Dist-County-Route: 03-Pla-65/80
Post Mile Limits: (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3
Project Type: Interchange Improvement
Project ID (or EA): 0300000696 (03-4E3200)
Program Identification:
Phase: ☐ PID ☒ PA/ED ☐ PS&E

Regional Water Quality Control Board(s): Region 5, Central Valley

Is the Project required to consider Treatment BMPs? Yes ☒ No ☐
If yes, can Treatment BMPs be incorporated into the project? Yes ☒ No ☐
If No, a Technical Data Report must be submitted to the RWQCB at least 30 days prior to the projects RTL date. List RTL Date:

Total Disturbed Soil Area: Alt 1: 160 ac; Alt 2: 165 ac; Alt 3: 177 ac Risk Level: 2
Estimated: Construction Start Date: 2020 Construction Completion Date: 2036
Notification of Construction (NOC) Date to be submitted: TBD

Erosivity Waiver	Yes ☐	Date:	No ☒
Notification of ADL reuse (if Yes, provide date)	Yes ☒	Date: TBD at PS&E	No ☐
Separate Dewatering Permit (if yes, permit number)	Yes ☒	Permit # TBD at PS&E	No ☐

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the date upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

Analette Ochoa, P.E., Registered Project Engineer — Date: 10/23/14

I have reviewed the stormwater quality design issues and find this report to be complete, current and accurate:

Leo Heuston, Project Manager — *Date*

Brian Toepfer, Designated Maintenance Representative — *Date*

T. Chris Johnson, Designated Landscape Architect Representative — *Date*

[Stamp Required for PS&E only)

Wesley Faubel, District/Regional Design SW Coordinator or Designee — *Date*

STORM WATER DATA INFORMATION

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 Required Attachments for Project location and vicinity maps.

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.

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-1/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.

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 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.

Transportation System Management Alternative

This alternative includes ramp metering, HOV bypass lanes, traffic signal coordination, transit options, and bicycle and pedestrian facilities in order to improve the transportation system at the I-80/SR 65 interchange. However, the transportation system management (TSM) measures alone could not satisfy the purpose and need of the Project. This alternative has been eliminated, but the TSM features have been incorporated into the build alternatives for this Project.

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.

Project's Disturbed Soil Area, Added Impervious Area, and Reworked Impervious Area

The total disturbed soil area (DSA) and additional impervious area (AIA) for the Project are summarized in Table 1, Table 2, and Table 3 for the entire Project area, the portion within Caltrans' right-of-way, and the portion within the City's right-of-way, respectively. The DSA for each alternative was conservatively calculated by taking the entire Project area minus the existing impervious area to remain. The impervious area and DSA values will be further refined during the PS&E phase once the limits of grading, construction staging locations, and other areas of disturbance have been developed. The Project would be required to treat

between 27 ac and 32 ac of the added impervious area, depending on the alternative chosen.

Table 1. DSA and AIA for Project Alternatives

Alternative	DSA, acres (ac)	Proposed Impervious Area, ac	Existing Impervious Area, ac	AIA, ac
1	160	127	95	32
2	165	124	95	29
3	177	122	95	27

Source: CH2M Hill 2014

Table 2. DSA and AIA for Project Alternatives in Caltrans' Right-of-Way

Alternative	DSA, acres (ac)	Proposed Impervious Area, ac	Existing Impervious Area, ac	AIA, ac
1	147	119	89	30
2	151	117	89	28
3	156	114	88	26

Source: CH2M Hill 2014

Table 3. DSA and AIA for Project Alternatives in the City's Right-of-Way

Alternative	DSA, acres (ac)	Proposed Impervious Area, ac	Existing Impervious Area, ac	AIA, ac
1	13	7	6	1
2	13	7	6	1
3	21	7	6	1

Source: CH2M Hill 2014

The Project traverses through Placer County, the City of Roseville, and the City of Rocklin, which are under a Phase II Municipal Separate Storm Sewer System (MS4).

2. Site Data and Storm Water Quality Design Issues (refer to Checklists SW-1, SW-2, and SW-3)

The Project is located entirely within the jurisdiction of Caltrans District 3 and the Central Valley Regional Water Quality Control Board (CVRWQCB), Region 5.

This Project's Project Initiation Document phase was completed prior to the effective date of the current Caltrans MS4 Permit (Order No. 2012-0011-DWQ), so this Project is not expected to be required to comply with the current Caltrans MS4 Permit. Therefore, the measures presented in this SWDR are based on the previous Caltrans MS4 Permit (Order No. 99-06-DWQ) and are consistent with current Caltrans District 3 practices.

Receiving Water Bodies and Hydrologic Sub-Areas

I-80 and SR 65 within the Project limits cross two hydrologic sub-areas, Lower American (HSA# 519.21) and Pleasant Grove (HSA# 519.22), within one hydrologic unit: see Table 4. Lower American includes Antelope Creek, Miners Ravine, Secret Ravine, and Sucker Ravine. Pleasant Grove includes Highland Ravine and the tributary to South Branch Pleasant Grove Creek. The 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 4. Hydrologic Units within the Project Limits

PM Limits	Hydrologic Unit	Hydrologic Sub-area	Hydrologic Sub-area Number
I-80 PM 1.9-6.1 and SR 65 PM R4.8-R5.58	Valley-American	Lower American	519.21
SR 65 PM R5.58-R7.3	Valley-American	Pleasant Grove	519.22

Source: Caltrans

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, Oakland Museum of California watershed maps, and aerial photographs.

Table 5 lists the identified creek and stream crossings within the Project limits. A map identifying the approximate location of each creek and stream crossing is included in the Required Attachments of this report. The five creek crossings within the Project limits are Sucker Ravine, Miners Ravine, Highland Ravine, a tributary to South Branch Pleasant Grove Creek, and Antelope Creek. 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.

Table 5. Receiving Water Bodies

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

Source: FEMA and USGS

Impaired Water Bodies and Total Maximum Daily Loads

One of the receiving water bodies for this Project, Miners Ravine, is listed as an impaired water body in the 2010 Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments. According to this list, the pollutant of impairment is dissolved oxygen. The potential source for dissolved oxygen is unknown. The expected total maximum daily load completion date is 2021. This pollutant is not considered a Caltrans Targeted Design Constituent (TDC).

Beneficial Uses for Hydrologic Sub-areas

The CVRWQCB Basin Plan (2011) lists beneficial uses for the Lower American Hydrologic Sub-area (No. 519.21), within and near the Project. Table 6 summarizes the beneficial uses.

Table 6. Beneficial Uses for Hydrologic Units

Hydrologic Sub-area	Beneficial Uses										
	MUN	AGR	IND	REC-1	REC-2	WARM	COLD	MIGR	SPWN	WILD	NAV
Lower American (No. 519.21)	E	E	E	E	E	E	E	E	E	E	

Source: Central Valley RWQCB Basin Plan 2011

Notes:
AGR—Agricultural Supply NAV—Navigation

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

Municipal or Domestic Water Supply Reservoirs

No District 3 drinking water reservoirs or recharge facilities were identified within or adjacent to the Project area.

Local Agency Requirements/Concerns

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 General Permit presents the provision for permanent post-construction stormwater requirements for areas outside of Caltrans' right-of-way. These standards would be required for Caltrans projects that connect or discharge into local drainage facilities as directed by the Caltrans Department Office of Water Quality or CVRWQCB.

Table 7 contains the permits and coordination that will likely be required for the Project.

Table 7. Permits and Approvals Needed

Agency	Permit/Approval	Status
U.S. Fish and Wildlife Service	Coordination regarding threatened and endangered species	Not yet initiated
U.S. Army Corps of Engineers	Section 404 authorization for fill of waters of the United States	Not yet initiated
California Department of Fish and Wildlife	A 1602 Permit for streambed alteration	Not yet initiated
Central Valley Regional Water Quality Control Board	Section 401 Water Quality Certification and coverage under the existing Caltrans National Pollutant Discharge Elimination System Permit (Order No. 99-06-DWQ)	Not yet initiated
Placer County Air Pollution Control District	Formal notification prior to construction	Not yet initiated

Source: CH2M Hill 2014

A project-specific WDR is not required for the CVRWQCB, unless the anticipated dewatering discharge from the Project results in greater than 0.25 million gallons per day and requires treatment before discharging, or there may be associated significant impacts from dewatering activities. These are not expected for the Project; therefore, a project-specific WDR is not anticipated. Construction site BMPs would be considered to address any Project impacts from the dewatering activities.

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 Section 401 Water Quality Certification is anticipated for this Project, as well as a Section 404 nationwide permit from the USACE. The 401 Certification would be prepared and submitted during the PS&E phase. A 1602 Permit for streambed alteration would likely be required from the California Department of Fish and Wildlife. 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 windows would be specified in the permits.

Because the Project would create impervious areas and discharge to small MS4 areas, hydromodification requirements from the Phase II MS4 permit may apply to areas outside of Caltrans' right-of-way. During the design phase, these requirements would be further analyzed.

Land Use

The City of Rocklin General Plan (2012) identifies the land use surrounding I-80/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 land use map in City of Roseville General Plan 2025 (2014) identifies the land use surrounding I-80/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.

