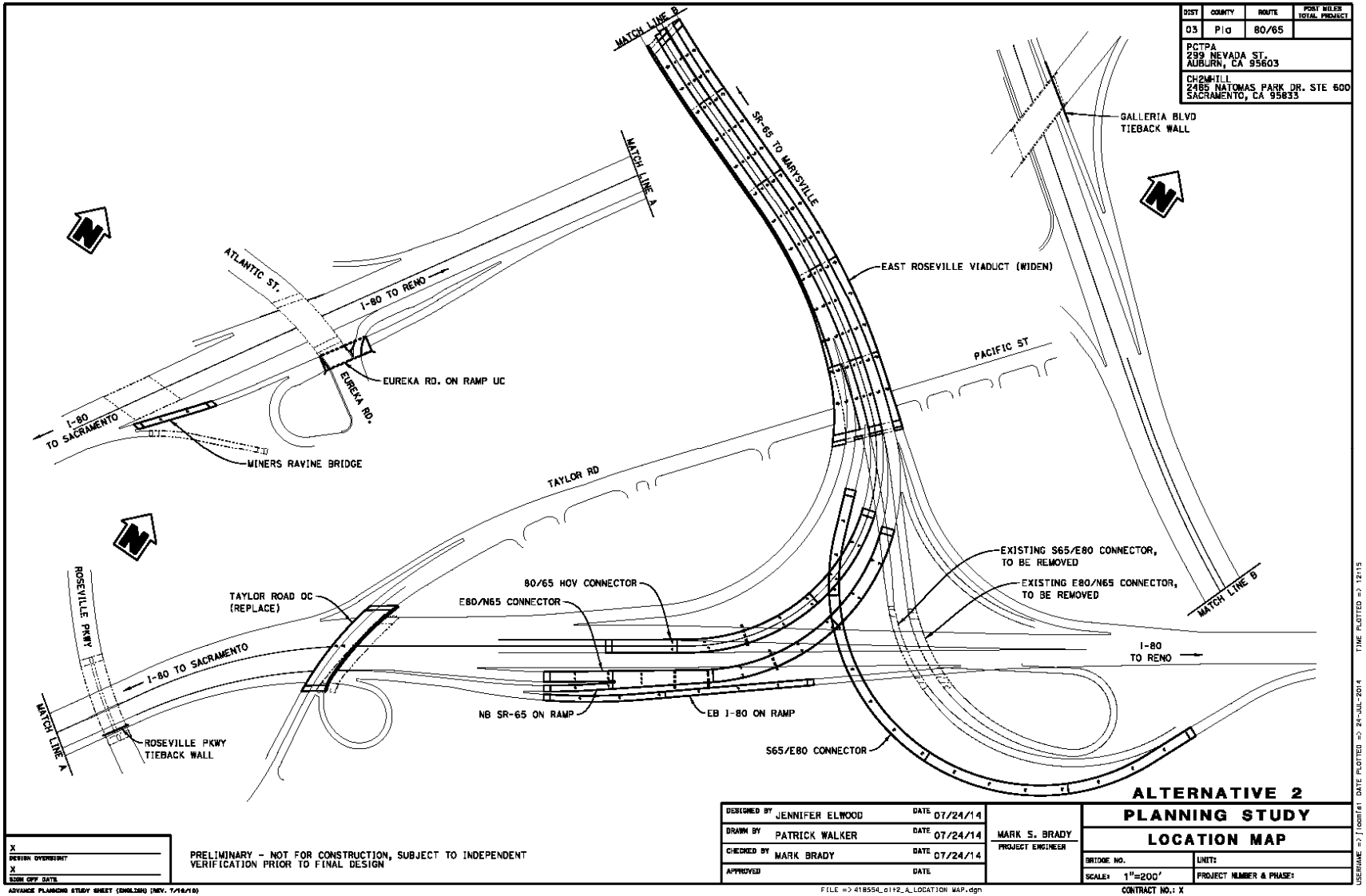

Figure 4. Alternative 2 Layout

Source: CH2M Hill

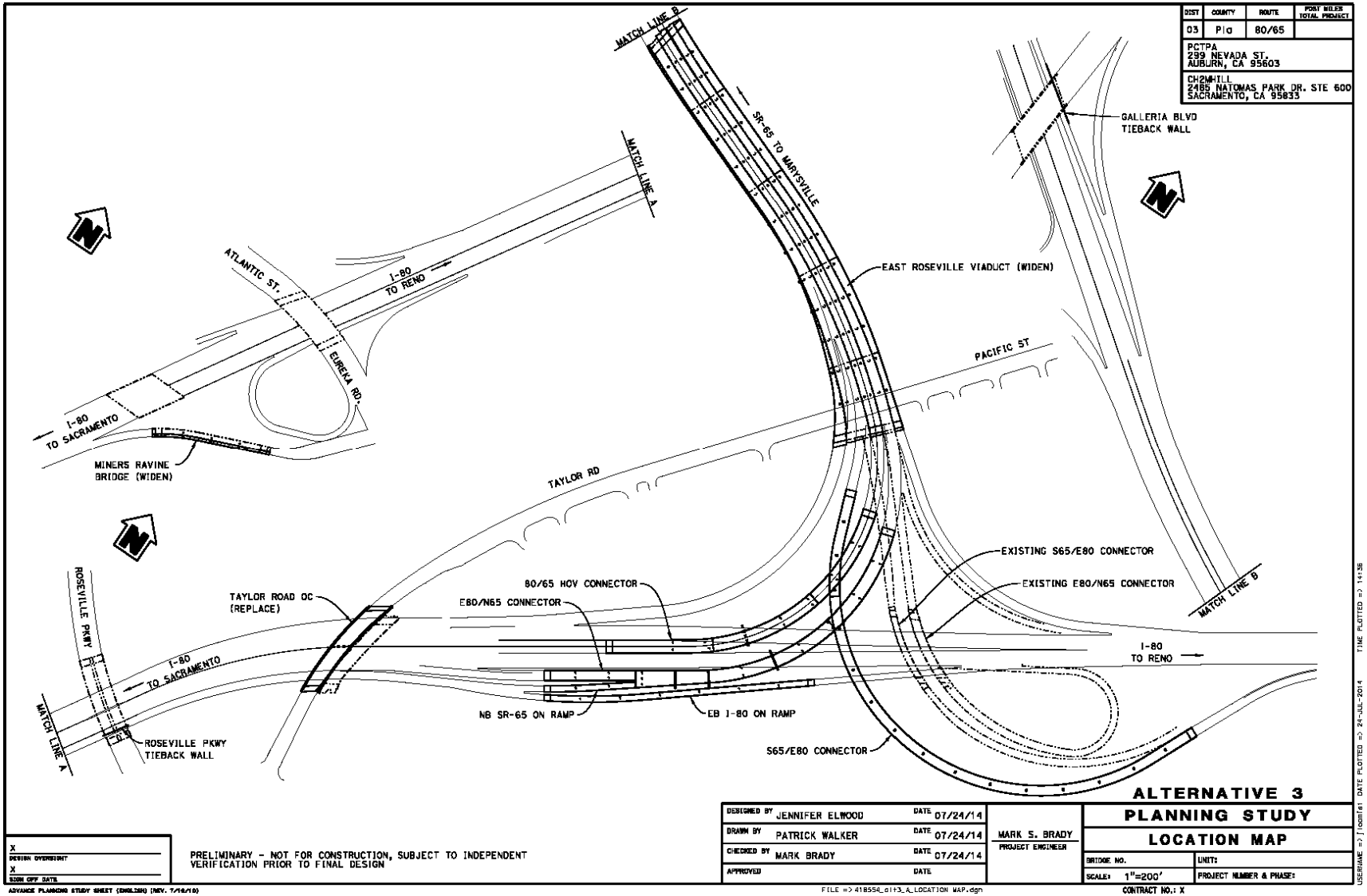

Figure 5. Alternative 3 Layout

Source: CH2M Hill

1.2 Approach to Water Quality Assessment

The purpose of the Water Quality Assessment Report (WQAR) is to fulfill the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), and to provide information for National Pollutant Discharge Elimination System (NPDES) permitting. The document includes a discussion of the proposed Project, the physical setting of the Project area, and the regulatory framework with respect to water quality. It also provides data on surface water and groundwater resources within the Project area and the water quality of these waters, describes water quality impairments and beneficial uses, identifies potential water quality impacts/benefits associated with the proposed Project, and recommends avoidance and/or minimization measures for potentially adverse impacts.

2 REGULATORY SECTION

2.1 Federal Laws and Requirements

2.1.1 Clean Water Act

In 1972 Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the U.S. from any point source unlawful unless the discharge is in compliance with an NPDES permit. Known today as the Clean Water Act (CWA), Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the NPDES permit. Important CWA sections are:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.
- Section 401 requires that an applicant for a federal license or permit for any activity potentially resulting in a discharge to waters of the U.S. must obtain certification from the State that the discharge will comply with other provisions of the act. (Most frequently required in tandem with a Section 404 permit request. See below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. The Regional Water Quality Control Boards (RWQCB) administers this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and Municipal Separate Storm Sewer Systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

USACE issues two types of 404 permits: Standard and General permits. For General permits, there are two types: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor Project activities with no more than minimal effects.

There are also two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE’s Standard permits. For Standard permits, the USACE’s decision to approve is based on compliance with the U.S. Environmental Protection Agency’s (EPA) Section 404 (b)(1) Guidelines (U.S. EPA CFR 40 Part 230) and whether permit approval is in the public interest. The 404(b)(1) Guidelines were developed by the U.S. EPA in conjunction with the USACE, and

allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The 404(b)(1) Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative to the proposed discharge that would have fewer effects on waters of the U.S. and not have any other significant adverse environmental consequences. Per the 404(b)(1) Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures have been followed, in that order. The 404(b)(1) Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from the USACE, even if not subject to the 404(b)(1) Guidelines, must meet general requirements; see 33 CFR 320.4.

2.2 State Laws and Requirements

2.2.1 Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the State. It predates the CWA and regulates discharges to waters of the State. Waters of the State include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined and this definition is broader than the CWA definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA, and regulating discharges to ensure compliance with the water quality standards. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions, and then set criteria necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents, and the standards cannot be met through point source or non-source point controls (NPDES permits or Waste Discharge Requirements), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

2.2.2 State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB adjudicates water rights, sets water pollution control policy, issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. RWQCBs are responsible for

protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

2.2.3 National Pollutant Discharge Elimination System Program

Municipal Separate Storm Sewer Systems (MS4)

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of stormwater dischargers, including MS4s. The U.S. EPA defines an MS4 as "any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over stormwater, that are designed or used for collecting or conveying storm water." The SWRCB has identified Caltrans as an owner/operator of an MS4 pursuant to federal regulations. Caltrans' MS4 permit covers all Caltrans rights-of-way, properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing stormwater management procedures and practices, as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-storm water discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed Project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address stormwater runoff.

Projects within the Caltrans R/W are required to adhere to Board Order 2012-0011-DWQ. The methods for evaluating the water quality impacts and discussion of avoidance, minimization and mitigation measures presented in this WQAR are based on the Order No. 2012-0011-DWQ and Order No. 2012-0006-DWQ.

Construction General Permit

The Construction General Permit (CGP) Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ, became effective on February 14, 2011 and July 17, 2012, respectively. The permit regulates stormwater discharges from construction sites which result in a disturbed soil area (DSA) of one acre or greater, and/or are smaller sites that are part of a larger common plan of development. For all projects subject to the CGP, applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan (SWPPP).

By law, all stormwater discharges associated with any construction activity, including but not limited to, clearing, grading, grubbing, excavation or any other activity that results in a land disturbance of equal to or greater than one acre must comply with the provisions of the CGP. Construction activity that results in land surface disturbances of less than one acre is subject to this CGP if the construction activity is part of a larger common plan of development or sale of one or more acres of disturbed land surface. Operators of regulated construction sites are

required to develop SWPPPs; implement sediment, erosion, and pollution prevention control measures; and obtain coverage under the CGP.

The CGP separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases and are based on potential erosion and transport to receiving waters. Requirements apply according to the risk level determined. For example, a Risk Level 3 (highest risk) project would require compulsory stormwater runoff pH and turbidity monitoring. For Risk Level 3 projects with more than 30 acres of soil disturbance, pre- and post-construction aquatic biological assessments will be performed during specified seasonal windows.

Section 401 Permitting

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the United States must obtain a 401 Water Quality Certification (Certification), which certifies that the project will be in compliance with State water quality standards. The most common federal permit triggering 401 Certification is a CWA Section 404 permit, issued by the USACE. The 401 Certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before USACE issues a 404 permit.

In some cases the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as Waste Discharge Requirements (WDRs) under the State Water Code (Porter-Cologne Act) that defines activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

Hydromodification

Hydromodification is the alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. In the case of a stream channel, this is the process whereby a stream bank or streambed is eroded by flowing water. This typically results in the suspension of sediments in the water course. Hydromodification management measures are non-structural or structural measures used to mitigate or minimize hydromodification impacts. Low impact development (LID) treatment measures include rainwater harvesting and reuse systems, infiltration or evapotranspiration systems, and lastly biotreatment devices, if the aforementioned systems are infeasible.