Climate, Topography, and Soils

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 winter to 60°F in summer. The rainy season for the Project is from October 15 through April 15, as indicated in the Northern and Central California Areas, Figure 1-1, Designation of Rainy Season, in the *Caltrans Storm Water Quality Handbooks, Construction Site Best Management Practices Manual* (Caltrans 2009).

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 8 and the Intensity-Duration-Frequency (IDF) curve is shown in the Required Attachments.

Table 8. 24-hour Rainfall Depth Summary

Recurrence (years)	2	10	25	50	100
Depth (inches)	2.23	3.21	3.84	4.34	4.86

Source: NOAA

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, the elevation ranges between about 160 and 260 feet above mean sea level (amsl) with an average elevation of 215 ft. The Project crosses over Antelope Creek at a peak elevation of about 254 ft amsl and then lowers into 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.

The Project site can be characterized by rolling hills with southwest trending ridges and relatively gentle slope gradients. In the Project area, I-80 is constructed near natural grade with some cuts through ridges and fills across low lying areas. SR 65 is mostly elevated by fills and bridges above natural grade from the interchange area to the northwest side of

Antelope Creek near PM 5.4. Northwest of Antelope Creek to Pleasant Grove Boulevard, SR 65 is constructed near natural grade with some cuts and fills (Blackburn Consulting 2013).

The hydrologic soil group (HSG) information is not available from the *Structures Preliminary Geotechnical Report* (Blackburn Consulting 2013). Per the Natural Resources Conservation Service Web Soil Survey, the soils in the Project area primarily consist of HSG D with some HSG B and C. Soils in HSG D have high runoff potential when thoroughly wet. Group B and C soils have a moderate to slow infiltration rate, respectively, when thoroughly wet.

Geology

The following geologic information referenced the Structures Preliminary Geotechnical Report for the Project (Blackburn Consulting 2013). A geologic map is included in the Required Attachments of this report.

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 feet of the surface with isolated "boulders" (or bodies) of moderately to slightly weathered, hard rock. This unit is shown as "Mzg" in the Required Attachments.

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). Mapped locations are shown as "Tva" in the Required Attachments.

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). Mapped locations are shown as "Qa" in the Required Attachments.

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.

Groundwater
Per the Structures Preliminary Geotechnical Report for the Project (Blackburn Consulting 2013), 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
- The presence of several creek beds

Regionally, MWH shows the groundwater elevation ranging from approximately 45 feet above mean sea level (msl) at the west end to approximately 65 feet at the east end of the Project. A portion of the groundwater elevation map is included in the Required Attachments. Based on this map, regional groundwater levels could be greater than 100 feet below the 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.

Hazardous Soils
A Draft Initial Site Assessment (ISA) Update was prepared by Blackburn Consulting (2014). This ISA concludes there is a potential for hazardous materials conditions within or adjacent to the Project boundaries which may potentially impact the Project. Two parcels in the I-80/SR 65 interchange area and one parcel adjacent to I-80 have been identified as potentially contaminated areas that need further assessment including a site inspection, owner interview, and county file review.

Reuse of Soil Containing Aerially Deposited Lead (ADL)
Per the Draft ISA Update prepared by Blackburn Consulting (2014), previous sampling results indicate the average levels of lead found along I-80 within the Project limits are below the levels requiring regulatory action. Soils excavated from the surface to any depth up to 3 ft can be reused or disposed as non-hazardous soil with respect to lead content. An appropriate Lead Compliance Plan and Lead Awareness Training Plan must be prepared by the contractor to prevent or minimize worker exposure to lead.

The presence of ADL is not uncommon adjacent to heavily traveled roadways in service prior to 1987. Based on review of aerial photos and topographic maps, the existing Taylor Road has been in service as a primary route in the region since at least 1941. Project plans include disturbing soil along Taylor Road; therefore, the ADL assessment would need to be expanded to include this area.

Right-of-Way
The Project involves full and partial right-of-way acquisition from private and city properties. Some full and partial property acquisitions as well as temporary easements for construction access and staging would be necessary. Per the Project Study Report (Baker 2009), a Right-of-Way Data Sheet was prepared for the Project. These areas are approximate and may change as the alternatives get refined in the PS&E phase.

Unit Costs of Additional Right-of-Way
The right-of-way for the Project has ample room for treatment BMPs. No additional right-of-way certification is anticipated for BMP deployment or maintenance. This will be verified and updated in the PS&E phase.

Measures for Avoiding or Reducing Potential Stormwater Impacts
The added impervious area is directly related to the potential permanent water quality impacts. Because of the added impervious area, Alternative 1 would have the greatest impact on runoff volume and velocity. With the greatest DSA, Alternative 3 would have the most potential impact on sedimentation and erosion during construction.

Slopes are planned to be no greater than 2:1 (H:V), compacted as specified in the Caltrans *Standard Specifications*, and stabilized using the permanent erosion control measures to be specified during the design phase. There are locations that are likely to have existing slopes greater than 2:1 (H:V), especially where the terrain is naturally hilly and consisting of steep slopes. At these locations, the existing slopes would be maintained where feasible; proposed slopes would be graded to match the existing condition. To avoid grading new slopes steeper than 2:1 (H:V) at locations where the existing slopes are flatter than 2:1 (H:V), and to reduce the need for further right-of-way acquisition, retaining walls would be constructed to achieve the proposed Project widening within the existing Caltrans right-of-way.

Measures would be employed to prevent any construction material from getting into the receiving water bodies. All work in creeks and waterways would be scheduled per regulatory

requirements and detailed in the Project's special provisions to be prepared during the PS&E phase. Concentrated flows would be collected into stabilized drains and channels.

Placement of all BMPs would be done in a manner to allow for maintenance access. Maintenance vehicle pullouts would be proposed, and side slopes would be specified to be as flat as possible, for ease of maintenance.

3. Regional Water Quality Control Board Agreements

At this stage, there are no key negotiated understandings or agreements with the CVRWQCB pertaining to this Project.

4. Proposed Design Pollution Prevention BMPs to be used on the Project.

The proposed Project would be constructed to minimize erosion by disturbing slopes only when necessary, minimizing cut and fill areas to reduce slope lengths, and providing cut and fill slopes flat enough to allow revegetation to limit erosion rates. In addition, design pollution prevention BMPs can be proposed to provide concentrated flow conveyance systems consisting of ditches, storm drains, and inlet and outlet protection devices, and maximize onsite infiltration by increased detention time within drainage systems and vegetated conveyances and surfaces.

Downstream Effects Related to Potentially Increased Flow, Checklist DPP-1, Parts 1 and 2

This Project would increase impervious areas that would increase runoff, volume and velocity. The Project would add 27 ac to 32 ac of impervious area depending on the alternative chosen and may need to consider design pollution prevention BMPs or energy dissipation devices, such as rock slope protection (RSP) or devices to meter flows (e.g., weirs or check dams).

Slope/Surface Protection Systems, Checklist DPP-1, Parts 1 and 3

Fill slopes of 2:1 (H:V) are proposed along portions of WN Connector for all build alternatives. All proposed cut slopes are 2:1 (H:V). At locations where existing slopes are steeper than 2:1 (H:V), proposed slopes would be graded to match the existing condition. This Project is planned to process an advisory exception and obtain Caltrans District 3 Landscape Architect approval for any slopes steeper than 4:1 (H:V). Due to the existing roadway width and limited right-of-way, new retaining walls would be constructed to achieve the desired final roadway width. The grading and retaining wall details would be developed during the PS&E phase.

Replacement landscaping and vegetation for slope stabilization would be placed wherever existing landscaping is disturbed. Further information on vegetated surfaces would be

provided during the design phase of the Project and receive concurrence from the Caltrans District 3 Landscape Architect.

The need for hard surface erosion control measures would be determined during the design phase and would include slope paving where standard erosion control measures are deemed to be inadequate to protect slopes, RSP and energy dissipation devices at culvert outlets, and ditch lining if concentrated flow velocities result in erosion of slopes.

Concentrated Flow Conveyance Systems, Checklist DPP-1, Parts 1 and 4

Concentrated flow conveyance systems, such as ditches, berms, swales, overside drains, flared end sections, outlet protection, and velocity dissipation devices would be considered for this Project. Dikes would likely be required in areas where slopes are steeper than 4:1 (H:V) to divert sheet flow and are needed to route runoff to existing and proposed drainage inlets. Outlet protection and velocity dissipation devices would be placed at all outlets of drainage systems that discharge into earth-lined ditches/basins. The existing roadway drainage systems would either be modified or be removed and replaced by new systems. The modifications to existing drainage facilities would likely result in changes in the interception of surface runoff. The goal of the drainage design is to maintain the existing flow patterns and to minimize the increase in runoff flow volumes to the maximum extent practicable. Proposed drainage facilities would be developed during the PS&E phase.

Preservation of Existing Vegetation, Checklist DPP-1, Parts 1 and 5

Existing mature vegetation and landscaping would be protected in place where possible. Areas of clearing and grubbing would be limited to those areas impacted by new construction. Studies to determine environmentally sensitive areas are currently being conducted and will be discussed in the PS&E phase Storm Water Data Report. Details of the areas to be preserved will be shown in the Project plans to be developed during the PS&E phase.