2.3 Regional and Local Requirements

2.3.1 CVRWQCB Basin Plan

The Project is under the jurisdiction of the Central Valley Regional Water Quality Control Board. Their *Water Quality Control Plan (Basin Plan [Revised October 2011 with approved amendments]) for the Sacramento River and San Joaquin River Basin* designates beneficial uses, establishes water quality objectives, and contains plans and policies for all waters of the basin.

2.3.2 MS4

The Project would traverse through Placer County, the City of Roseville, and the City of Rocklin, which are under a Phase II MS4. Phase II MS4s would be subject to the Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Systems, which became effective on July 1, 2013. The WDRs specify a compliance schedule for projects:

> "Within the second year of the effective date of the permit, the Permittee shall develop and maintain and inventory of Permittee-owned or operated facilities within their jurisdiction that are a threat to water quality; submit a map of the area within the permit boundary and identify where the inventoried Permittee-owned or operated facilities are located; develop and implement procedures to assess and prioritize MS4 storm drain system maintenance; implement standards to effectively reduce runoff and pollutants associated with runoff from Regulated Projects; adopt or reference appropriate performance criteria for biotreatment and media filters; and implement an O&M Verification Program for storm water treatment and baseline hydromodification management structural control measures.
>
> Within the third year of the effective date of the permit, the Permittee shall develop and implement Hydromodification Management procedures; for all inventoried Permittee-owned or operated facilities, conduct a comprehensive and assessment of pollutant discharge potential and identification of pollutant hotspots; begin maintenance of all high priority storm drain systems on an ongoing schedule; assess Operations and Maintenance (O&M) activities for potential to discharge pollutants in storm water and inspect all O&M BMPs on a quarterly basis; develop and implement a process for incorporating water quality and habitat enhancement features into new and rehabilitated flood management facilities; and inventory and assess the maintenance condition of structural post-construction BMPs (including BMPs used for flood control) within jurisdiction.
>
> Within the fourth year of the effective date of the permit, the Permittee shall develop and implement SWPPPs for pollutant hotspots.
>
> Within the fifth year of the effective date of this Permit, the Permittee shall conduct regular inspections of Permittee-owned and operated facilities."

This MS4 permit presents the provision for permanent post-construction stormwater requirements for areas outside of Caltrans rights-of-way. Some or all of these requirements may be required for Caltrans projects that connect or discharge into local drainage facilities as directed by the Caltrans Office of Stormwater Program Implementation or RWQCB.

2.3.3 Storm Water Management Plan

Placer County's Storm Water Management Plan (2003-2008) provides a comprehensive plan to direct the County's stormwater management program activities.

The City of Roseville's Storm Water Management Program (2004) outlines the following six minimum control measures: public education, public involvement, illicit discharge detection and elimination, construction stormwater runoff, new development and redevelopment, and municipal operations.

The City of Rocklin's Storm Water Management Program in Compliance with the Phase II Regulations of the NPDES (2003) describes how pollutants in stormwater will be controlled by means of best management practices that address six minimum control measures specified in the CGP.

3 AFFECTED ENVIRONMENT/EXISTING CONDITIONS

The Project would extend along I-80 from Douglas Boulevard to Rocklin Road and along SR 65 between Pleasant Grove Boulevard and I-80, within Placer County in and near the cities of Roseville and Rocklin.

3.1 General Setting

3.1.1 Population and Land Use

The City of Roseville Land Use Map (April 2013) identifies the land use along I-80 and SR 65 within the City limits as community commercial, regional commercial, and business professional, with some general industrial, open space, parks and recreation, and high density residential. The 2010 U.S. Census reported that City of Roseville had a population of 118,800.

The *City of Rocklin General Plan* (November 2012) identifies the land use along I-80 and SR 65 within the City limits as medium density residential and recreation/conservation with some low density residential, retail commercial, medium-high density residential, high density residential, and business professional. The City of Rocklin website states that the City has a current population of 58,295.

3.1.2 Topography

Both I-80 and SR 65 run through relatively flat terrain in a heavily urbanized area with frequent interchanges. The SR 65 alignment from Pleasant Grove Boulevard to I-80 ranges in elevation from about 160 to 260 ft above mean sea level (amsl) with an average elevation of 215 ft. The project crosses over Antelope Creek, with a peak elevation of about 254 ft amsl, and lowers to I-80 at an elevation of 206 ft. The I-80 alignment from Rocklin Road to Douglas Boulevard gradually decreases from 285 ft to 173 ft with an average elevation of 215 ft.

3.1.3 Hydrology

3.1.3.1 Regional Hydrology

I-80 and SR 65 within the Project limits cross two hydrologic sub-areas, Valley American-Lower American (HSA# 519.21) and Pleasant Grove (HSA# 519.22), within one hydrologic unit: see Table 1. Valley American-Lower American includes Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine. Pleasant Grove includes Highland Ravine and the tributary to the south branch of Pleasant Grove Creek. Caltrans' *Water Quality Planning Tool* shows that there are three hydrologic sub-areas; this is hydrologically incorrect because Secret Ravine is a tributary to Miners Ravine, which in turn is a tributary to Dry Creek.

Table 1. Hydrologic Units within the Project Limits

Post Mile	Hydrologic Unit	Hydrologic Sub-area	Hydrologic Sub-area Number	Hydrologic Unit Code
PLA 80 1.9/6.1 PLA 65 R4.8/R5.58	Valley-American	Lower American	519.21	180201110101
PLA 65 R5.58/R7.3	Valley-American	Pleasant Grove	519.22	180201610302

3.1.3.2 Local Hydrology

Precipitation and Climate

Roseville has a Mediterranean climate that is characterized by cool, wet winters and hot, dry summers. Average daily high temperatures range from 54°F in January to 95°F in July and 94°F in August. Daily low temperatures range from 39°F in the winter to 60°F in the summer.

Precipitation data were collected using the National Oceanic and Atmospheric Administration (NOAA) Atlas Precipitation Frequency Data Server (PFDS) web application. The location chosen was in Roseville, California, with latitude: 38.7716 and longitude -121.2479. The 24-hour rainfall depths are summarized in Table 2.

Table 2. 24-hour Rainfall Depth Summary

Recurrence (yrs)	2	10	25	50	100
Depth (in)	2.23	3.21	3.84	4.34	4.86

Surface Streams

A list of creek and stream crossings within the Project limits was created using Federal Emergency Management Agency (FEMA) maps, United States Geological Survey (USGS) topographic maps, and aerial photographs. Table 3 lists the existing creek crossings, adjacent creeks, and their approximate station(s).

Table 3. Existing Waterways of I-80 and SR65

Stream Name	Crossing Type	Approximate Station(s)
Antelope Creek	Bridge	126+00 (SR 65)
Highland Ravine	Culvert	191+00 (SR 65)
Miners Ravine	Bridge	58+90, 60+75, and 62+00 (I-80)
Secret Ravine	Longitudinal	113+30, 137+80, 145+90, 164+50, and 109+05 – 111+05 (I-80)
Tributary to South Branch of Pleasant Grove Creek	Culvert	156+35 (SKEW 121º), 162+72 (SKEW 78º), 168+25 (SKEW 64º), and 174+00 (SR 65)
Sucker Ravine	Culvert	195+40 (I-80)

Source: FEMA and USGS

Highland Ravine crosses SR 65 approximately 0.4 mi southeast (toward the I-80/SR 65 Interchange) of Pleasant Grove Boulevard. The stream crosses SR 65 twice but only once within

the Project limits. The tributary to the south branch of Pleasant Grove Creek crosses SR 65 farther southeast of Highland Ravine just before the Galleria Boulevard overcrossing. The Highland Ravine crossing is a double 72-in. culvert.

Antelope Creek crosses SR 65 at the East Roseville Viaduct bridge immediately west of Taylor Road and the I-80/SR 65 Interchange. Secret Ravine generally flows parallel to I-80 within the Project limits, from the Taylor Road overcrossing, which is located 0.2 mi north of Roseville Parkway on I-80, to the Project's northern limits at Rocklin Road. Miners Ravine crosses I-80 immediately south of Atlantic Street near the Taylor Road off-ramp.

Sucker Ravine flows in the southwesterly direction, crossing beneath Rocklin Road between Granite Drive and Shaw Court. Further downstream, Sucker Ravine crosses beneath Lake Side Drive and Oakridge Street before being conveyed in a culvert beneath I-80 toward Secret Ravine. This culvert is located about 0.61 miles southwest of the Rocklin Road undercrossing.

Floodplains
According to the FEMA Flood Insurance Rate Maps (FIRMs) 06061C0477F, 06061C0477G, and 06061C0479G, Antelope Creek, Miners Ravine, and Secret Ravine are designated as Zone AE. Zone AE is described as areas subject to inundation by the 1% annual-chance flood event determined by detailed methods and where base flood elevations are provided. Secret Ravine is adjacent to the south side of eastbound I-80. Secret Ravine is also designated as Zone AE. The Sucker Ravine crossing of I-80 is designated as a Zone AO, which represents areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 ft. The remaining Project area is located within a Zone X region which is a designation pertaining to areas of flood with a recurrence interval of 500 years or more. For detailed floodplain information, please refer to the Project's *Location Hydraulic Study* (WRECO 2015).

Municipal Supply
No drinking water reservoirs or recharge facilities were identified within or adjacent to the Project area.

3.1.3.3 Groundwater Hydrology

Preliminary geotechnical data for the Project (Blackburn Consulting 2013b) indicate that the depth to groundwater beneath the Project area is variable due to:

- Significant changes in ground surface elevation
- The presence of alluvial sediments that extend through the central portion of the area
- Relatively hard, well-consolidated sediments and hard rock on the Project perimeter
- Presence of several creek beds

Regionally, the data show the groundwater elevation ranging from approximately 45 ft amsl at the west end of the Project to approximately 65 ft at the east end.

Regional groundwater levels at some locations could be greater than 100 ft below the existing ground surface and the gradient is to the west-southwest. While the groundwater mapping provides the approximate elevation of the deeper/regional groundwater conditions, groundwater that can impact Project design and construction may occur much shallower. In general, groundwater should be expected near the elevation of water in the adjacent creek beds such as Secret Ravine, Miners Ravine, and Antelope Creek. For example, the depth to groundwater at the east central portion of the Project (adjacent to Secret Ravine) is 10 ft to 25 ft, 2 ft to 5 ft at the west end (at Miners Ravine), and 0.5 ft to 9 ft at the northwest (East Roseville Viaduct [near Antelope Creek]).

3.1.4 Geology/Soils

The following geologic information is obtained from the Structures Preliminary Geotechnical Report for the Project (Blackburn Consulting 2013a). The Project area lies on the eastern margin of the Great Valley Geomorphic Province (Sacramento Valley portion). The Great Valley is bordered by the Coast Ranges to the west, the Sierra Nevada to the east, and the Cascade and Klamath ranges to the north. The valley was formed by tilting of the Sierran Block with the eastern side uplifted to form the Sierra Nevada and the western side dropping to form the valley. The valley deposits are characterized by a thick sequence of alluvial, lacustrine, and marine sediments. The thickness of the sediments varies from a thin veneer at the margin, to thousands of feet in the central portion. Granitic rock and volcanic deposits occur along the valley margin in the Project area. Based on review of published geologic maps, site review, and available subsurface information, the Project area is underlain by the following:

Granitic Rock

Granitic rock in the Project area is known as the Rocklin Pluton; it is composed of quartz diorite and is deeply weathered in many areas. Granitic rock occurs immediately west of the Rocklin Road Interchange within the Project area. The rock is typically decomposed to intensely weathered within approximately 5 to 10 ft of the surface with isolated “boulders” (or bodies) of moderately to slightly weathered, hard rock.

Mehrten Formation

Deposits of the Mehrten Formation in the Project area consist primarily of andesitic, volcanic mudflow breccia, and cobble conglomerate. Breccia consists of a gray mixture of gravel to boulder size, angular, andesitic fragments. These fragments are well cemented in a matrix of volcanic lapilli and ash (tuff). The conglomerate consists primarily of cobbles in a well-cemented matrix of andesitic sand and silt, and often contains interbedded layers of sandstone, siltstone, and lenses of mudflow breccia. In the Project area, the lowest portions of the Mehrten Formation are often underlain by claystones possibly associated with the Valley Springs or Ione Formations. Bedding of sediments and flows within the Mehrten Formation typically dip gently (2 to 4 degrees) to the west/southwest. These volcanic materials were deposited during Miocene time (5 to 20 million years ago).

Riverbank and Turlock Lake Formations

Sediments of the Riverbank and Turlock Lake formations occur in the central portion of the Project area. These are alluvial deposits that are typically composed of interbedded medium dense to dense sands (often cemented) and gravels, and stiff to hard silts and clays. Bedding is

typically horizontal, lenticular, and discontinuous. These sediments are Late to Middle Pleistocene age (deposited over 150,000 years ago).

Other Geologic Units
Several shallow waterways cross the Project area and these waterways may contain a certain thickness of young alluvial deposits. This includes alluvial deposits at the banks (stream terrace deposits) as well as active channel deposits. Alluvium likely consists of several feet of loose sand and gravel with some cobbles and boulders.