Existing wetlands would be preserved during construction with the use of ESA fencing. Existing wetlands that cannot be preserved would be mitigated with appropriate measures to be developed during the PS&E phase.

5. Proposed Permanent Treatment BMPs to be used on the Project

Treatment BMP Strategy, Checklist T-1

This Project is required to consider the use of treatment BMPs because this Project is a major reconstruction project and would result in the addition of 1 acre or more of impervious area. Dry weather flow diversion, gross solids removal devices and traction sand traps were not considered for this Project because there is no dry weather diversion, no receiving water bodies on the 303(d) List for trash, and traction sand is not regularly applied to I-80 or SR 65 in the Project area. The potentially feasible treatment devices for this Project are

biofiltration devices, infiltration devices, detention devices, Austin vault sand filters, Delaware filters, multi-chambered treatment trains, and wet basins.

The Project is not expected to result in an increase of greater than 50 percent of the existing impervious surface. Within Caltrans' right-of-way, the Project team is proposing treatment equal to the added impervious areas. Table 1 breaks down the impervious areas by alternative. Conceptual treatment BMP locations have been identified and are listed in Table 9, along with percent water quality flow (WQF) infiltrated for bioswales and biostrips or percent water quality volume (WQV) infiltrated for detention devices. Conceptual Treatment Plans and preliminary calculations using infiltration Tool (Version 3.01.034) are included in the Supplemental Attachments of this report.

Preliminary calculations show that 83 to 100 percent of WQF can be infiltrated with biostrips and 12 to 34 percent of WQF can be infiltrated with bioswales by using soil amendments. Because infiltration is less than 50 percent with bioswales, infiltration devices, detention devices, and Austin sand filters would be considered and further studied in the next phase.

Table 9. Treatment BMP Summary Table

BMP ID	Alignment	Lt/Rt	Approximate Station	Treated Impervious Area (ac)	WQV/ WQF infiltrated (with amended soil)	Potential BMP Type
1	ME1	Lt	58+00	0.36	21	Bioswale
2	ME1	Lt	60+00	0.50	28	Bioswale
3	ME1	Lt	62+50	1.7[1]	14	Bioswale
4	ME1	Lt	64+30	2.3[1]	13	Bioswale
5[2]	ME1	Rt	64+00	0.89[1]	14	Bioswale
6	ME1	Rt	63+75	2.1[1]	13	Bioswale
7[2]	ME1	Rt	77+00	2.9[1]	14	Bioswale
8	MW1	Lt	105+50	0.60	19	Bioswale
9	MW1	Lt	130+00	1.3[1]	16	Bioswale
10	ME1	Rt	133+00	2.3[1]	16	Bioswale
11	T1	Lt	36+50	1.1[1]	17	Bioswale
12	ME1	Rt	137+00	1.0[1]	16	Bioswale
13	MS	Lt	170+50	0.88[1]	14	Bioswale
14	MS	Lt	172+00	1.9	31	Detention Basin
15	MS	Lt	177+50	0.40	100	Biostrip
16	MS	Lt	190+50	0.93	34	Bioswale

Table 9. Treatment BMP Summary Table (continued)

BMP ID	Alignment	Lt/Rt	Approximate Station	Treated Impervious Area (ac)	WQV/ WQF infiltrated (with amended soil)	Potential BMP Type
17	MS	Lt	216+00	3.4[1]	12	Bioswale
18	MS	Rt	221+50	0.49	33	Bioswale
19	MS	Lt	226+50	1.5	83	Biostrip
20	T1	Lt	39+00	0.80	21	Bioswale
21	ME1	Rt	16+150	0.89[1]	16	Bioswale
22	ME1	Rt	16+700	1.6[1]	16	Bioswale
23	ME1	Rt	17+500	0.58	31	Bioswale
24	ME1	Lt	17+800	1.2[1]	23	Bioswale
25	ME1	Lt	18+675	1.3	20	Bioswale
26	ME1	Rt	20+650	1.2[1]	15	Bioswale

Notes:
1. Can consider other alternatives such as detention basins and Austin vault sand filters.
2. BMP 5 and 7 are proposed for Alternatives 1 and 3, but not for Alternative 2 due to construction conflict.

Based on this preliminary feasibility study, 100% of the AIA can be treated within the existing right-of-way for all three alternatives; see Table 10.

Table 10. Impervious Areas Summary

Alternative	1	2	3
Additional Impervious Area (ac)	32	29	27
Proposed Treated Impervious Area (ac)	34	30	34
Treated Impervious Area Deficit (ac)	0	0	0

BMPs were proposed in areas that avoided potential waters of the U.S. per the *Delineation of Potential Waters of the U.S. including Wetlands Report* (ICF International 2014) and mine tailings and historic foundations as provided by CH2M Hill. The proposed BMP locations are preliminary and therefore may be updated during the next phase.

Biofiltration Swales/Strips, Checklist T-1, Parts 1 and 2

Biofiltration devices that provide retention and infiltration are the most feasible treatment BMPs for the Project. To increase the retention capabilities of the biofiltration swales, the swales would be designed to include a layer of imported biofiltration soil. The proposed conceptual treatment BMPs shown in Table 9 were sized using the "T.1 Checklist Infiltration Tools v. 3.01." For retention BMPs, the Infiltration Tool was designed to estimate the percentage of WQV infiltrated by a biofiltration strip, biofiltration swale, existing pervious surface, or infiltration trench. Detailed design calculations to size the retention devices would be completed during the PS&E phase.

Infiltration Devices – Checklist T-1, Parts 1 and 4

Infiltration devices are not feasible for the majority of the Project because the soils are predominantly within HSGs C or D. Infiltration devices may be feasible for areas within HSGs A and B. Further geotechnical studies are needed to determine the actual infiltration rates of the soils in these areas. However, the existing soils can be amended, or engineered soil media can be used to increase the infiltration potential of proposed treatment BMPs in these areas. The design feasibility of infiltration devices should be further evaluated during the PS&E phase once detailed infiltration studies have been conducted and appropriate soil amendments or engineered soil mixes are developed.

Detention Devices, Checklist T-1, Parts 1 and 5

Detention devices are feasible for the Project and could be placed in the interchange areas for the purpose of achieving flow control. Soil amendments increase the infiltration capacity and water retention capabilities and help reduce runoff from the site. The possibility of amending the soils of the detention devices would be explored during the next phase.

Media Filters, Checklist T-1, Parts 1 and 8

Austin sand media filters are feasible for the Project and could be placed in the interchange areas where there is adequate space to place the device with a volume equal to at least the water quality volume with the minimum 3-foot hydraulic head. There are no anticipated groundwater conflicts in the ramp loop areas if either an earthen or concrete base is used. The design feasibility of Austin sand filters should be further investigated during the PS&E phase when the existing drainage facilities have been surveyed and proposed drainage facilities and outfalls have been established.

Delaware filters remove fine sediment, particulate-associated pollutants, and sometimes dissolved pollutants. Delaware filters are also ranked fourth for general pollutant removal and are only to be considered after detention devices have been determined to be infeasible. Delaware filters were determined to not be feasible for this Project as detention devices are feasible for the Project.

Multi-Chambered Treatment Trains (MCTTs), Checklist T-1, Parts 1 and 9

Multi-Chambered Treatment Trains (MCTTs) use three treatment mechanisms in three different chambers. These include a catch basin with a sump pump, a sedimentation chamber with tube settlers and sorbent pads, and a filtering chamber lined with media. MCTTs also are ranked fourth for general pollutant removal and are to be considered only when both detention basins and media filters have been determined to be infeasible. MCTTs were developed for treatment of stormwater at critical source areas, such as vehicle service facilities, parking areas, paved storage areas and fueling stations. MCTTs were determined to not be feasible for this Project as detention basins and media filters are feasible for the Project and there is no critical source area available for the project.

Wet Basins, Checklist T-1, Parts 1 and 10

Wet basins are permanent pools of water designed to mimic naturally occurring wetlands. The main distinction between constructed and natural wetlands is that constructed wetlands are placed in upland areas and are not subject to wetland protection regulations.

Wet basins are ranked second for consideration for general pollutant removal but to be considered only when biofiltration strips have been determined to be infeasible. Wet basins were determined to be infeasible for this Project, as biofiltration devices are feasible for the Project, and a permanent source of water in sufficient quantities is not available.

6. Proposed Temporary Construction Site BMPs to be used on Project

The Project risk level is identified as 2. The risk level would be confirmed as detailed information on the Project geometry and schedule become available during the PS&E phase. This section presents the temporary construction site BMP strategy to be considered for this Project to meet both current Caltrans criteria and the requirements presented in the CGP.

Risk Level Determination

All three build alternatives would disturb more than one acre of soil, so in accordance with the *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Order No, 2009-0009-DWQ, NPDES No. CAS000002), this Project is required to perform a risk assessment to determine the Project Risk Level.

The Caltrans Stormwater Design Application website identifies the planning watersheds within the Project limits. A map identifying the planning watersheds is included in the Required Attachments of this report. The Project risk level is determined from the sediment risk and the receiving water risk. The sediment risk factor 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). 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 planning watershed were used to determine the sediment risk. The construction period is assumed to span from 2020 to 2036, with each construction phase lasting approximately 2 years. The sediment risk was calculated using a 2-year construction duration. The factors used to determine the planning watershed sediment risk are included in Required Attachments of this report and summarized in Table 11.