Highway embankment fill is also present at a number of locations along the Project corridor. The embankment fill is expected to be engineered fill, placed in accordance with Caltrans specifications, that consists of locally derived clay, silt, sand, and gravel.

Hydrologic Soil Group
Per the Natural Resources Conservation Service (NRCS) *Web Soil Survey*, the soils in the Project area primarily consist of Hydrologic Soil Group (HSG) D with some HSG B and C. Soils in HSG D have high runoff potential when thoroughly wet. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential. These soils have very low rate of water transmission (0-0.05 in/hr). Group B and C soils have a moderate to slow infiltration rate when thoroughly wet and have a moderate (0.15-0.30 in/hr) to low (0.05-0.15 in/hr) rate of water transmission.

3.1.4.1 Soil Erosion Potential

Erosion is the detachment and movement of soil material by natural processes, such as wind and water. The rate of soil erosion, which is dependent on the local landscape, climate, and soil properties, can be accelerated by human activities such as construction grading and excavation. In the Project vicinity, erosion from stormwater runoff is the dominant natural erosion process. The susceptibility of soils to water erosion is described by the K factor derived for the Universal Soil Loss Equation. The K factor is one of six parameters used in the Universal Soil Loss Equation to estimate the average annual rate of soil loss from water erosion on agricultural and construction sites.

Soils with a moderate susceptibility to water erosion have K factors between 0.25 and 0.4, and soils with a high susceptibility to water erosion have K factors greater than 0.4. Based on K factors estimated by the United States Department of Agriculture (USDA) NRCS, 3.3% of the Project soils have a high susceptibility to water erosion, with a K factor of 0.43; 67.4% of the Project soils have a moderate susceptibility to water erosion, with a K factor of 0.37 and 0.32; and the remaining 29.3% of the Project soils have a low susceptibility to water erosion or have no K factor rating.

3.1.5 Biological Communities

3.1.5.1 Aquatic Habitat

According to the *Delineation of Potential Waters of the United States, Including Wetlands* (ICF International 2014), a total of 9.5 ac of wetlands and other waters were identified in the

delineation area. In accordance with a preliminary jurisdictional approach, all these features were determined to be subject to the USACE's jurisdiction under CWA Section 404.

3.1.5.2 Stream/Riparian Habitats

Riparian forest and shrub communities occur along Antelope Creek, Miners Ravine, and Secret Ravine in the delineation area. The riparian communities contain varying associations of valley oak (*Q. lobata*), Fremont cottonwood (*Populus fremontii*), black willow (*salix gooddingii*), red willow (*S. laevigata*), and arroyo willow (*S. lasiolepis*). Common species in the understory are buttonwillow (*Cephalanthus occidentalis*), narrow-leaf willow (*S. exigua*), California blackberry (*R. ursinus*), and mugwort (*Artemisia douglasiana*). The invasive red sesbania (*Sesbania punicea*) shrub and Himalayan blackberry (*Rubus armeniacus*) were observed in the riparian forest along Miners Ravine.

Six areas of riparian forest in the delineation area exhibited positive indicators of all three federal wetland factors (hydrophytic vegetation, hydric soils, wetland hydrology) as defined by USACE. Two of the areas are on the east side of Antelope Creek, three are in the southern portion of the delineation area, and another occurs near the northeast corner of the Roseville Galleria Mall. The remainder of the riparian forest lacked positive indicators of one or more of the federal wetland criteria.

3.1.5.3 Wetlands

Vernal pools are a type of seasonal wetland; however, not all seasonal wetlands are vernal pools. The vegetation in areas identified as vernal pools included one or more of the following species typically found only in vernal pools: coyote thistle (*Eryngium castrense*), doublehorn calicoflower (*Downingia bicornuta var. picta*), horned downingia (*D. ornatissima*), annual hairgrass (*Deschampsia danthonioides*), smooth goldfields (*Lasthenia glaberrima*), vernal pool buttercup (*Ranunculus bonariensis var trisepaulus*), stalked popcornflower (*Plagiobothrys stipitatus var micranthus*), and whitehead navarretia (*Navarretia leucocephala ssp. leucocephala*). In terms of hydrology, areas identified as vernal pools exhibited a greater depth of ponding compared to seasonal wetlands, and also remained inundated for a longer duration than seasonal wetlands. Many vernal pools in the delineation area are located in the grassland that is south of the east terminus of Antelope Creek Drive. The rest of the vernal pools are located inside the cloverleaf loops of SR 65 at the exit for Stanford Ranch Road/Galleria Boulevard.

Seasonal wetlands occur in the portion of the delineation area adjacent to SR 65. Vegetation found in seasonal wetlands includes spike rush (*Eleocharis macrostachya*), tall flatsedge (*Cyperus eragrostis*), narrowleaf cattail (*Typha angustifolia*), Bermuda grass (*Cynodon dactylon*), pennyroyal, dallis grass (*Paspalum dilatatum*), curly dock (*Rumex crispus*), Italian ryegrass, brome fescue (*Festuca bromoides*), and hairy willowherb (*Epilobium ciliatum*).

Emergent wetlands in the delineation area were characterized by the presence of emergent vegetation and perennial hydrology. The emergent wetlands occur along Antelope Creek, in Highland Ravine, and on the southern side of SR 65 (just west of the Roseville Galleria Mall). The vegetation in emergent wetlands includes narrowleaf cattail, pennyroyal (*Mentha pulegium*),

false waterpepper (*Persicaria hydropiperoides*), hardstem bulrush (*Schoenoplectus acutus*), rough cocklebur (*Xanthium strumarium*), and variable flatsedge (*C. difformis*).

Seasonal wetlands in the delineation area lacked the plant species identified above as typically occurring in vernal pools. Additionally, although some of the plant species that inhabit seasonal wetlands also occur in emergent wetlands, the seasonal wetlands lacked the perennial hydrology of the emergent wetlands; i.e., the seasonal wetlands are inundated only during wetter times of the year.

3.2 Water Quality Objectives/Standards and Beneficial Uses

3.2.1 Surface Water Quality Objectives/Standards and Beneficial Uses

The Basin Plan (CVRWQCB Revised October 2011 with approved amendments) identifies narrative and numerical water quality objectives for the region. Excerpts from Chapter 3 "Water Quality Objectives" of the Basin Plan are included in Appendix A of this WQAR.

The general water quality objectives established within the Central Valley region include: bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, mercury, methylmercury, oil and grease, pesticides, pH, radioactivity, salinity, sediment, settleable material, suspended material, tastes and orders, temperature, toxicity, and turbidity.

The Basin Plan lists beneficial uses for one Hydrologic Unit number, 519.21, (Hydrologic Unit: Valley-American, Hydrologic Sub-area: Lower American) within and near the Project. Table 4 summarizes the beneficial uses for this Hydrologic Unit. Detailed descriptions of the individual beneficial uses are provided in the excerpts from Chapter 2 "Beneficial Uses" of the Basin Plan included in Appendix B of the WQAR.

Table 4. Beneficial Uses for Hydrologic Units

Hydrologic Unit Number	Hydrologic Unit	Hydrologic Sub-Area	Beneficial Uses										
			MUN	AGR	IND	REC-1	REC-2	WARM	COLD	MIGR	SPWN	WILD	NAV
519.21	Valley-American	Lower American	E	E	E	E	E	E	E	E	E	E	

Source: Central Valley Basin Plan

Notes:
AGR—Agricultural Supply
COLD—Cold Freshwater Habitat
IND—Industrial Service Supply
E—Existing Beneficial Uses
MIGR—Fish Migration
MUN—Municipal & Domestic Water Supply
NAV—Navigation
REC-1—Water Contact Recreation
REC-2—Non-contact Water Recreation
SPWN—Fish Spawning
WARM—Warm Freshwater Habitat
WILD—Wildlife Habitat

3.2.2 Groundwater Quality Objectives/Standards and Beneficial Uses

The Basin Plan identifies narrative and numerical groundwater objectives for the region. Excerpts from Chapter 3 "Water Quality Objectives" of the Basin Plan are included in Appendix A of this WQAR. The Central Valley RWQCB Basin Plan has established general water quality objectives for bacteria, chemical constituents, radioactivity, tastes and odors, and toxicity.

The Basin Plan states, "unless otherwise designated by the Regional Water Board, all ground waters in the Region are considered as suitable or potentially suitable, at a minimum, for municipal and domestic water supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO)." These groundwater beneficial uses are included in Appendix B of this WQAR.

3.3 Existing Water Quality

3.3.1 List of Impaired Waters

Miners Ravine is the only Project receiving water body listed on the 2010 Integrated Report (Clean Water Action Section 303[d] List/305[b] Report); and it is impaired for dissolved oxygen. The potential source for dissolved oxygen is unknown. The total maximum daily load for dissolved oxygen is expected to be completed in 2021.

4 ENVIRONMENTAL CONSEQUENCES

During construction, potential water quality impacts include sediment-laden discharge from DSAs and pollutant-laden discharge from storage or work areas. Temporary impacts can also result from construction near or within water resources. Permanent impacts to water quality can result from the addition of impervious area; this additional impervious area prevents runoff from naturally dispersing and infiltrating into the ground, resulting in increased concentrated flow. The additional flow has the potential to transport an increased amount of sediment and pollutants to waterways and water resources and create increased erosion resulting from changes to waterway hydrographs.

The projected DSA, existing paved area, and added impervious area are shown in Table 5 within the Caltrans R/W and Table 6 within the City of Roseville R/W. These numbers would be refined during the design process when more information is available.

Table 5. Estimated Disturbed Soil and Impervious Areas within Caltrans R/W

Hydrologic Unit Code – Hydrologic Sub-Area (Receiving Waterbodies)	Build Alternative 1		
	Disturbed Soil Area (acre)	Impervious Area (acre)	
		Existing	Added
180201110101 – Lower American (Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine)	117	76	26
180201610302 – Pleasant Grove (Highland Ravine and Tributary to South Branch Pleasant Grove)	30	13	4
Total	147	89	30

Hydrologic Unit Code – Hydrologic Sub-Area (Receiving Waterbodies)	Build Alternative 2		
	Disturbed Soil Area (acre)	Impervious Area (acre)	
		Existing	Added
180201110101 – Lower American (Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine)	120	76	24
180201610302 – Pleasant Grove (Highland Ravine and Tributary to South Branch Pleasant Grove)	31	13	4
Total	151	89	28

Hydrologic Unit Code – Hydrologic Sub-Area (Receiving Waterbodies)	Build Alternative 3		
	Disturbed Soil Area (acre)	Impervious Area (acre)	
		Existing	Added
180201110101 – Lower American (Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine)	123	75	22
180201610302 – Pleasant Grove (Highland Ravine and Tributary to South Branch Pleasant Grove)	33	13	4
Total	156	88	26

Within the Caltrans R/W, Alternative 1 proposes the most impervious area with 30 ac but proposes the least disturbed soil area with 147 ac. Alternative 2 proposes 28 ac of added

impervious area and 151 ac of disturbed soil area. Alternative 3 proposes the least impervious area added with 26 ac but proposes the most disturbed soil area, 156 ac within the Caltrans R/W.

Table 6. Estimated Disturbed Soil and Impervious Areas within City of Roseville R/W

Hydrologic Unit Code – Hydrologic Sub-Area (Receiving Waterbodies)	Build Alternative 1		
	Disturbed Soil Area (acre)	Impervious Area (acre)	
		Existing	Added
180201110101 – Lower American (Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine)	13	6	1

Hydrologic Unit Code – Hydrologic Sub-Area (Receiving Waterbodies)	Build Alternative 2		
	Disturbed Soil Area (acre)	Impervious Area (acre)	
		Existing	Added
180201110101 – Lower American (Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine)	13	6	1

Hydrologic Unit Code – Hydrologic Sub-Area (Receiving Waterbodies)	Build Alternative 3		
	Disturbed Soil Area (acre)	Impervious Area (acre)	
		Existing	Added
180201110101 – Lower American (Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine)	21	6	1

Within the City of Roseville R/W, Alternative 1 and Alternative 2 have the same disturbed soil area with 13 ac. Alternative 3 has more disturbed soil area with 21 ac. All three alternatives have the same added impervious area of 1 ac within the City of Roseville R/W.

4.1 Potential Impacts to Water Quality

4.1.1 Anticipated Changes to the Physical/Chemical Characteristics of the Aquatic Environment

This Project would result in an increase of impervious area and therefore could potentially increase the volume and velocity of stormwater flow to downstream receiving water bodies. In addition, pollutant loading could also be increased. The added impervious area is directly related to the potential permanent water quality impacts. Stormwater runoff from the Project corridor drains directly into creek crossings and to nearby storm drain systems, which ultimately discharge into lined and unlined channels. Because of the added impervious area, Build Alternative 1 would have the greatest impact on runoff volume and velocity. With the greatest DSA, Build Alternative 3 would have the most potential impact on sedimentation and erosion during construction.

4.1.1.1 Currents, Circulation, or Drainage Patterns

The proposed widening and modifications to the existing freeway under all build alternatives would result in the fill or removal of existing ditches, modification or relocation of existing longitudinal drainage structures, extension or relocation of existing cross culverts, and construction of new drainage structures. The goal of the Project drainage design would be to maintain existing drainage patterns. Also, the additional impervious area created by the Project

may result in impacts to the existing hydrograph, including increases in low flow and peak flow velocity and volume to Project water bodies.

The Project proposes work within waterway crossings to widen or replace existing bridges and culvert structures. In addition, the Project proposes new bridges. The widened, replaced, or new bridges and culverts could result in changes to creek characteristics at the crossing and upstream and downstream of the crossing depending on the geometry of the proposed bridge or culvert.

4.1.1.2 Suspended Particulates (Turbidity)

Sources of sediment that could result in increases in turbidity include uncovered or improperly covered active and non-active stockpiles, unstabilized slopes and construction staging areas, and construction equipment not properly maintained or cleaned.

This Project would result in the creation of additional impervious area, which increases the amount of runoff not infiltrated or dispersing over unpaved surfaces. This non-infiltrated and concentrated runoff could result in the direct discharge of sediment-laden flow from the roadway to receiving water bodies. However, the additional impervious would be insignificant relative to the 60 sq mi of the combined watershed drainage areas of the waterways. Also, the additional traffic lanes would allow for an increased area for deposition of sediment and other pollutants from vehicular traffic that can be discharged from the Project corridor. Any storm water impacts would be impacted through proper implementation of permanent design pollution prevention best management practices (BMPs).

4.1.1.3 Oil, Grease, and Chemical Pollutants

Heavy metals associated with vehicle tire and brake wear, oil and grease, and exhaust emissions are the primary pollutants associated with transportation corridors. Generally, highway stormwater runoff has the following pollutants: Total Suspended Solids, nitrate nitrogen, Total Kjeldahl Nitrogen, phosphorus, ortho-phosphate, copper, lead, and zinc. The pollutants are dispersed from tree leaves, combustion products from fossil fuels, and the wearing of brake pads and tires. The No-build Alternative could have potential permanent water quality impacts due to increasing congestion, leading to greater deposition of particulates from exhaust and heavy metals from braking. The three build alternatives could also result in increased deposition of particulates due to increased traffic loads throughout the corridor.

4.1.1.4 Flood Control Functions

The goal of the Project is to avoid and minimize effects to existing floodplains. The Project may require the need to widen, extend, or modify existing bridge and culvert crossings, as well as new bridge crossings, within existing floodplains or areas prone to localized flooding. The Project *Location Hydraulic Study* (WRECO 2015) provides a detailed analysis of Project effects to existing identified floodplains.

4.1.1.5 Erosion and Accretion Patterns

The increase in impervious area can result in the modification of existing receiving water body hydrographs by increasing the flow volumes and rates and peak durations from the loss of unpaved overland flow and native infiltration (hydromodification). These hydromodification

impacts can cause increased bed and bank erosion, loss of habitat, increased sediment transport and deposition, and increased flooding. Build Alternative 1 has the greatest added impervious area impact with 33 ac.

4.1.1.6 Aquifer Recharge/Groundwater

As previously discussed in this section, this Project would result in the addition of impervious area and reduce the available unpaved area that previously allowed runoff to infiltrate into the native soils. The reduction of runoff infiltrating through native soils has the potential to: 1) result in loss in volume or amount of water that previously recharged localized aquifers; and 2) reduce regional groundwater volumes. The reduction in local aquifer and groundwater recharge also has the potential to impact the beneficial uses of groundwater basins; the groundwater beneficial uses are detailed in Section 3.2.2 of this report.

Regional groundwater levels at some locations could be greater than 100 ft below the existing ground surface. Between the three build alternatives, Build Alternative 1 would have the greatest impact with an estimated added impervious area of 33 ac. The North American groundwater subbasin of the Sacramento Valley groundwater basin is 548 sq mi, so the Project would only increase the impervious area by 0.009%. While this minimal increase in impervious area would reduce the available area for infiltration of stormwater, groundwater impacts would be minimal.

4.1.1.7 Baseflow

The increase of impervious surfaces compared with the total watershed areas would be minimal. The amount of surface runoff that infiltrates into the groundwater system would be minimally affected; therefore, the amount of base flow to creeks and ravines would be minimally affected. The impacts would be insignificant in comparison to the overall baseflow and to the resilience in the natural hydrologic cycle.

4.1.2 Anticipated Changes to the Biological Characteristics of the Aquatic Environment

4.1.2.1 Habitat for Fish and Other Aquatic Organisms

Fish Passage (Beneficial Uses)

The hydrologic unit of the Project is identified as having the combined beneficial uses of cold freshwater habitat, warm freshwater habitat, and wildlife habitat (see Table 4). In addition, Hydrologic Unit Number 519.21 has the beneficial uses of both fish migration and fish spawning. Work within or near these hydrologic units may impact these beneficial uses. DSA created from grading, equipment mobilization and other construction activities could result from the proposed fill within these water bodies. The loss of habitat, migration, or spawning abilities could result from the proposed fill within these water bodies from proposed bridge improvements and culvert extensions required to construct the proposed widened roadway. The permanent increase in impervious area could result in a permanent increase in pollutant loading, plus hydromodification impacts can result in localized or downstream alterations to water-body characteristics including erosion and loss of habitat due to increased velocities and volumes.

4.1.3 Anticipated Changes to the Human Use Characteristics of the Aquatic Environment

4.1.3.1 Recreational or Commercial Fisheries

The creeks and ravines have not been identified as having beneficial uses of ocean, commercial, and sport fishing and shellfish harvesting. As such, no commercial fisheries would be directly affected by the construction or operation of the Project. The receiving water bodies have been identified as having the combined existing beneficial uses of water contact recreation (REC-1) and non-contact water recreation (REC-2). The Project may temporarily impact these beneficial uses during construction.

4.1.4 Short-Term Impacts During Construction

4.1.4.1 Physical/Chemical Characteristics of the Aquatic Environment

Earth moving and other construction activities could cause minor erosion and runoff of topsoils into the drainage systems along the Project corridor during construction, which could temporarily affect water quality in creeks and ravines. During construction, temporary drainage facilities may be required to redirect runoff from work areas. Sediment-laden flow could result from runoff flowing over DSAs, and could enter storm drainage facilities or directly discharge into receiving water bodies, increasing turbidity and decreasing the clarity and beneficial uses of the receiving water body.

During construction, Build Alternatives 1, 2, and 3 would have the potential for temporary water quality impacts due to grading and excavation activities, which could cause increased erosion. Stormwater runoff from the Project site may transport pollutants to nearby receiving waters and storm drains if BMPs are not properly implemented. Generally, as the DSAs increase, the potential for temporary water quality impacts also increases. Within the Caltrans R/W, the proposed Project has an estimated DSA of 147 ac for Build Alternative 1; 151 ac for Build Alternative 2; and 156 ac for Build Alternative 3. Within the City of Roseville R/W, the proposed Project has an estimated DSA of 13 ac for Build Alternative 1 and Build Alternative 2, and 21 ac for Build Alternative 3. Based on the preliminary calculated area, the Project would have potential water quality impacts during construction.

Fueling or maintenance of construction vehicles would occur within the Project site during construction, so there would be a risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials could pose a threat to water quality if contaminants enter storm drains, open channels, or surface water receiving bodies. The magnitude of the impact from an accidental release depends on the amount and type of material spilled.

The proposed Project does not involve substantial excavations that would affect groundwater resources. As indicated in Section 3.1.3.3, the shallow groundwater averages 4 to 13 ft below ground surface, and the Project alternatives would involve excavation for the installation of the elevated new bridge structures; therefore, dewatering would be anticipated for the Project. Currently, Antelope Creek and Miners Ravine are the water bodies where in-water work is

planned and where temporary creek diversion or dewatering is expected. Construction within other creek channels or at cross culvert locations may be necessary, so temporary stream crossings, clear water diversions, and dewatering would be considered as appropriate.

5 AVOIDANCE AND MINIMIZATION MEASURES

The proposed Project is expected to result in less than significant impacts to water quality with the following avoidance and minimization measures incorporated into the Project design and construction. Unless otherwise stated within this Section, the avoidance and minimization measures are expected to be similar for Build Alternatives 1, 2, and 3.

5.1 Avoidance and/or Minimization Measures for Water Resources

Temporary construction site BMPs would be implemented during construction to prevent any construction materials or debris from entering surface waters or channels within the Project vicinity. Design pollution prevention and erosion control BMPs would be implemented prior to, during, and after construction to prevent silt and sediment from entering surface waters.

According to the *Delineation of Potential Waters of the United States, Including Wetlands* (ICF International 2014), a total of 6.7 ac of wetlands and other waters were identified in the delineation area. This Project proposes work within or near water bodies that are identified as waters of the State and waters of the U.S.; therefore, a 404 Permit from the U.S. Army Corps of Engineers and a 401 Water Quality Certification from the Central Valley RWQCB are expected to be required for this Project. Additional permits for this Project may include, but are not limited to, a 1602 Streambed Alteration Agreement from the California Department of Fish and Wildlife, and a Biological Opinion from the U.S. Fish and Wildlife Service. Each of the permits or agreements would detail specific temporary and permanent impacts to the appropriate jurisdiction, required actions or BMPs to be used to avoid or minimize impacts to water resources, and specific mitigation efforts to enhance or restore water resources. Work in the creek would be limited to the drier months per the permit requirements.

To minimize potential impacts to waters of the U.S., construction activities would be limited to the smallest area possible to complete the proposed work. Construction would follow approved BMPs, including but not limited to erosion control, sediment control, spill prevention, and vehicle/equipment refueling measures to minimize any potential for impacting wetlands and waters onsite or downstream of the Project.

A qualified biologist would clearly delineate the limited construction areas and environmentally sensitive areas (ESAs), if any, for incorporation into the Project plans and specifications. The construction crew would be alerted if a sensitive habitat exists adjacent to the construction zone. Before construction begins, the contractor would install ESA fencing to clearly delineate protected areas and would confine workers and equipment to the designated construction areas.

5.2 Avoidance and/or Minimization Measures for Stormwater and Groundwater

The design features to address water quality impacts are a condition of Caltrans' NPDES permit, CGP, and other regulatory agency requirements. Implementation of details for these design features or BMPs would be developed and incorporated into the Project design and operations

prior to the Project construction. With proper implementation of these design features or BMPs, short-term construction-related water quality impacts and permanent water quality impacts would be avoided or minimized.

5.2.1 Construction General Permit

All three build alternatives would disturb more than one ac of soil, so in accordance with the CGP, this Project is required to perform a risk assessment to determine the Project risk level. The Project risk level is determined from the sediment risk and the receiving water risk. The sediment risk is determined from the product of the rainfall-runoff erosivity factor (R), the soil erodibility factor (K), and the length-slope factor (LS). The R factor was determined from the U.S. EPA "Stormwater Phase II Final Rule Construction Rainfall Erosivity Waiver" Fact Sheet 3.1 (EPA 833-F-00-014, Revised March 2012) with a two-year construction duration because the Project would be broken up into segments. The K and LS factors were determined from the Caltrans Stormwater Design Application website. To be conservative, the maximum K and LS values within each hydrologic unit were used to determine the sediment risk. The factors used to determine the hydrologic unit sediment risk are included in Appendix C and summarized in Table 7. The sediment risk is classified as low when the product of the R, K, and LS factors is less than 15, medium when the product is between 15 and 75, and high when the value is greater than 75.

Table 7. Sediment Risk by Hydrologic Unit

PM Limit	Hydrologic Unit – Hydrologic Sub-Area	R	K	LS
I-80 1.9 to 6.1 & SR 65 4.8 to R5.58	Valley American-Lower American	100	0.20	0.85 to 1.48
SR 65 R5.58 to R7.3	Valley American-Pleasant Grove	100	0.20	1.37

A sediment-sensitive water body is either on the most recent 303d list for water bodies impaired for sediment; has a USEPA-approved Total Maximum Daily Load implementation plan for sediment; or has the beneficial uses of COLD, SPWN, and MIGRATORY. A project that meets at least one of the three criteria has a high receiving water risk. The Hydrologic Sub-area 519.21 has the beneficial uses of COLD, SPWN, and MIGRATORY, and therefore, the receiving water risk for that planning watershed is high. The other undefined planning watershed from SR 65 PM R5.58 to R7.3 is not a sediment-sensitive water body; and therefore, has a low receiving water risk.

Table 8 summarizes the sediment and receiving water risk by hydrologic unit, and presents the risk level for each hydrologic unit. The sediment risk was determined to be medium. The risk level is classified as Risk Level 1 if both the sediment and receiving water risk are low, is classified as Risk Level 3 if both the sediment and receiving water risk are high, and all other combinations are classified as Risk Level 2.

Table 8. Risk Level by Hydrologic Unit

Hydrologic Unit – Sub-area	Sediment Risk	Receiving Water Risk	Risk Level	Disturbed Soil Area (acre)		
				Alternative 1	Alternative 2	Alternative 3
Valley American- Lower American	Medium	High	2	117	120	123
Valley American-Pleasant Grove	Medium	Low	2	40	41	43
Total Disturbed Soil Area				157	161	166

All risk levels are subject to temporary construction site BMP implementation and visual monitoring requirements. The hydrologic units identified as Risk Level 2 require stormwater sampling at all discharge locations. For Risk Levels 2 and 3, samples are subject to Numeric Action Levels for pH, turbidity, and non-visible pollutants, if applicable.