Table 11. Risk Level Determination by Planning Watersheds

PM Limit	Planning watershed	California Isoerodent Map	EI Index	R	K	LS	Sediment Risk	Receiving Water Risk	Risk Level
I-80 PM 1.9-6.1 and SR 65 PM R4.8-R5.58	Undefined	50	21	100	0.2	0.85 to 1.48	Medium (29.6)	High	2
SR 65 PM R5.58 to R7.3	Undefined			100	0.2	1.37	Medium (27.4)	Low	2

Source: Caltrans

The Hydrologic Sub-area 519.21 has the beneficial uses of COLD, SPAWN, 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 11 summarizes the sediment and receiving water risks for each planning watershed, as well as the corresponding risk levels. The risk levels presented are based on planning level information available at the time of preparation of this report; the Project may contain planning watersheds with Risk Level 2.

The actual planning watershed or single Project Risk Level would be determined in the next submittal, revised in the design phase, and coordinated with Caltrans District 3.

Storm Water Pollution Prevention Plan

A Storm Water Pollution Prevention Plan (SWPPP) would be prepared by the Contractor and approved by the Caltrans Resident Engineer prior to the start of construction. The SWPPP includes the development of a Construction Site Monitoring Program that presents procedures and methods related to the visual monitoring and sampling and analysis plans for non-visible pollutants, sediment and turbidity, and pH. Risk Level 2 and 3 projects are also required to prepare Rain Event Action Plans (REAPs) prior to an anticipated rain event, perform stormwater sampling at all discharge locations during a qualifying rain event, comply with numeric action levels and prepare annual reports detailing BMP and sampling efforts.

REAPs are required for this Project. REAPs should be developed prior to an anticipated rain event. The quantities for REAPs would be determined during the PS&E phase when the construction schedule has been refined. The nearest weather station that may be used to develop these quantities is in Rocklin, 2.3 miles to the northeast. These weather stations were identified using the Caltrans Stormwater Design Application website.

Construction Site BMP Strategy

The construction period for each Project phase would be determined during the PS&E phase. Whenever possible, the scheduling of earth-disturbing construction activities would not be made during anticipated rain events. To mitigate any potential runoff or run-on within the Project area, construction site BMPs would be installed prior to the start of construction or as early as feasibly possible during construction.

DSAs would be protected in accordance with the Project's pollution control measures. Measures to be considered for this Project would be detailed during the PS&E phase. The construction site BMP strategy for this Project would consist of the following:

- Soil Stabilization Measures
- Sediment Control Measures
- Tracking Control
- Non-stormwater Management Measures

- General Construction Site Management
- Stormwater Sampling and Analysis

Storm drain inlet protection would be deployed throughout the Project at all existing, temporary, and permanent drainage inlets.

There are areas adjacent to creeks that would be designated as ESAs and protected with temporary high visibility fencing such temporary fence or temporary reinforced silt fence.

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; details for these systems would be developed during the PS&E phase. Construction windows would be specified in the permits. A project-specific WDR is not expected for the proposed work at identified perennial waterways.

There is potential for wind erosion. Off-site tracking of sediment would be limited by placing stabilized construction entrances in combination with regular street sweeping and vacuuming. Stabilized construction roadways would be used to provide access for construction activities. Locations of these tracking-control BMPs would be considered during the design phase.

Various waste management, materials handling, and other housekeeping BMPs would be used throughout the duration of the Project. Stockpiles of various kinds are anticipated and would be maintained with the appropriate BMPs. These efforts would be covered under the job site management lump sum for the Project. The lump sum cost would be included in the cost estimate prepared during the PS&E phase.

7. Maintenance BMPs (Drain Inlet Stenciling)

Drain inlet stenciling is not required along the mainline of I-80 and SR 65 because pedestrian and bicycle traffic is prohibited. Stenciling may be required for proposed inlets where the ramps intersect with local roads because there is potential for pedestrian and bicycle access. The locations of drain inlet stenciling would be identified on the design plans to be prepared during the PS&E phase.

Maintenance access to all BMP areas would be coordinated with the Caltrans Maintenance Area Manager and incorporated into the Project design to be developed during the PS&E phase.

Required Attachments

- Vicinity Map
- Evaluation Documentation Form (EDF)
- Risk Level Determination Documentation

Supplemental Attachments

Note: Supplemental Attachments are to be supplied during the SWDR approval process; where noted, some of these items may only be required on a project-specific basis.

- Storm Water BMP Cost Summary
- BMP cost information from: Project Planning Cost Estimate (PPCE) during PID and PA/ED project phases; Preliminary Engineer's Cost Estimate (PECE) for PS&E project phase
- Plans showing BMP Deployment (i.e. Layout Sheets, Drainage Sheets, Water Pollution Control Sheets, etc.)
- Checklist SW-1, Site Data Sources
- Checklist SW-2, Storm Water Quality Issues Summary
- Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water BMPs
- Checklists DPP-1, Parts 1–5 (Design Pollution Prevention BMPs) [only those parts that are applicable]
- Checklists T-1, Parts 1–10 (Treatment BMPs) [only those Parts that are applicable]

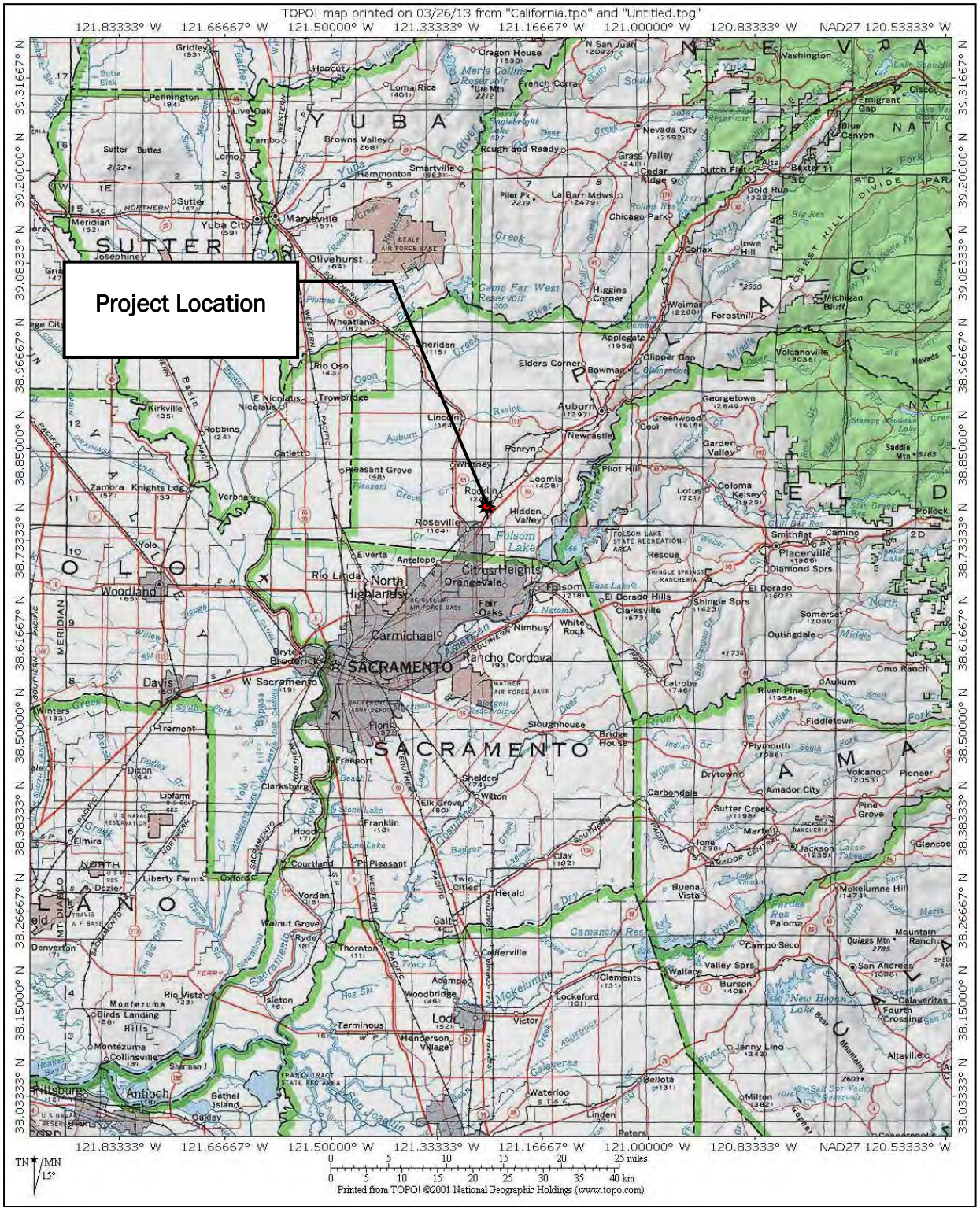

Figure 1. Location Map

Source: United States Geological Survey

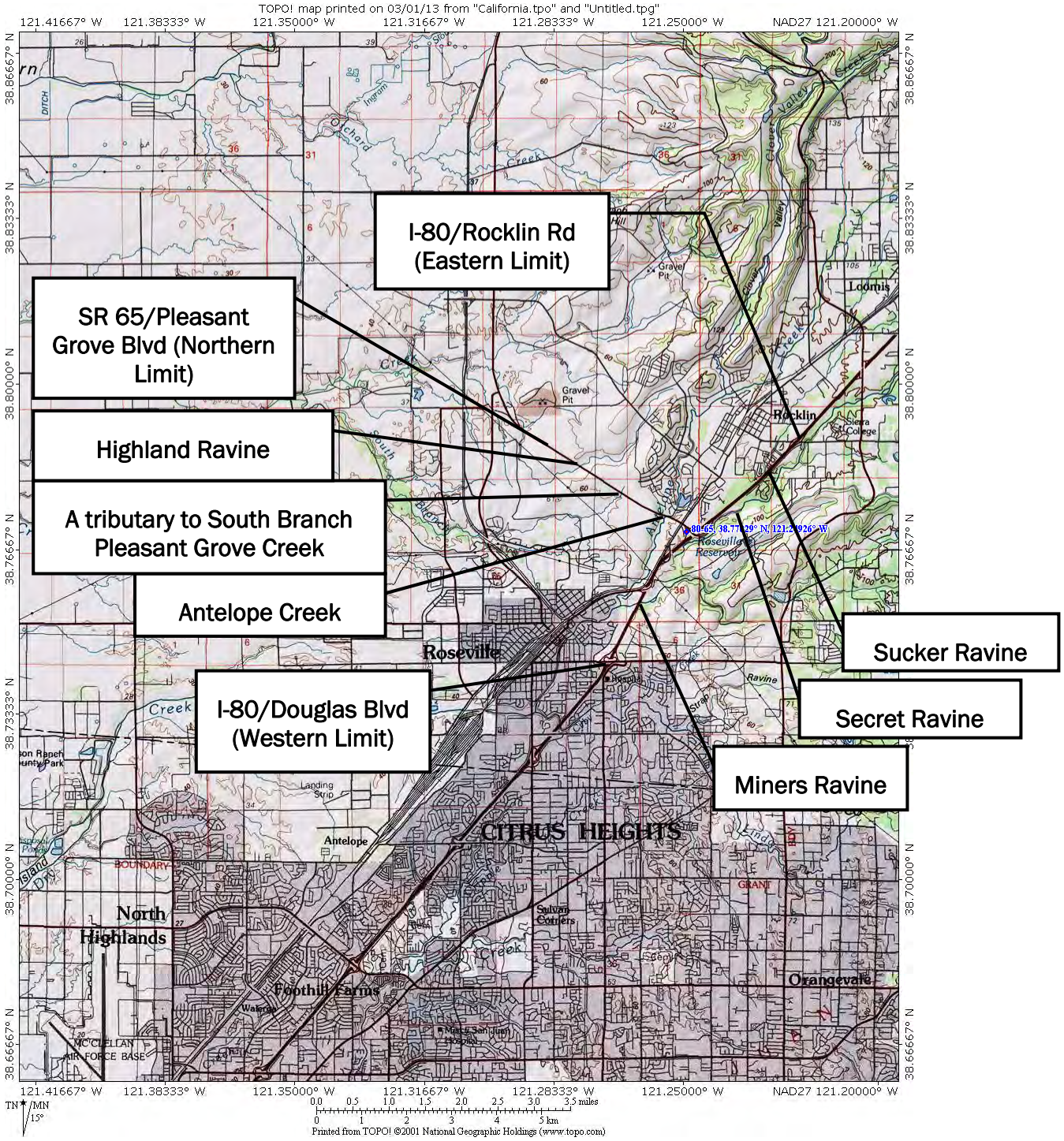

Figure 2. Vicinity Map

Source: United States Geological Survey

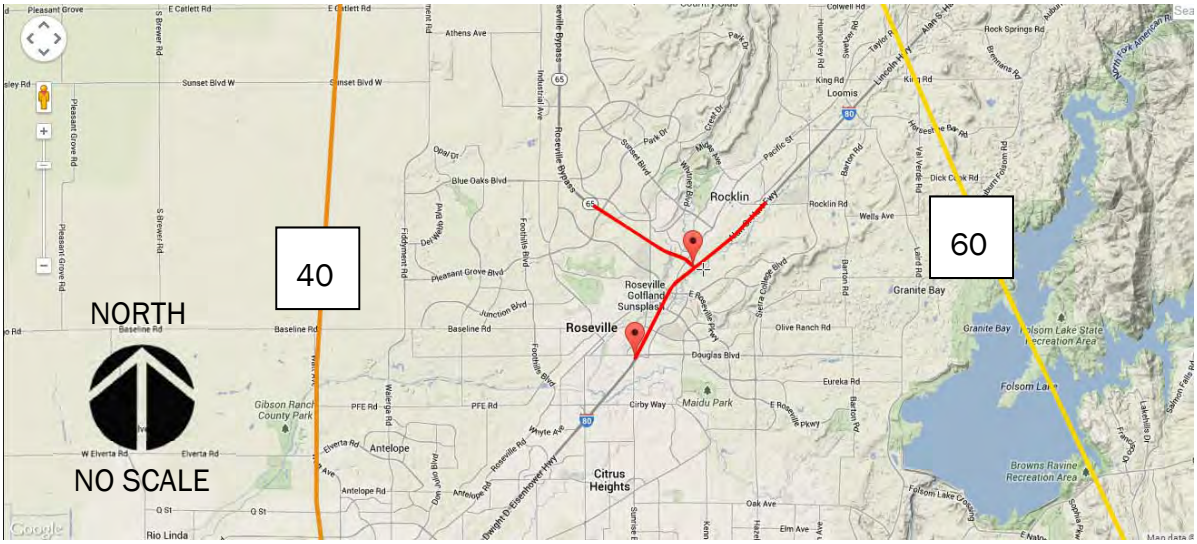

Figure 3. California Isoerodent Map

Source: Caltrans

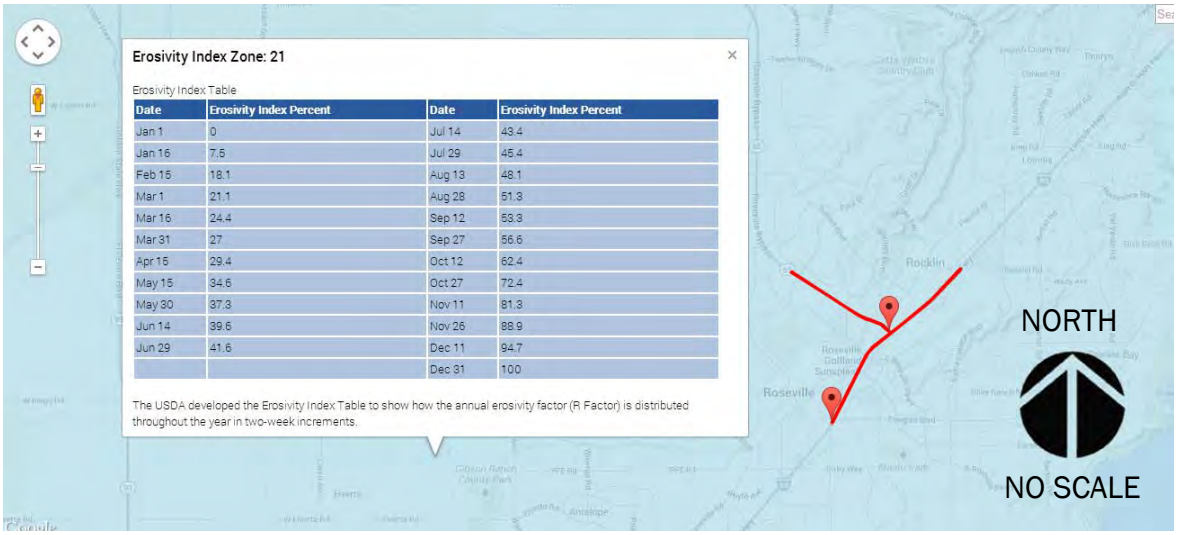

Figure 4. Erosivity Index Zone Map

Source: Caltrans

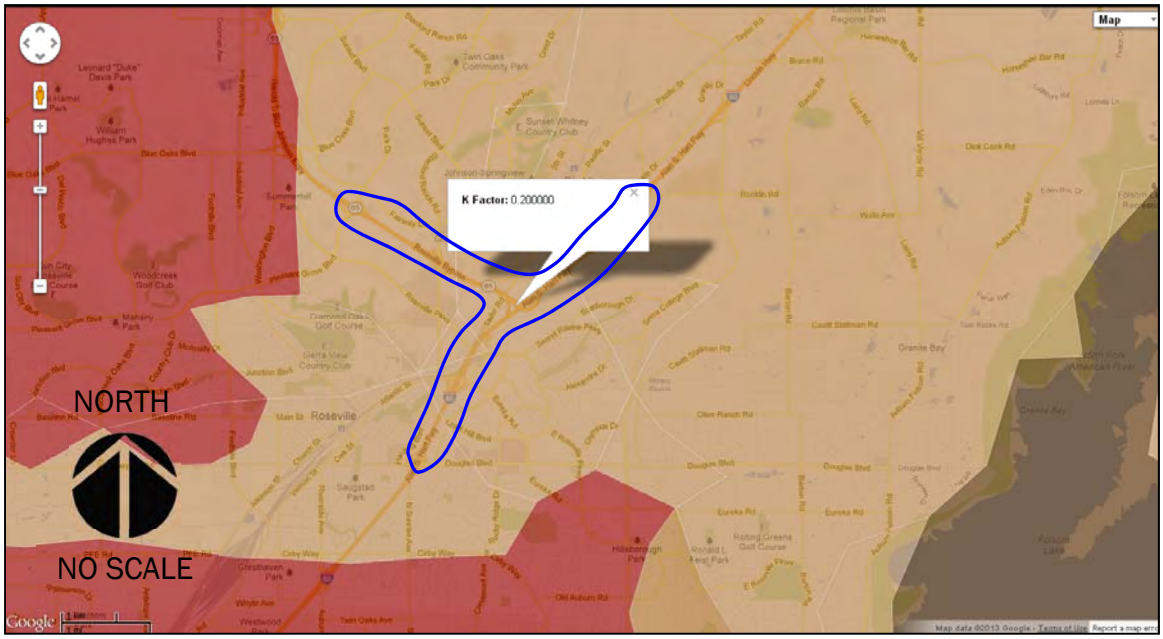

Figure 5. K Factor

Source: Caltrans

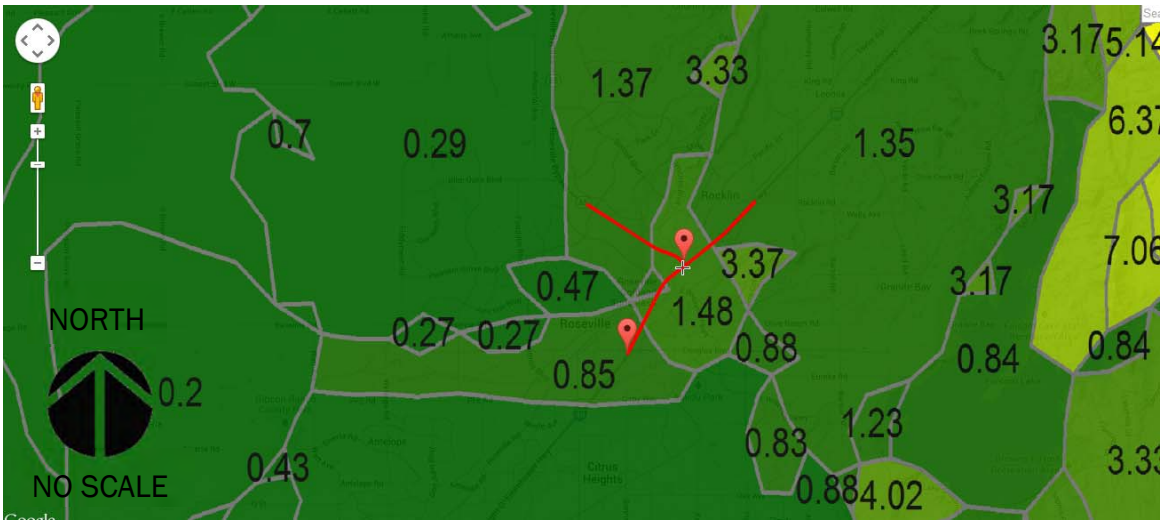

Figure 6. LS Factor

Source: Caltrans

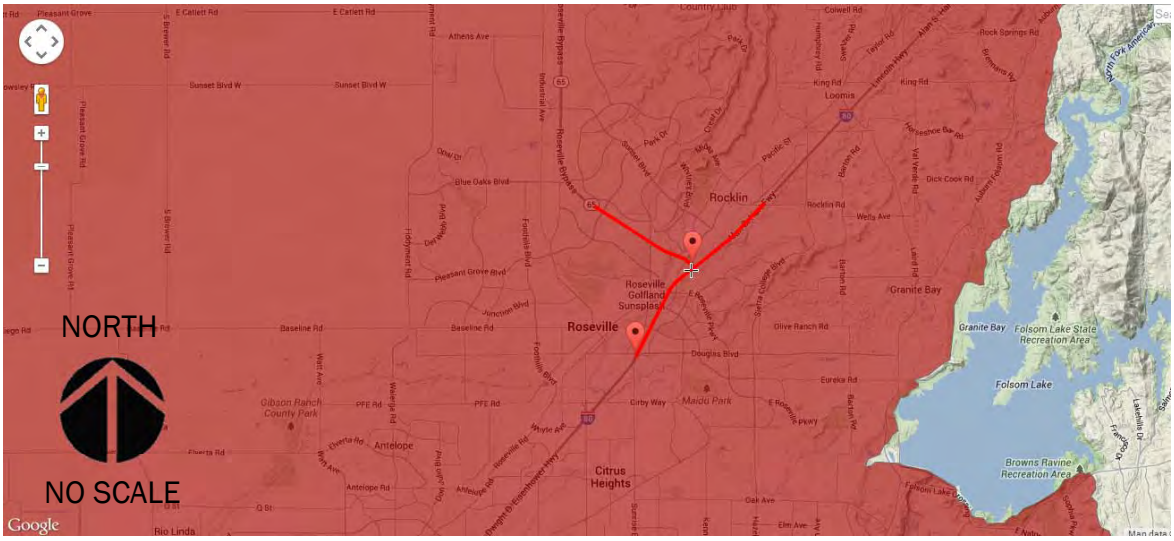

Figure 7. Receiving Water Risk

Source: Caltrans

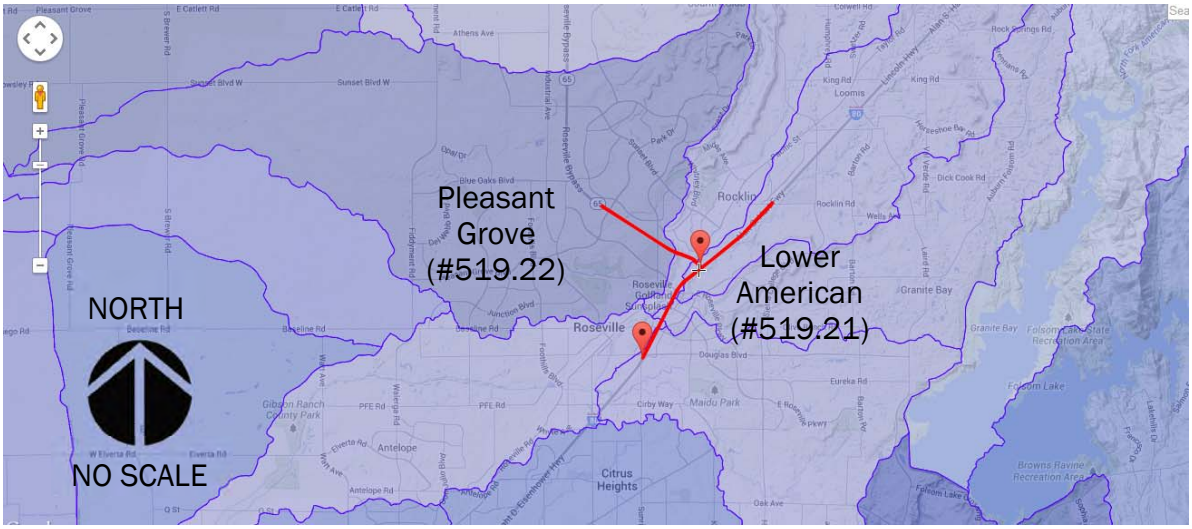

Figure 8. Watershed Boundary Dataset

Source: Caltrans

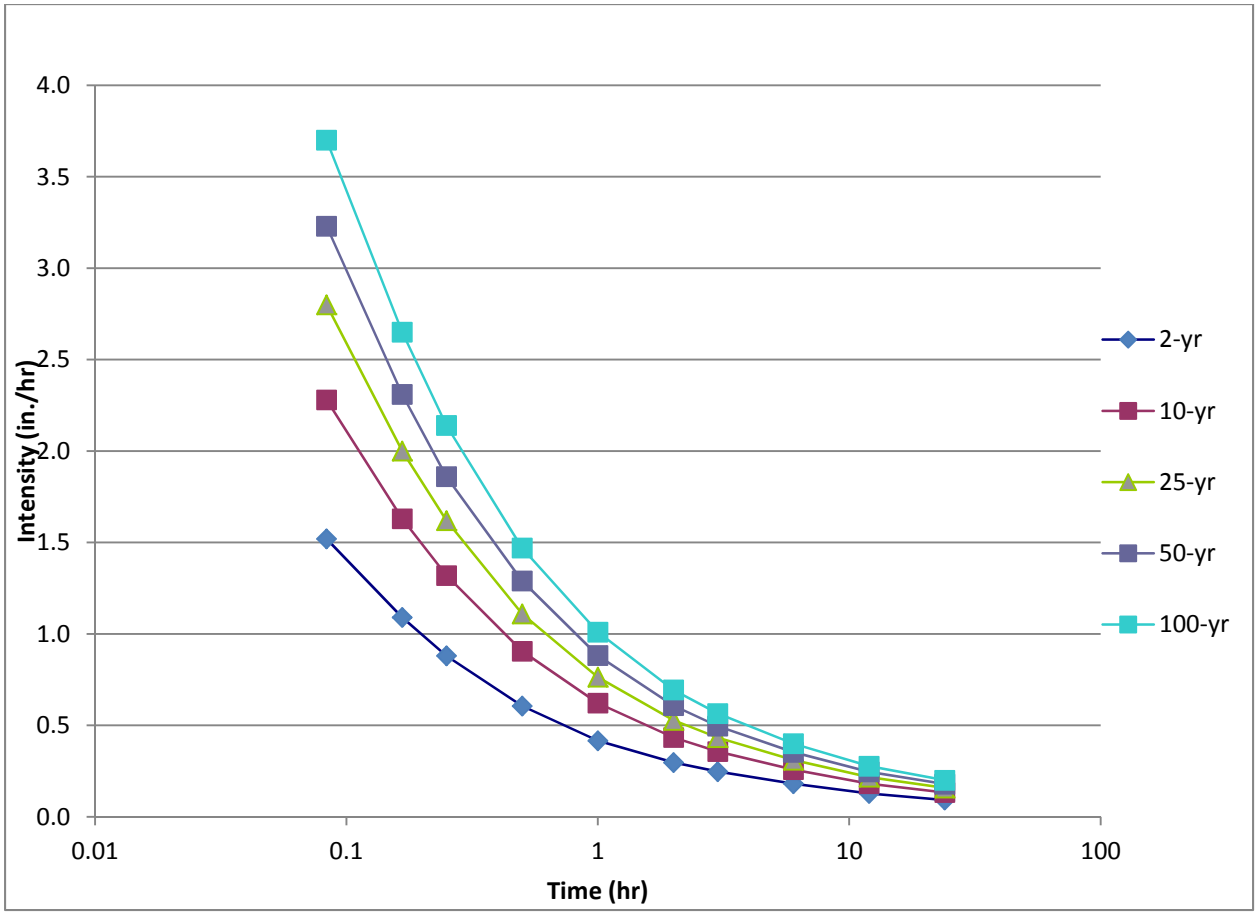

Figure 9. IDF Curves

Source: NOAA

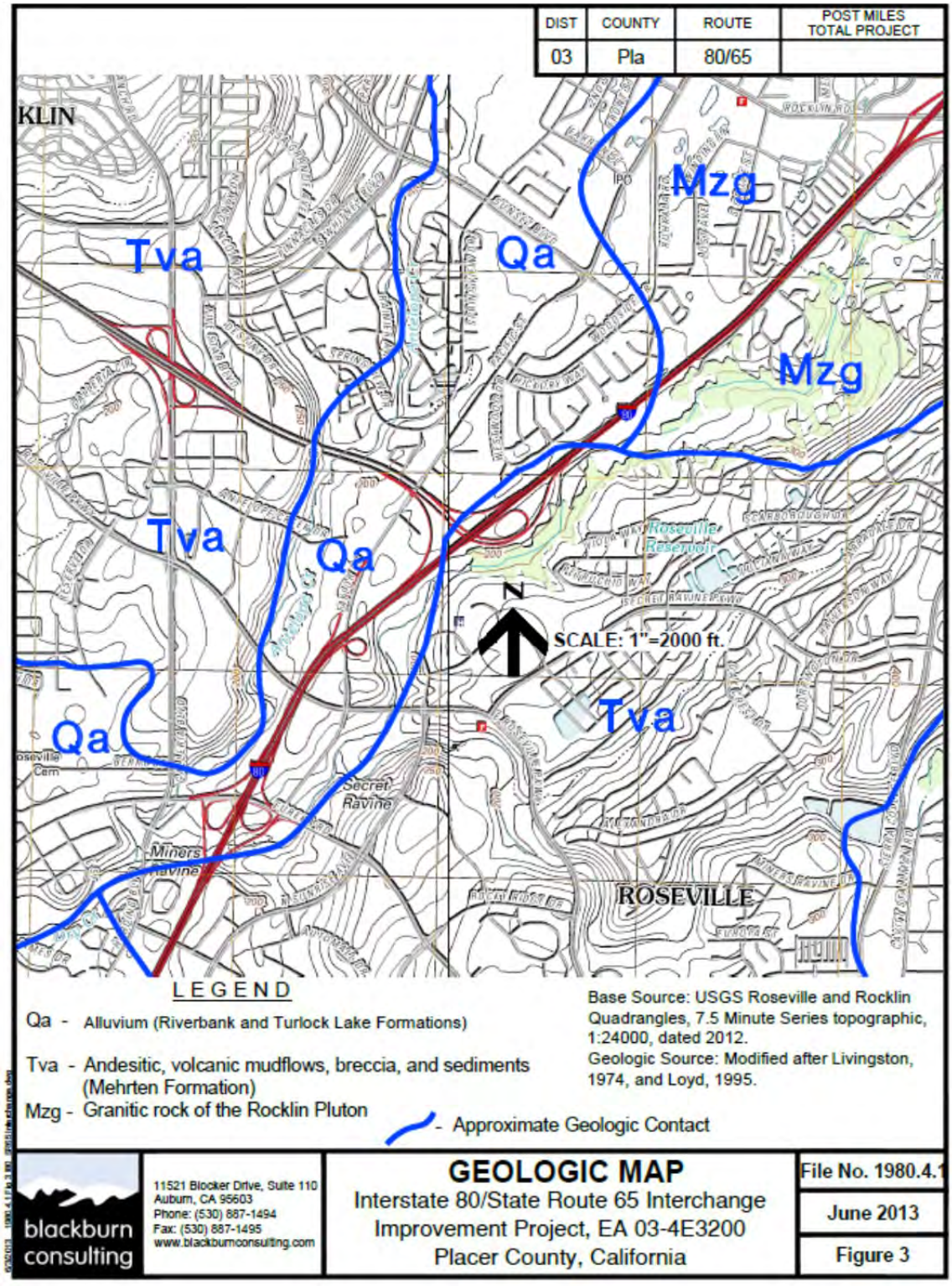

Figure 10. Geologic Map of the Project Area

Source: Blackburn Consulting 2013

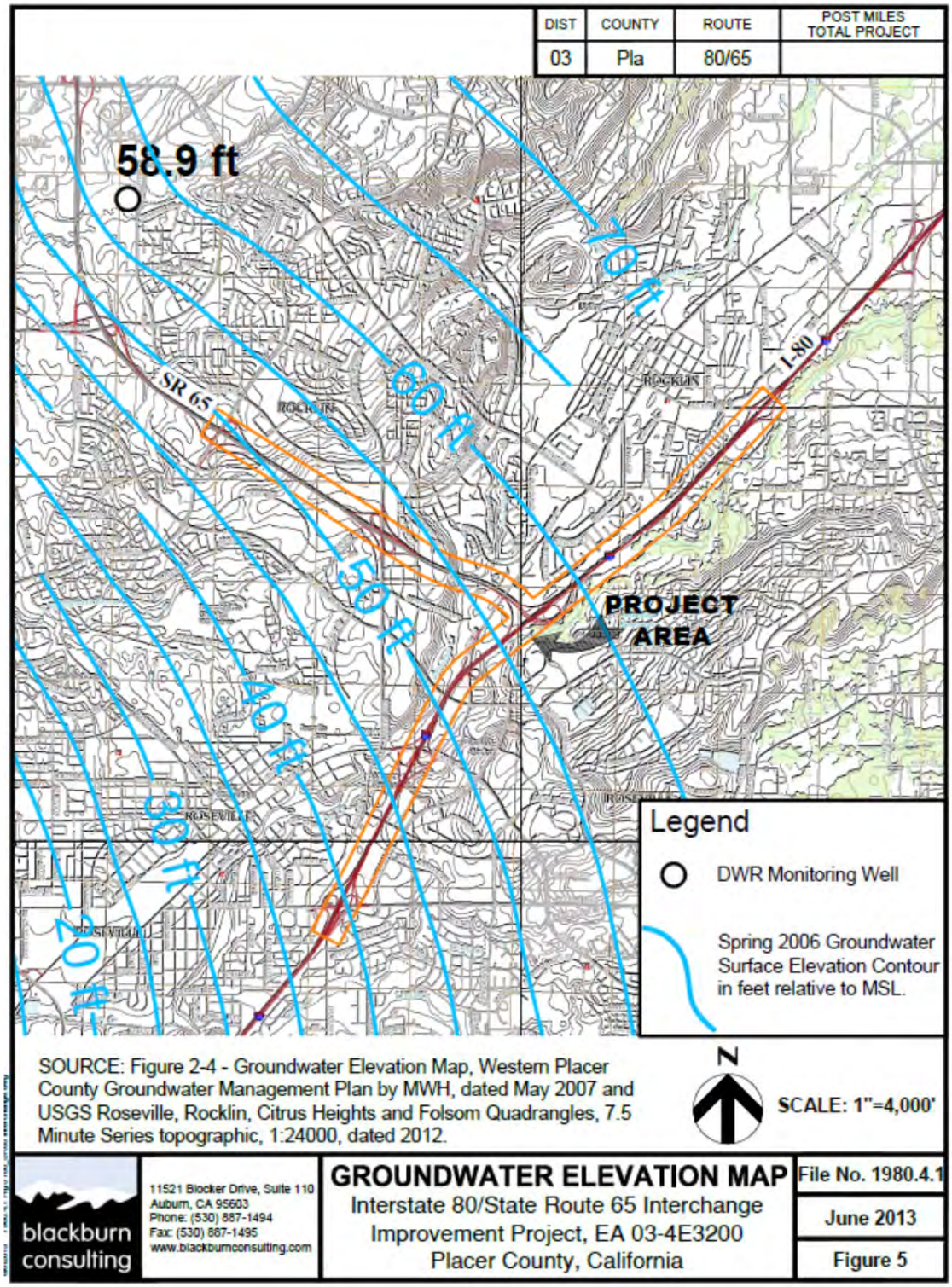

Figure 11. Groundwater Elevation Map

Source: Blackburn Consulting 2013

DATE: _____July 2014__

Project ID (or EA): _____03-4E3200_____

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION FOR EVALUATION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	✓		See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs. Go to 2
2.	Is this an emergency project?		✓	If **Yes**, go to 10. If **No**, continue to 3.
3.	Have TMDLs or other Pollution Control Requirements been established for surface waters within the project limits? Information provided in the water quality assessment or equivalent document.	✓		If **Yes**, contact the District/Regional NPDES Coordinator to discuss the Department's obligations under the TMDL (if Applicable) or Pollution Control Requirements, go to 9 or 4. _____ *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project located within an area of a local MS4 Permittee?	✓		If **Yes**. *(Phase II MS4 Area)*, go to 5. If **No**, document in SWDR go to 5.