The risk level presented in this section is based on planning level information available at the time of preparation of this WQAR. The actual hydrologic unit or overall Project risk level will be refined during the Project design phase.

5.2.2 Project Construction

Because the Project must comply with the CGP, a Notice of Intent (NOI) would need to be filed with the SWRCB's Storm Water Multiple Application and Report Tracking System. Caltrans would require the Project's contractors to implement a SWPPP to comply with the conditions of Caltrans' MS4 permit and CGP to address the temporary water quality impacts resulting from the construction activities associated with this proposed Project.

The SWPPP would be submitted by the Contractor and approved by Caltrans prior to the start of construction. The SWPPP is intended to address construction-phase impacts, and include, at minimum, the following elements:

- Project Description – The Project description includes maps and other information related to construction activities and potential sources of pollutants.
- Minimum Construction Control Measures – These measures may include limiting construction access routes, stabilization of areas denuded by construction, and using sediment controls and filtration.
- Erosion and Sediment Control – The SWPPP is required to contain a description of soil stabilization practices, control measures to prevent a net increase in sediment load in stormwater, controls to reduce tracking sediment onto roads, and controls to reduce wind erosion.
- Non-Stormwater Management – The SWPPP includes provisions to reduce and control discharges other than stormwater.
- Post-Construction Stormwater Management – The SWPPP includes a list of stormwater control measures that provide ongoing (permanent) protection for water resources.
- Waste Management and Disposal – The SWPPP includes a waste management section including equipment maintenance waste, used oil, batteries, etc. All waste must be disposed of as required by state and federal law.

- Maintenance, Inspection, and Repair – The SWPPP requires an ongoing program to ensure that all controls are in place and operating as designed.
- Monitoring – This provision requires documented inspections of the control measures.
- Reports – The contractor will prepare an annual report on the construction project and submit this report on July 15 each year. This report will be submitted on the Storm Water Multiple Application and Report Tracking System website to the SWRCB.
- Training – The SWPPP provides documentation on the training and qualifications of the designated Qualified SWPPP Developer and Qualified SWPPP Practitioner. Trained personnel must do inspections, maintenance, and repair of construction site BMPs.
- Construction Site Monitoring Program – The SWPPP includes a Construction Site Monitoring Program detailing the procedures and methods related to the visual monitoring and sampling and analysis plans for non-visible pollutants, sediment and turbidity, pH and bioassessment.

To obtain permit coverage under the CGP, all dischargers must electronically file Permit Registration Documents, changes of information, sampling and monitoring information, annual reporting, and other compliance documents required through the SWRCB's Storm Water Multiple Application and Report Tracking System.

Caltrans is required to reduce pollutants in stormwater discharges to the maximum extent practicable. For discharges from a construction site, pollutants must be reduced using the Best Available Technology Economically Achievable (BATEA), and conventional pollutants (i.e., total suspended solids and pH) must be reduced using Best Conventional Technology.

5.2.3 List of Proposed Temporary Construction Site Best Management Practices

Potential temporary impacts to water quality can be avoided or minimized by implementing standard BMPs recommended for a particular construction activity. The selected temporary BMPs are consistent with the practices required under the CGP and Caltrans MS4 permit and are intended to achieve compliance with the requirements of the permits. Compliance with the requirements of these permits, and adherence to the conditions, would reduce or avoid potentially significant construction-related impacts.

Adverse impacts can occur during construction-related activities. Soil erosion, especially during heavy rainfall, can increase the suspended solids, dissolved solids, and organic pollutants in stormwater runoff generated within the Project limits. These conditions can persist until completion of construction activities and implementation of long-term erosion control measures.

The potential bridge widening and cross culvert extensions or modifications may require the need for dewatering, temporary creek diversion, and material and equipment use over water. Contract documents would address any necessary permits for dewatering or temporary creek diversion. Scheduling is also a BMP that should be considered. Work proposed in wetlands or waters of the U.S. or waters of the State will need to be scheduled according to the appropriate regulatory agency requirements.

Non-stormwater waste management is also essential to minimize the potential for water quality impacts. Accidental spills of petroleum hydrocarbons (such as fuels and lubricating oils), concrete wastewater, and possibly sanitary wastes from construction work site wash facilities are also of concern during construction activities. An accidental release of these wastes could adversely affect surface water quality, vegetation, and wildlife habitat.

A spill on the roadway would trigger immediate response actions to report, contain, and mitigate the incident. The California Office of Emergency Services has developed a Hazardous Materials Incident Contingency Plan, which provides a program for response to spills involving hazardous materials. The plan designates a chain of command for notification, evacuation, response, and cleanup of spills. Caltrans also has spill contingency procedures and response crews. According to the Draft Initial Site Assessment Update (Blackburn Consulting 2014), there is a potential for hazardous materials within or adjacent to the Project boundaries that could impact the Project. The potential hazardous materials are summarized below:

- Asbestos-containing materials, lead-based paints, leach fields, septic tanks, and heating oil tanks
- Gasoline released from underground storage tanks
- Aerially deposited lead
- Lead and chromium
- Treated wood waste

Erosion control measures can be applied to all exposed areas during construction, including the trapping of sediment within the construction area through the placing of barriers, such as silt fences, at the perimeter of downstream drainage points or through the construction of temporary detention basins. Other methods of minimizing erosion impacts could include the implementation of hydromulching and/or limiting the amount and length of exposure of graded soil. In addition to these erosion control measures, the use of compost is strongly encouraged by Caltrans. Compost not only improves erosion resistance and vegetation establishment, but it also helps immobilize heavy metals that are common along highways. Compost would be considered or specified at the design phase of the Project.

The *Project Planning and Design Guide* (PPDG) (Caltrans 2010) describes approved erosion control BMPs. Temporary erosion control and water quality measures would be defined in detail in the contract documents. The proposed construction site BMPs would be reviewed and approved by the Construction Stormwater Coordinator during the plans, specifications, and estimate phase.

The suggested minimum temporary control BMPs that would be necessary for the Project are included in Table 9. Further evaluation of the BMPs necessary for this Project to comply with the CGP and Caltrans MS4 Permit would be detailed during the plans, specifications, and estimate phase. Furthermore, during construction, the Contractor would be required to detail in the SWPPP actual in-field implementation of the BMPs, and amend the SWPPP as necessary to match field conditions and phasing of the Project.

Table 9. Temporary BMPs

Temporary BMP	Purpose
Soil Stabilization	
Hydroseeding	Locations where permanent erosion control or revegetation to sustain slopes as required within the Project limits.
Geotextiles, Mats, Plastic Covers, and Erosion Control Blankets	Plastic covers for stockpiles.
Hydraulic Mulch	This is a mixture of shredded wood fiber or a hydraulic matrix and a stabilizing emulsion or tackifier with hydroseeding equipment, which temporarily protects exposed soil from erosion.
Sediment Control	
Fiber Rolls	Degradable fibers rolled tightly and placed on the toe and face of slopes to intercept runoff.
Silt Fence	Linear, permeable fabric barriers to intercept sediment-laden sheet flow. Placed downslope of exposed soil areas, along channels and Project perimeter.
Sediment Trap	Temporary containment area that allows sediment in collected storm water to settle out during infiltration or before the runoff is discharged through a stabilized spillway.
Gravel Bag Berm	Single row of gravel bags installed end to end to form a barrier across a slope to intercept runoff. Can be used to divert or detain moderately concentrated flows.
Check Dams	Small constructed device of rock or other product placed across a channel or ditch to reduce flow velocity.
Storm Drain Inlet Protection	Runoff detainment devices used at storm drain inlets that is subject to runoff from construction activities.
Tracking Control Practices	
Temporary construction entrance	Points of entrance/exit to a construction site that are stabilized to reduce the tracking of mud and dirt onto public roads.
Non-Stormwater Controls	
Dewatering Operations	Practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location so that construction work may be accomplished.
Material and Equipment Use Over Water	Use, storage, and disposal of materials and equipment on barges, boats, temporary construction pads, other platforms or similar locations that minimize or eliminate the discharge of potential pollutants to a watercourse.
Clear Water Diversion	For work within live creeks. Prevents sediment and water from disrupting construction activities.
Temporary Stream Crossing	Structure placed across a waterway that allows vehicles to cross the waterway during construction, minimizing, reducing or managing erosion and downstream sedimentation caused by vehicles.
Potable Water/Irrigation	Manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, discharges from potable water sources, water line flushing, and hydrant flushing.
All other anticipated non-stormwater management measures are covered under Job Site Management.	
Waste Management and Materials Pollution Control	
Concrete Waste Management	Specified vehicle washing areas to contain concrete waste materials.
Hazardous Waste Management and Contaminated Soil Management are covered in Section 14-11 of the Standard Specifications.	
All other anticipated waste management and materials pollution control measures are covered under Job Site Management.	

Several other temporary water quality or construction site BMPs are listed in the Caltrans Stormwater Quality Handbooks, and each should be considered for inclusion as the design progresses.

5.2.4 Permanent Pollution Prevention Design Measures

The Caltrans MS4 permit contains provisions to reduce, to the maximum extent practicable, pollutant loadings from the facility once construction is complete. The permit stipulates that permanent measures that control pollutant discharges must be considered and implemented for all new or reconstructed facilities. Permanent control measures located within Caltrans' right-of-way reduce pollutants in stormwater runoff from the roadway. These measures reduce the suspended particulate loads, and thus pollutants associated with the particles, from entering waterways. The measures would be incorporated into the final engineering design or landscape design of the Project and would take into account expected runoff from the roadway. In addition, the permit also stipulates that an operation and maintenance program be implemented for permanent control measures. This category of water quality control measures can be identified as including both design pollution prevention BMPs and treatment BMPs.

Many design elements that are traditionally part of highway, drainage, and landscape design for a project are considered beneficial to pollution prevention. The designers must consider all of the items discussed in the following sub-sections.

5.2.4.1 List of Proposed Design Pollution Prevention BMPs

Consideration of downstream effects related to potentially increased flow

Low impact development (LID) measures include treatment devices that reduce the rate of runoff, filter pollutants, and allow infiltration into the ground. The proposed measures to address peak flow attenuation impacts can include structural measures, such as detention, underground storage, and non-structural measures, through the modification of proposed treatment BMPs to accommodate flow and volume control. Energy dissipation devices include rock slope protection (RSP) and flared end sections (FES). The Project would discharge into unlined channels; therefore, necessary erosion control should be applied to the ditches. Increased sediment loads may be transported to downstream waterways; therefore, permanent erosion control measures should be applied to all new or exposed slopes.

Concentrated flow conveyance systems

The Project would:

1. Have the potential to create water gullies
2. Create or modify existing slopes
3. Require the concentration of surface runoff
4. Require cross drains

Each of the above conditions would require the proper design to the drainage facilities listed below to handle concentrated flows:

1. Ditches, berms, dikes, and/or swales

2. Overside drains
3. Flared end sections
4. Outlet protection/velocity dissipation devices
    a. Riprap
    b. Grouted riprap
    c. Concrete apron
    d. Riprap apron

Slope/surface protection systems
The Project would create or modify existing slopes requiring the application of one or more of the following control measures:

1. Vegetated surfaces:
    a. Hydroseeding
    b. Preservation of existing vegetation
    c. Soil binders
2. Hard surfaces:
    a. Geotextiles, plastic covers & erosion control blankets/mats
    b. Lined ditches
    c. Slope drains

Preservation of existing vegetation
At all locations, preserving existing vegetation is beneficial. The following general steps should be taken to preserve existing vegetation during the Design Phase:

1. Identify and delineate in contract documents all vegetation to be retained.
2. Designer should provide specifications in contract documents that the Contractor shall delineate the areas to be preserved in the field prior to the start of soil-disturbing activities.
3. Designer should provide specifications in contract documents that the Contractor shall minimize disturbed areas by locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce areas of cut and fill.
4. Designer should, when specifying the removal of vegetation, consider provisions included in the contract documents to minimize impacts (increased exposure or wind damage) to the adjacent vegetation that will be preserved.

5.2.4.2 List of Proposed Treatment BMPs

Section 4 of the PPDG presents the methods used to determine if a Project is required to consider the use of treatment BMPs. This Project would be required to consider the use of treatment BMPs because this Project is not classified as an emergency project, directly discharges to surface waters, is a major reconstruction project, and would result in the addition of one ac or more of impervious area. The estimated added impervious area for each hydrologic unit within the Project limits is shown in Table 5.

Caltrans has an approved list of treatment BMPs that have been studied and verified to remove targeted design constituents and provide general pollutant removal. The following is the list of these treatment BMPs:

- Biofiltration Systems
- Infiltration Devices
- Detention Devices
- Dry Weather Flow Diversion
- Gross Solids Removal Devices (GSRDs)
- Media Filters
- Multi-Chamber Treatment Train
- Wet Basins

5.2.4.3 Project Operation and Maintenance

Because the Caltrans Maintenance Unit is responsible for maintaining I-80, SR 65, and BMP facilities once the Project is complete, the Maintenance Unit would be involved in the development process from conception through construction. The Maintenance Unit field representative has unique insight into local problems and maintenance and safety concerns. The Caltrans Maintenance Unit typically comments on the following Project-related issues:

- Drainage patterns (particularly known areas of flooding, debris, etc.)
- Stability of slopes and roadbed (help determine if the Project can be built and maintained economically)
- Possible material borrow or spoil sites
- Concerns of the local residents
- Existing and potential erosion problems
- Facilities within the right-of-way that will affect alternative designs
- Special problems such as deer crossings, endangered species, etc.
- Whether facilities are safe to maintain
- Known environmentally sensitive areas
- Frequency of traction sand use and estimate of sand quantity applied annually

The Maintenance Stormwater Coordinator would be involved in the design review of any permanent stormwater treatment BMPs and would need to approve any such devices at the end of the plans, specifications, and estimate phase.

5.3 Water Quality Assessment Checklists

The following list of questions is from the Hydrology and Water Quality Checklist from Section 8 of the CEQA Environmental Checklist Form. The possible answers are: "Potentially Significant Impact," "Less than Significant," "Less than Significant Impact," and "No Impact."

Does the Project:

a) *Violate any water quality standards or waste discharge requirements?*

Less than Significant Impact

The primary potential for impacts to water quality is soil erosion or suspended solids being introduced into the waterways. The proposed Project would have a proposed soil disturbance of 1 ac or more, and therefore would be regulated under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002). This CGP is also referenced in Caltrans' NPDES Permit, from the SWRCB (Order No. 2012-0011-DWQ, NPDES No. CAS000003). Stormwater discharges from Caltrans' transportation properties, facilities, and activities are regulated through this Permit. Minimization measures that comply with Caltrans' NPDES permit such as requiring the contractor to submit a SWPPP prior to start of construction and implementing permanent BMPs such as erosion control and treatment BMPs in the Project to address long-term impacts, including the control of sediment, suspended solids, and general pollutant removal. For the areas of the Project outside of the Caltrans R/W, the Project is under a Phase II Municipal Separate Storm Sewer System (MS4), which would be subject to the Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Systems, effective on July 1, 2013. Therefore, the proposed Project would comply with all water quality standards and waste discharge requirements, and the impact to water quality would be less than significant.

b) *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

Less than Significant Impact

Groundwater recharge is reduced when the ground is compacted or when it is covered completely (by development) and less water can seep into the soil. Implementing Caltrans approved permanent treatment BMPs to the maximum extent practicable, such as biofiltration strips or swales, detention devices, and earthen based media filter systems has the potential to reduce impervious area runoff from directly discharging into receiving water bodies and promote infiltration through native soils. Between the three build alternatives, Build Alternative 1 would have the greatest impact with an estimated added impervious area of 33 ac. The North American groundwater subbasin of the Sacramento Valley groundwater basin is 548 sq mi, so the Project would only increase the impervious area by 0.009%. While this minimal increase in impervious area would reduce the available area for infiltration of stormwater, groundwater impacts would be minimal.

c) *Substantially alter the existing drainage pattern of the site area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?*

Less than Significant Impact

Existing culverts may be extended and/or replaced to accommodate the wider roadway, but the existing drainage pattern is not expected to change. No stream or river is planned to be altered such that substantial erosion or siltation would be expected to result. The objective of the drainage design would be to limit the design water surface elevations and velocities to no greater than the existing conditions, or to what can be handled by the existing conditions, at the boundary of the proposed Project. Long-term erosion and sediment controls would be addressed with permanent treatment BMPs, and short-term erosion and sediment controls would be addressed with construction site BMPs. These BMPs would be implemented to ensure that sediment potential would not increase.

d) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?*

Less than Significant Impact

Existing drainage patterns are planned to be perpetuated. While the proposed Project would introduce additional pavement (impervious surface area), the effect on the flow rate and amount of surface runoff would be managed by the proposed hydromodification mitigation or other associated treatment and drainage facilities. The design goal of hydromodification mitigation as a minimization measure is to maintain preconstruction stormwater discharge flows by metering or detaining these flows prior to discharging to a receiving water body.

According to the Location Hydraulic Study (WRECO 2015), the Project would cause encroachments from the bridge widening at Antelope Creek and Miners Ravine; I-80/SR 65 Connector replacement bridges over Secret Ravine; and a ramp re-alignment near Miners Ravine. There would be longitudinal encroachments at Secret Ravine and Miners Ravine as a result of the proposed actions. Antelope Creek, Secret Ravine and Miners Ravine would also have encroachments on their floodways due to proposed bent locations of the bridge structures over these creeks. However, the Project would not support potentially incompatible floodplain development or cause traffic interruptions, and longitudinal encroachments would be minimal. There would be minimal water surface elevation changes caused by the Project.

e) *Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?*

Less than Significant Impact

The proposed Project increases the total impervious surface area within its limits, and therefore, is expected to increase the volume of stormwater runoff. Potential sources of pollutants from the right-of-way include: total suspended solids, nutrients, pesticides, particulate metals, dissolved metals, pathogens, litter, biochemical oxygen demand, and total dissolved solids. As minimization measures, existing drainage facilities within the Project limits may be extended, replaced, repaired, and/or improved as necessary to provide proper off-site and highway drainage. In compliance with Caltrans' MS4 requirements, water quality treatment BMPs would be included where practicable. The impact to runoff, therefore, is expected to be less than significant.

f) *Otherwise substantially degrade water quality?*

Less than Significant Impact

The Project would follow the requirements set forth in the NPDES permits. These permits require the contractor to submit a SWPPP with the appropriate temporary BMPs as minimization measures to eliminate the degradation of water quality to the maximum extent practicable. Therefore, the impact of the proposed Project to water quality is expected be less than significant.

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Appendix A Basin Plan Water Quality Objectives

Appendix A.1 Objectives for Surface Waters

already resulted in water quality objectives being exceeded. The Regional Water Board recognizes that man made changes that alter flow regimes can affect water quality and impact beneficial uses.

The **third point** is that objectives are to be achieved primarily through the adoption of waste discharge requirements (including permits) and cleanup and abatement orders. When adopting requirements and ordering actions, the Regional Water Board considers the potential impact on beneficial uses within the area of influence of the discharge, the existing quality of receiving waters, and the appropriate water quality objectives. It can then make a finding as to the beneficial uses to be protected within the area of influence of the discharge and establish waste discharge requirements to protect those uses and to meet water quality objectives. The objectives contained in this plan, and any State or Federally promulgated objectives applicable to the basins covered by the plan, are intended to govern the levels of constituents and characteristics in the main water mass unless otherwise designated. They may not apply at or in the immediate vicinity of effluent discharges, but at the edge of the *mixing zone* if areas of dilution or criteria for diffusion or dispersion are defined in the waste discharge specifications.

The **fourth point** is that the Regional Water Board recognizes that immediate compliance with water quality objectives adopted by the Regional Water Board or the State Water Board, or with water quality criteria adopted by the USEPA, may not be feasible in all circumstances. Where the Regional Water Board determines it is infeasible for a discharger to comply immediately with such objectives or criteria, compliance shall be achieved in the shortest practicable period of time (determined by the Regional Water Board), not to exceed ten years after the adoption of applicable objectives or criteria. This policy shall apply to water quality objectives and water quality criteria adopted after the effective date of this amendment to the Basin Plan [25 September 1995].

The **fifth point** is that in cases where water quality objectives are formulated to preserve historic conditions, there may be insufficient data to determine completely the temporal and hydrologic variability representative of historic water quality. When violations of such objectives occur, the Regional Water Board judges the reasonableness of achieving those objectives through regulation of the controllable factors in the areas of concern.

The **sixth point** is that the State Water Board adopts policies and plans for water quality control which can specify water quality objectives or affect their implementation. Chief among the State Water Board's policies for water quality control is State Water Board Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California). It requires that wherever the existing quality of surface or ground waters is better than the objectives established for those waters in a basin plan, the existing quality will be maintained unless as otherwise provided by Resolution No. 68-16 or any revisions thereto. This policy and others establish general objectives. The State Water Board's water quality control plans applicable to the Sacramento and San Joaquin River Basins are the Thermal Plan and Water Quality Control Plan for Salinity. The Thermal Plan and its water quality objectives are in the Appendix. The Water Quality Control Plan for Salinity water quality objectives are listed as Table
III-5. The State Water Board's plans and policies that the Basin Plan must conform to are addressed in Chapter IV, Implementation.

The **seventh point** is that water quality objectives may be in numerical or narrative form. The enumerated milligram-per-liter (mg/l) limit for copper is an example of a numerical objective; the objective for color is an example of a narrative form.

Information on the application of water quality objectives is contained in the section, *Policy for Application of Water Quality Objectives*, in Chapter IV.

WATER QUALITY OBJECTIVES FOR INLAND SURFACE WATERS

The objectives below are presented by categories which, like the Beneficial Uses of Chapter II, were standardized for uniformity among the Regional Water Boards. The water quality objectives apply to all surface waters in the Sacramento and San Joaquin River Basins, including the Delta, or as noted. *(The legal boundary of the Delta is contained in Section 12220 of the Water Code and identified in Figure III-1.)* The numbers in parentheses following specific water bodies are keyed to Figure II-1.

Bacteria

In waters designated for contact recreation (REC-1), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.

For Folsom Lake (50), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period, shall not exceed a geometric mean of 100/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 200/100 ml.

Biostimulatory Substances

Water shall not contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.

Chemical Constituents

Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. The chemical constituent objectives in Table III-1 apply to the water bodies specified. Metal objectives in the table are dissolved concentrations. Selenium, molybdenum, and boron objectives are total concentrations. Water quality objectives are also contained in the Water Quality Control Plan for Salinity, adopted by the State Water Board in May 1991.

At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain lead in excess of 0.015 mg/l. The Regional Water Board acknowledges that specific treatment requirements are imposed by state and federal drinking water regulations on the consumption of surface waters under specific circumstances. To protect all beneficial uses the Regional Water Board may apply limits more stringent than MCLs.

TABLE III-1
TRACE ELEMENT WATER QUALITY OBJECTIVES

CONSTITUENT	MAXIMUM CONCENTRATION [a] (mg/l)	APPLICABLE WATER BODIES
Arsenic	0.01	Sacramento River from Keswick Dam to the I Street Bridge at City of Sacramento (13, 30); American River from Folsom Dam to the Sacramento River (51); Folsom Lake (50); and the Sacramento-San Joaquin Delta.
Barium	0.1	As noted above for Arsenic.
Boron	2.0 (15 March through 15 September) 0.8 (monthly mean, 15 March through 15 September) 2.6 (16 September through 14 March) 1.0 (monthly mean, 16 September through 14 March) 1.3 (monthly mean, critical year[b])	San Joaquin River, mouth of the Merced River to Vernalis
Cadmium	0.00022 [c]	Sacramento River and its tributaries above State Hwy 32 bridge at Hamilton City

TABLE III-1 TRACE ELEMENT
WATER QUALITY OBJECTIVES (Continued)

CONSTITUENT	MAXIMUM CONCENTRATION [a] (mg/l)	APPLICABLE WATER BODIES
Copper	0.0056 [c]	As noted above for Cadmium.
	0.01 [d]	As noted above for Arsenic. [d]
Cyanide	0.01	As noted above for Arsenic.
Iron	0.3	As noted above for Arsenic.
Manganese	0.05	As noted above for Arsenic.
Molybdenum	0.015 0.010 (monthly mean)	San Joaquin River, mouth of the Merced River to Vernalis
	0.050 0.019 (monthly mean)	Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River
Selenium	0.012 0.005 (4-day average)	San Joaquin River, mouth of the Merced River to Vernalis
	0.020 0.005 (4-day average)	Mud Slough (north), and the San Joaquin River from Sack Dam to the mouth of Merced River
	0.020 0.002 (monthly mean)	Salt Slough and constructed and re-constructed water supply channels in the Grassland watershed listed in Appendix 40.
Silver	0.01	As noted above for Arsenic.
Zinc	0.1 [d]	As noted above for Arsenic. [d]
	0.016 [c]	As noted above for Cadmium.

a Metal objectives in this table are dissolved concentrations. Selenium, molybdenum, and boron objectives are total concentrations.

b See Table IV-3.

c The effects of these concentrations were measured by exposing test organisms to dissolved aqueous solutions of 40 mg/l hardness that had been filtered through a 0.45 micron membrane filter. Where deviations from 40 mg/l of water hardness occur, the objectives, in mg/l, shall be determined using the following formulas:

$$Cu = e^{(0.905)(\ln \text{hardness}) - 1.612} \times 10^{-3}$$

$$Zn = e^{(0.830)(\ln \text{hardness}) - 0.289} \times 10^{-3}$$

$$Cd = e^{(1.160)(\ln \text{hardness}) - 5.777} \times 10^{-3}$$

d Does not apply to Sacramento River above State Hwy. 32 bridge at Hamilton City. See relevant objectives (*) above.

Color

Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.

Dissolved Oxygen

Within the legal boundaries of the Delta, the dissolved oxygen concentration shall not be reduced below:

> 7.0 mg/l in the Sacramento River (below the I Street Bridge) and in all Delta waters west of the Antioch Bridge; 6.0 mg/l in the San Joaquin River (between Turner Cut and Stockton, 1 September through 30 November); and 5.0 mg/l in all other Delta waters except for those bodies of water which are constructed for special purposes and from which fish have been excluded or where the fishery is not important as a beneficial use.