5.	Is the project directly or indirectly discharging to surface waters?	✓		If **Yes**, continue to 6. If **No**, go to 10.
6.	Is it a new facility or major reconstruction?	✓		If **Yes**, continue to 8. If **No**, go to 7.
7.	Will there be a change in line/grade or hydraulic capacity?			If **Yes**, continue to 8. If **No**, go to 10.
8.	Does the project result in a net increase of one acre or more of new impervious surface?	✓		If **Yes**, continue to 9. If **No**, go to 10. *32 ac (Alt 1), 29 ac (Alt 2) and 27 ac (Alt 3) (Net Increase New Impervious Surface)*
9.	Project is required to consider approved Treatment BMPs.	✓		See Sections 2.4 and either Section 5.5or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.
10.	Project is not required to consider Treatment BMPs. _____*(Dist./Reg. Design SW Coord. Initials)* _____*(Project Engineer Initials)* _____ *(Date)*			Document for Project Files by completing this form, and attaching it to the SWDR.

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs

Storm Water BMP Cost Summary

THIS INFORMATION IS FOR **CALTRANS INTERNAL USE ONLY**

Project Na	**I-80/SR 65 Interchange Improvements Project**
District:	**3**
County:	**Pla**
Route:	**I-80/ SR 65**
Limits:	**(I-80) PM 1.9-6.1; (SR-65) PM R4.8-R7.3**
Project ID	**(EA) 4E3200**

Alternative 1

1.0 DPP BMPs

Total Construction Cost	Assumed Cost			
$162,610,000	1.00%	**SUBTOTAL**	$	1,626,100

2.0 Treatment BMPs

Total Construction Cost	Assumed Cost			
$162,610,000	1.50%	**SUBTOTAL**	$	2,439,150

3.0 Prepare SWPPP (or WCPC)

Total Construction Cost	Cost per Table F-6			
$162,610,000	$71,000	**SUBTOTAL**	$	71,000

Routine Quarterly Monitoring Value: $65,000

4.0 Construction Site BMPs

Total Construction Cost	1.25% per Table F-3			
$162,610,000	1.25%	**SUBTOTAL**	$	2,032,625

5.0 ROW Acquisition