For surface water bodies outside the legal boundaries of the Delta, the monthly median of the mean daily dissolved oxygen *(DO)* concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation. The dissolved oxygen concentrations shall not be reduced below the following minimum levels at any time:

> Waters designated WARM 5.0 mg/l
> Waters designated COLD 7.0 mg/l
> Waters designated SPWN 7.0 mg/l

The more stringent objectives in Table III-2 apply to specific water bodies in the Sacramento and San Joaquin River Basins:

TABLE III-2
SPECIFIC DISSOLVED OXYGEN WATER QUALITY OBJECTIVES

AMOUNT	TIME	PLACE
9.0 mg/l *	1 June to 31 August	Sacramento River from Keswick Dam to Hamilton City (13)
8.0 mg/l	1 September to 31 May	Feather River from Fish Barrier Dam at Oroville to Honcut Creek (40)
8.0 mg/l	all year	Merced River from Cressy to New Exchequer Dam (78)
8.0 mg/l	15 October to 15 June	Tuolumne River from Waterford to La Grange (86)

* When natural conditions lower dissolved oxygen below this level, the concentrations shall be maintained at or above 95 percent of saturation.

Floating Material

Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses.

Mercury

For Sulphur Creek (Colusa County), waters shall be maintained free of mercury from anthropogenic sources such that beneficial uses are not adversely affected. During low flow conditions, defined as flows less than 3 cfs, the instantaneous maximum total mercury concentration shall not exceed 1,800 ng/l. During high flow conditions, defined as flows greater than 3 cfs, the instantaneous maximum ratio of mercury to total suspended solids shall not exceed 35 mg/kg. Both objectives apply at the mouth of Sulphur Creek.

Methylmercury

For Clear Lake (53), the methylmercury concentration in fish tissue shall not exceed 0.09 and 0.19 mg methylmercury/kg wet weight of tissue in trophic level 3 and 4 fish, respectively.

For Cache Creek (Clear Lake to Yolo Bypass) (54), North Fork Cache Creek, and Bear Creek (tributary to Cache Creek), the average methylmercury concentration shall not exceed 0.12 and 0.23 mg methylmercury/ kg wet weight of muscle tissue in trophic level 3 and 4 fish, respectively. For Harley Gulch (tributary to Cache Creek), the average methylmercury concentration shall not exceed 0.05 mg methylmercury/ kg wet weight in whole, trophic level 2 and 3 fish.

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Compliance with the methylmercury fish tissue objectives shall be determined by analysis of fish tissue as described in Chapter V, Surveillance and Monitoring.

Oil and Grease

Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

pH

The pH shall not be depressed below 6.5 nor raised above 8.5.

The following site-specific objectives replace the general pH objective, above, in its entirety for the listed water bodies.

For Goose Lake (2), pH shall be less than 9.5 and greater than 7.5 at all times.

Pesticides

- No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.

- Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.

- Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer.

- Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section 131.12.).

- Pesticide concentrations shall not exceed the lowest levels technically and economically achievable.

- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15.

- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of thiobencarb in excess of 1.0 µg/l.

Pesticide concentrations shall not exceed the levels identified in Table III-2A. Where more than one objective may be applicable, the most stringent objective applies.

For the purposes of this objective, the term pesticide shall include: (1) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever, or (2) any spray adjuvant,

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TABLE III-2A

SPECIFIC PESTICIDE OBJECTIVES

PESTICIDE	MAXIMUM CONCENTRATION AND AVERAGING PERIOD	APPLICABLE WATER BODIES
Chlorpyrifos	0.025 µ g/L ; 1-hour average (acute) 0.015 µ g/L ; 4-day average (chronic) Not to be exceeded more than once in a three year period.	San Joaquin River from Mendota Dam to Vernalis (Reaches include Mendota Dam to Sack Dam (70), Sack Dam to Mouth of Merced River (71), Mouth of Merced River to Vernalis (83)), Delta Waterways listed in Appendix 42. Sacramento River from Shasta Dam to Colusa Basin Drain (13) and the Sacramento River from the Colusa Basin Drain to I Street Bridge (30). Feather River from Fish Barrier Dam to Sacramento River (40).
Diazinon	0.16 µ g/L ; 1-hour average (acute) 0.10 µ g/L ; 4-day average (chronic) Not to be exceeded more than once in a three year period.	San Joaquin River from Mendota Dam to Vernalis (Reaches include Mendota Dam to Sack Dam (70), Sack Dam to Mouth of Merced River (71), Mouth of Merced River to Vernalis (83)), Delta Waterways listed in Appendix 42, Sacramento River from Shasta Dam to Colusa Basin Drain (13) and the Sacramento River from the Colusa Basin Drain to I Street Bridge (30). Feather River from Fish Barrier Dam to Sacramento River (40).

or (3) any breakdown products of these materials that threaten beneficial uses. Note that discharges of "inert" ingredients included in pesticide formulations must comply with all applicable water quality objectives.

Radioactivity

Radionuclides shall not be present in concentrations that are harmful to human, plant, animal or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life.

At a minimum, waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

Salinity

Electrical Conductivity and Total Dissolved Solids– Special Cases in the Sacramento and San Joaquin River Basins Other Than the Delta

The objectives for electrical conductivity and total dissolved solids in Table III-3 apply to the water bodies specified. To the extent of any conflict with the general Chemical Constituents water quality objectives, the more stringent shall apply.

Electrical Conductivity, Total Dissolved Solids, and Chloride--Delta Waters

The objectives for salinity (electrical conductivity, total dissolved solids, and chloride) which apply to the Delta are listed in Table III-5 at the chapter's end. See Figure III-2 for an explanation of the hydrologic year type classification system. The objectives in Table III-5 were adopted by the State Water Board in May 1991 in the Water Quality Control Plan for Salinity.

Table III-3

ELECTRICAL CONDUCTIVITY AND TOTAL DISSOLVED SOLIDS

PARAMETER	WATER QUALITY OBJECTIVES	APPLICABLE WATER BODIES
Electrical Conductivity (at 25°C)	Shall not exceed 230 micromhos/cm (50 percentile) or 235 micromhos/cm (90 percentile) at Knights Landing above Colusa Basin Drain; or 240 micromhos/cm (50 percentile) or 340 micromhos/cm (90 percentile) at I Street Bridge, based upon previous 10 years of record.	Sacramento River (13, 30)
	Shall not exceed 150 micromhos/cm (90 percentile) in well-mixed waters of the Feather River.	North Fork of the Feather River (33); Middle Fork of the Feather River from Little Last Chance Creek to Lake Oroville (36); Feather River from the Fish Barrier Dam at Oroville to Sacramento River (40)
	Shall not exceed 150 micromhos/cm from Friant Dam to Gravelly Ford (90 percentile).	San Joaquin River, Friant Dam to Mendota Pool (69)
Total Dissolved Solids	Shall not exceed 125 mg/l (90 percentile)	North Fork of the American River from the source to Folsom Lake (44); Middle Fork of the American River from the source to Folsom Lake (45); South Fork of the American River from the source to Folsom Lake (48, 49); American River from Folsom Dam to Sacramento River (51)
	Shall not exceed 100 mg/l (90 percentile)	Folsom Lake (50)
	Shall not exceed 1,300,000 tons	Goose Lake (2)

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Settleable Material

Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

Suspended Material

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Tastes and Odors

Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.

Temperature

The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses.

Temperature objectives for COLD interstate waters, WARM interstate waters, and Enclosed Bays and Estuaries are as specified in the *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California* including any revisions. There are also temperature objectives for the Delta in the State Water Board's May 1991 *Water Quality Control Plan for Salinity*.

At no time or place shall the temperature of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water temperature. Temperature changes due to controllable factors shall be limited for the water bodies specified as described in Table III-4. To the extent of any conflict with the above, the more stringent objective applies.

In determining compliance with the water quality objectives for temperature, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

TABLE III-4
SPECIFIC TEMPERATURE OBJECTIVES

DATES	APPLICABLE WATER BODY
From 1 December to 15 March, the maximum temperature shall be 55°F. From 16 March to 15 April, the maximum temperature shall be 60°F. From 16 April to 15 May, the maximum temperature shall be 65°F. From 16 May to 15 October, the maximum temperature shall be 70°F. From 16 October to 15 November, the maximum temperature shall be 65°F. From 16 November to 30 November, the maximum temperature shall be 60°F.	Sacramento River from its source to Box Canyon Reservoir (9); Sacramento River from Box Canyon Dam to Shasta Lake (11)
The temperature in the epilimnion shall be less than or equal to 75°F or mean daily ambient air temperature, whichever is greater.	Lake Siskiyou (10)
The temperature shall not be elevated above 56°F in the reach from Keswick Dam to Hamilton City nor above 68°F in the reach from Hamilton City to the I Street Bridge during periods when temperature increases will be detrimental to the fishery.	Sacramento River from Shasta Dam to I Street Bridge (13, 30)

The following site-specific objective replaces the general temperature objective, above, in its entirety for the listed water body:

For Deer Creek, source to Cosumnes River, temperature changes due to controllable factors shall not cause creek temperatures to exceed the objectives specified in Table III-4A.

TABLE III-4A
DEER CREEK TEMPERATURE OBJECTIVES

Date	Daily Maximum (ºF)[a]	Monthly Average (ºF)[b]
January and February	63	58
March	65	60
April	71	64
May	77	68
June	81	74
July through Sept.	81	77
October	77	72
November	73	65
December	65	58

a Maximum not to be exceeded.
b Defined as a calendar month average.

Toxicity

All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests of appropriate duration or other methods as specified by the Regional Water Board.

The Regional Water Board will also consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.S. Food and Drug Administration, the National Academy of Sciences, the U.S. Environmental Protection Agency, and other appropriate

organizations to evaluate compliance with this objective.

The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors shall not be less than that for the same water body in areas unaffected by the waste discharge, or, when necessary, for other control water that is consistent with the requirements for "experimental water" as described in *Standard Methods for the Examination of Water and Wastewater*, latest edition. As a minimum, compliance with this objective as stated in the previous sentence shall be evaluated with a 96-hour bioassay.

In addition, effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate; additional numerical receiving water quality objectives for specific toxicants will be established as sufficient data become available; and source control of toxic substances will be encouraged.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

- Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
- Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU.
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.
- Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

Exceptions to the above limits will be considered when a dredging operation can cause an increase in turbidity. In those cases, an allowable zone of dilution within which turbidity in excess of the limits may be tolerated will be defined for the operation and prescribed in a discharge permit.

For Folsom Lake (50) and American River (Folsom Dam to Sacramento River) (51), except for periods of storm runoff, the turbidity shall be less than or equal 10 NTUs. To the extent of any conflict with the general turbidity objective, the more stringent applies.

For Delta waters, the general objectives for turbidity apply subject to the following: except for periods of storm runoff, the turbidity of Delta waters shall not exceed 50 NTUs in the waters of the Central Delta and 150 NTUs in other Delta waters. Exceptions to the Delta specific objectives will be considered when a dredging operation can cause an increase in turbidity. In this case, an allowable zone of dilution within which turbidity in excess of limits can be tolerated will be defined for the operation and prescribed in a discharge permit.

For Deer Creek, source to Cosumnes River:

- When the dilution ratio for discharges is less than 20:1 and where natural turbidity is less that 1 Nephelometric Turbidity Unit (NTU), discharges shall not cause the receiving water daily average turbidity to exceed 2 NTUs or daily maximum turbidity to exceed 5 NTUs. Where natural turbidity is between 1 and 5 NTUs, dischargers shall not cause receiving water daily average turbidity to increase more than 1 NTU or daily maximum turbidity to exceed 5 NTUs
- Where discharge dilution ratio is 20:1 or greater, or where natural turbidity is greater than 5 NTUs, the general turbidity objectives shall apply.

WATER QUALITY OBJECTIVES FOR GROUND WATERS

The following objectives apply to all ground waters of the Sacramento and San Joaquin River Basins, as the objectives are relevant to the protection of designated beneficial uses. These objectives do not require improvement over naturally occurring background concentrations. The ground water objectives contained in this plan are not required by the federal Clean Water Act.

Appendix A.2 Objectives for Groundwater

Bacteria

In ground waters used for domestic or municipal supply (MUN) the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100 ml.

Chemical Constituents

Ground waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses.

At a minimum, ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain lead in excess of 0.015 mg/l. To protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs.

Radioactivity

At a minimum, ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

Tastes and Odors

Ground waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

Toxicity

Ground waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial use(s). This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.