Length of ROW	Unit Cost per Length			
		SUBTOTAL	$	-

5.0 Rain Event Action Plan

Each	Unit Cost			
647	$500	**SUBTOTAL**	$	323,500

6.0 Stormwater Monitoring

Project Risk Level	SWM Cost (PPDG Append F)			
2	$738,400	**SUBTOTAL**	$	738,400

7.0 Storm Water Annual Report

Each	Unit Cost			
18	$2,000	**SUBTOTAL**	$	36,000

TOTAL COST FOR STORM WATER BMPs	$	7,266,775

Note: This cost summary would cover the entire construction period that spans from 2020 to 2036.

Storm Water BMP Cost Summary

THIS INFORMATION IS FOR **CALTRANS INTERNAL USE ONLY**

Project Na	I-80/SR 65 Interchange Improvements Project
District:	3
County:	Pla
Route:	I-80/ SR 65
Limits:	(I-80) PM 1.9-6.1; (SR-65) PM R4.8-R7.3
Project ID	(EA) 4E3200

Alternative 2

1.0 DPP BMPs

Total Construction Cost	Assumed Cost			
$151,560,000	1.00%	**SUBTOTAL**	$	1,515,600

2.0 Treatment BMPs

Total Construction Cost	Assumed Cost			
$151,560,000	1.50%	**SUBTOTAL**	$	2,273,400

3.0 Prepare SWPPP (or WCPC)

Total Construction Cost	Cost per Table F-6			
$151,560,000	$71,000	**SUBTOTAL**	$	71,000

Routine Quarterly Monitoring Value: $65,000

4.0 Construction Site BMPs

Total Construction Cost	1.25% per Table F-3			
$151,560,000	1.25%	**SUBTOTAL**	$	1,894,500

5.0 ROW Acquisition

Length of ROW	Unit Cost per Length			
		SUBTOTAL	$	-

5.0 Rain Event Action Plan

Each	Unit Cost			
647	$500	**SUBTOTAL**	$	323,500

6.0 Stormwater Monitoring

Project Risk Level	SWM Cost (PPDG Append F)			
2	$738,400	**SUBTOTAL**	$	738,400

7.0 Storm Water Annual Report

Each	Unit Cost			
18	$2,000	**SUBTOTAL**	$	36,000

TOTAL COST FOR STORM WATER BMPs	$	6,852,400

Note: This cost summary would cover the entire construction period that spans from 2020 to 2036.

Storm Water BMP Cost Summary

THIS INFORMATION IS FOR **CALTRANS INTERNAL USE ONLY**

Project Na	**I-80/SR 65 Interchange Improvements Project**
District:	**3**
County:	**Pla**
Route:	**I-80/ SR 65**