Appendix B Basin Plan Beneficial Uses

SURFACE WATER BODIES AND BENEFICIAL USES

	SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION			FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV
				AGR		PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN			
			MUNICIPAL AND DOMESTIC SUPPLY	IRRIGATION	STOCK WATERING	PROCESS	SERVICE SUPPLY	POWER	CONTACT	CANOEING (1) AND RAFTING	OTHER NONCONTACT	WARM	COLD	WARM (3)	COLD (4)	WARM (3)	COLD (4)	WILDLIFE HABITAT	NAVIGATION
30	COLUSA BASIN DRAIN TO EYE ["I"] STREET BRIDGE	520.00	E	E					E	E	E	E	E	E	E	E	E	E	E
31	SUTTER BYPASS	520.3		E					E			E			E		E	E	
	FEATHER RIVER																		
32	LAKE ALMANOR	518.41						E	E			E	E			E		E	
33	NORTH FORK, FEATHER RIVER	518.4	E					E	E	E	E		E				E	E	
	MIDDLE FORK, FEATHER RIVER	518.3																	
34	SOURCE TO LITTLE LAST CHANCE CREEK	518.35		E	E				E	E	E	E	E				E	E	
35	FRENCHMAN RESERVOIR	518.36							E		E	P	E				E	E	
36	LITTLE LAST CHANCE CREEK TO LAKE OROVILLE	518.3	E						E	E	E	E	E				E	E	
37	LAKE DAVIS	518.34							E		E	P	E				E	E	
38	LAKES BASIN LAKES	518.5							E		E		E				E	E	
39	LAKE OROVILLE	518.12	E	E				E	E		E	E	E			E	E	E	
40	FISH BARRIER DAM TO SACRAMENTO RIVER	515.	E	E					E	E	E	E	E	E	E	E	E	E	
	YUBA RIVER																		
41	SOURCES TO ENGLEBRIGHT RESERVOIR	517.	E	E	E			E	E	E	E		E				E	E	
42	ENGLEBRIGHT DAM TO FEATHER RIVER	515.3		E	E			E	E	E	E	E	E	E	E	E	E	E	
43	BEAR RIVER	515.1	E	E	E			E	E	E	E	E	E	P	P	P	P	E	
	AMERICAN RIVER																		
44	NORTH FORK, SOURCE TO FOLSOM LAKE	514.5	E	E					E	E	E	P	E				E	E	
45	MIDDLE FORK, SOURCE TO FOLSOM LAKE	514.4	E	E	E			E	E	E	E	P	E				E	E	
46	DESOLATION VALLEY LAKES	514.4							E		E		E				E	E	
	SOUTH FORK	514.3																	
48	SOURCE TO PLACERVILLE	514.3	E					E	E	E	E	P	E				E	E	
49	PLACERVILLE TO FOLSOM LAKE	514.32	E	E				E	E	E	E	E	E					E	
50	FOLSOM LAKE	514.23	E	E			P	E	E		E	E	E			E		E	
51	FOLSOM DAM TO SACRAMENTO RIVER	519.21	E	E			E	E	E	E	E	E	E	E	E	E	E	E	
52	YOLO BYPASS	510.		E	E				E		E	E	P	E	E	E		E	
	CACHE CREEK																		
53	CLEAR LAKE (a)	513.52	E	E	E				E		E	E	P			E		E	
54	CLEAR LAKE TO YOLO BYPASS (d)	511/513	E	E	E	E	E		E	E	E	E	P			E	E	E	

(1) Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.
(2) Resident does not include anadromous. Any Segments with both COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.
(3) Striped bass, sturgeon, and shad.
(4) Salmon and steelhead
(5) As a primary beneficial use.
(6) The indicated beneficial uses are to be protected for all waters except in specific cases where evidence indicates the appropriateness of additional or alternative beneficial use designations.
(7) Sport fishing is the only recreation activity permitted.
(8) Beneficial uses vary throughout the Delta and will be evaluated on a case-by-case basis.
(9) Per State Board Resolution No. 90-28, Marsh Creek and Marsh Creek Reservoir in Contra Costa County are assigned the following beneficial uses: REC1 and REC2

A/ Hidden Reservoir = Hensley Lake
B/ Buchanan Reservoir = Eastman Lake

(a) The following beneficial uses EXIST in addition to those noted in Table II-1

Mud Slough (north): COMM and SHELL
Salt Slough: COMM, BIOL, and SHELL
Wetland Water Supply Channels: BIOL
Clear Lake: COMM

(d) In addition to the beneficial uses noted in Table II-1, COMM exists for Cache Creek from Clear Lake to Yolo Bypass and in the following tributaries only: North Fork Cache Creek and Bear Creek.

Unless otherwise designated by the Regional Water Board, all ground waters in the Region are considered as suitable or potentially suitable, at a minimum, for municipal and domestic water supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO).

In making any exceptions to the beneficial use designation of municipal and domestic supply (MUN), the Regional Water Board will apply the criteria in State Water Board Resolution No. 88-63, 'Sources of Drinking Water Policy'. The criteria for exceptions are:

- "The total dissolved solids (TDS) exceed 3,000 mg/l (5,000 &mhos/cm, electrical conductivity) and it is not reasonably expected by the Regional Water Board [for the ground water] to supply a public water system, or

- "There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices, or

- "The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day, or

- "The aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR, Section 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR Section 261.3."

To be consistent with State Water Board Resolution No. 88-63 in making exceptions to beneficial use designations other than municipal and domestic supply (MUN), the Regional Water Board will consider criteria for exceptions, parallel to Resolution No. 88-63 exception criteria, which would indicate limitations on those other beneficial uses as follows:

In making any exceptions to the beneficial use designation of agricultural supply (AGR), the Regional Water Board will consider the following criteria:

- There is pollution, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for agricultural use using either Best Management Practices or best economically achievable treatment practices, or

- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day, or

- The aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR, Section 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR Section 261.3.

In making any exceptions to the beneficial use designation of industrial supply (IND or PRO), the Regional Water Board will consider the following criteria:

- There is pollution, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for industrial use using either Best Management Practices or best economically achievable treatment practices, or

- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Appendix C Risk Level Determination Documentation

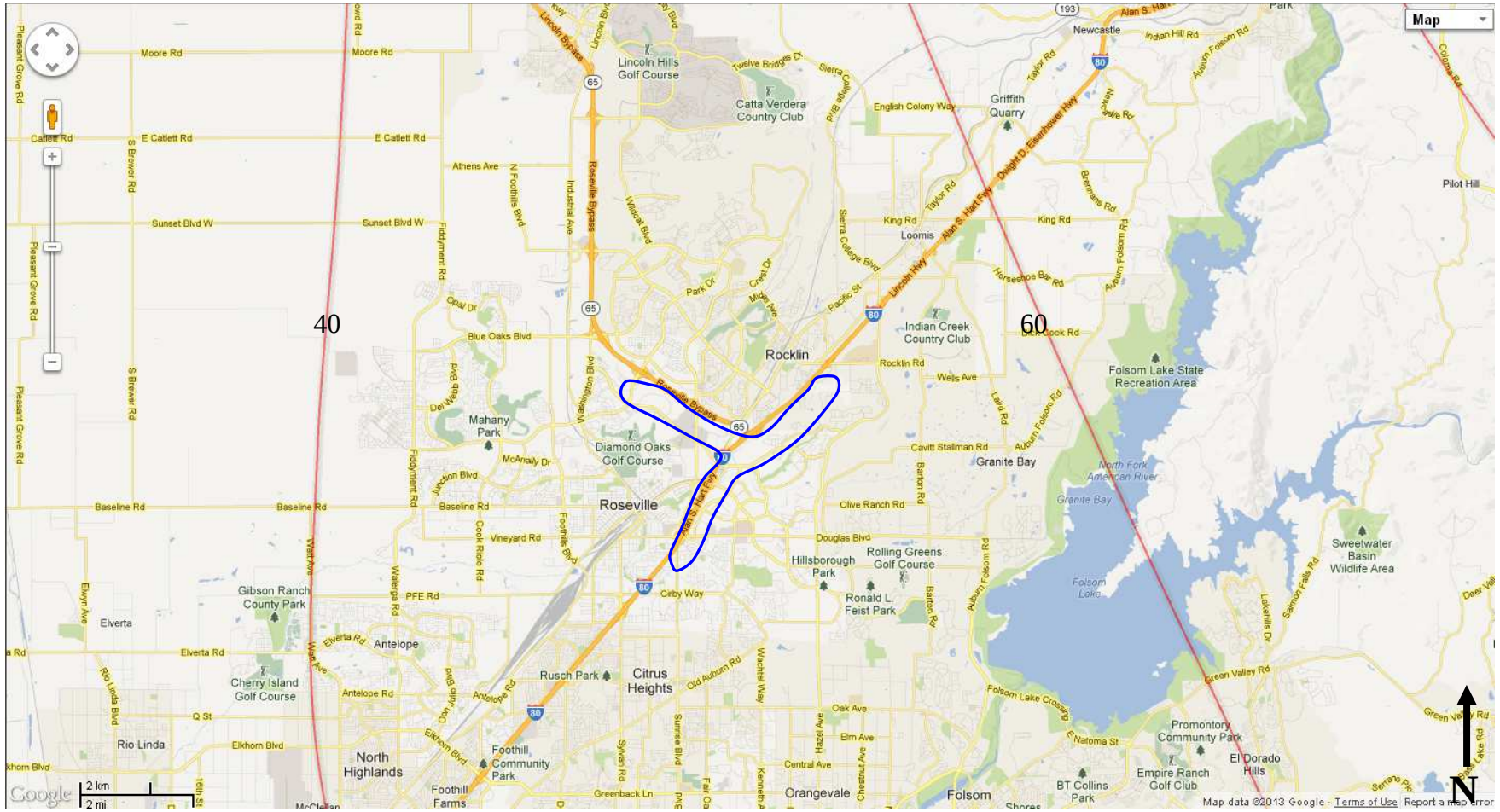

Figure 1. California Isoerodent Map

Figure 2. Erosivity Index Zone Map

Source: California Department of Transportation

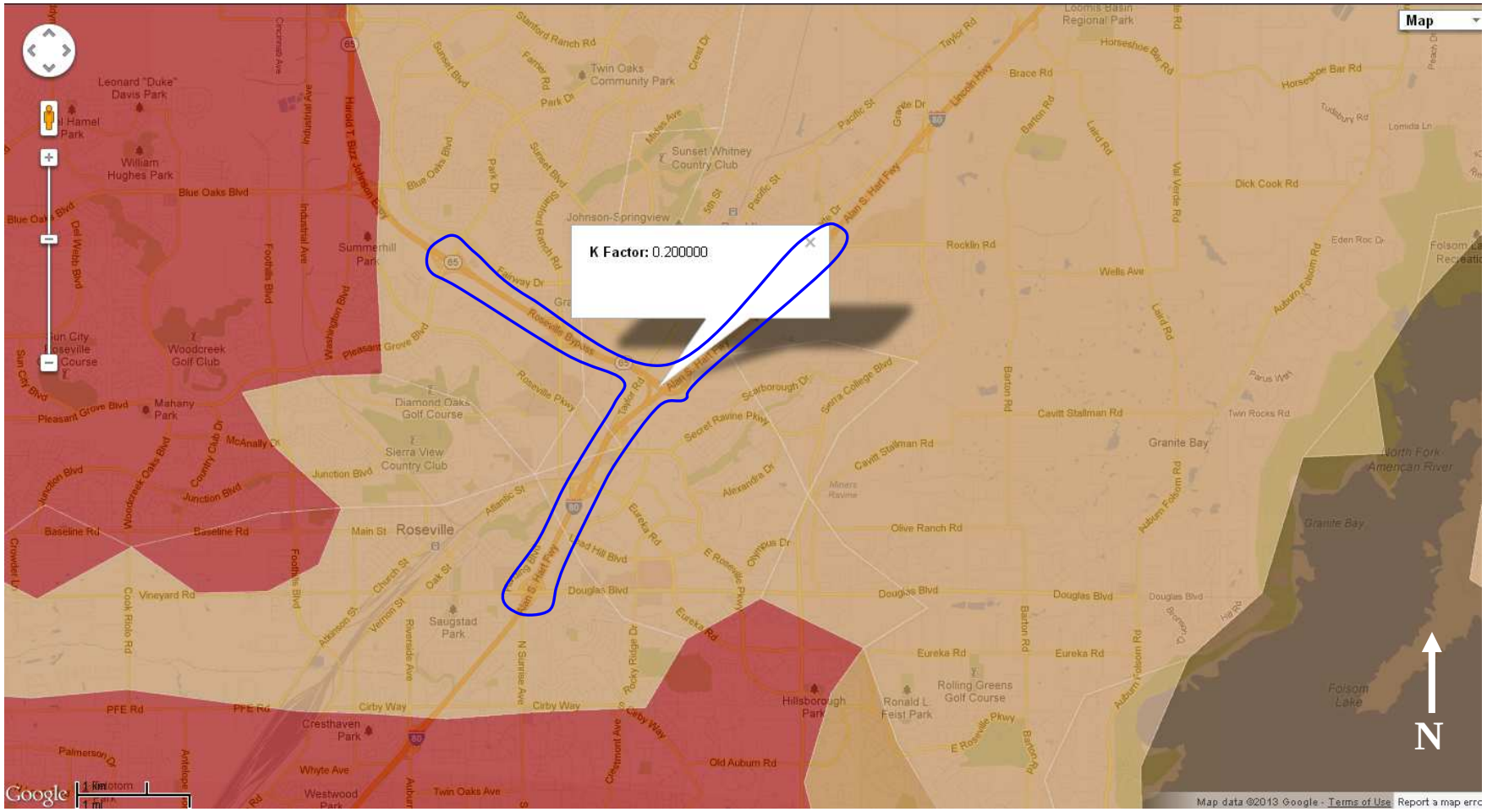

Figure 3. K Factor

Source: California Department of Transportation

Figure 4. LS Factor

Source: California Department of Transportation