Limits:	**(I-80) PM 1.9-6.1; (SR-65) PM R4.8-R7.3**
Project ID	**(EA) 4E3200**

Alternative 3

1.0 DPP BMPs

Total Construction Cost	Assumed Cost			
$150,740,000	1.00%	**SUBTOTAL**	$	1,507,400

2.0 Treatment BMPs

Total Construction Cost	Assumed Cost			
$150,740,000	1.50%	**SUBTOTAL**	$	2,261,100

3.0 Prepare SWPPP (or WCPC)

Total Construction Cost	Cost per Table F-6			
$150,740,000	$71,000	**SUBTOTAL**	$	71,000

Routine Quarterly Monitoring Value: $65,000

4.0 Construction Site BMPs

Total Construction Cost	1.25% per Table F-3			
$150,740,000	1.25%	**SUBTOTAL**	$	1,884,250

5.0 ROW Acquisition

Length of ROW	Unit Cost per Length			
		SUBTOTAL	$	-

5.0 Rain Event Action Plan

Each	Unit Cost			
647	$500	**SUBTOTAL**	$	323,500

6.0 Stormwater Monitoring

Project Risk Level	SWM Cost (PPDG Append F)			
2	$738,400	**SUBTOTAL**	$	738,400

7.0 Storm Water Annual Report

Each	Unit Cost			
18	$2,000	**SUBTOTAL**	$	36,000

TOTAL COST FOR STORM WATER BMPs	$	6,821,650

Note: This cost summary would cover the entire construction period that spans from 2020 to 2036.

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

Project Description: I-80/SR 65 SYSTEM INTERCHANGE IMPROVEMENTS

Limits: I-80 FROM DOUGLAS BLVD TO ROCKLIN ROAD AND
SR 65 FROM I-80 TO PLEASANT GROVE BLVD

Alternative: ALTERNATIVE 1 - FULL TAYLOR

Proposed Improvement (Scope): UPGRADE THE I-80/SR 65 INTERCHANGE AND ADJACENT TRANSPORTATION FACILITIES TO REDUCE TRAFFIC CONDITIONS COMPLY WITH CURRENT DESIGN STANDARDS. ALTERNATIVE 1 PROPOSES A FULL ACCESS INTERCHANGE WITHIN THE I-80/SR 65 INTERCHANGE FOOTPRINT TO PROVIDE ACCESS TO TAYLOR ROAD

TOTAL ROADWAY ITEMS	**$ 162,610,000**
TOTAL STRUCTURE ITEMS	**$ 182,250,000**
SUBTOTAL CONSTRUCTION COSTS	**$ 344,860,000**
TOTAL RIGHT OF WAY ITEMS	**$ 3,450,000**
TOTAL PROJECT CAPITAL OUTLAY COST	**$ 348,310,000**
3% COMPOUNDED TO 2027	**$ 511,505,000**

Prepared by Lauren Proctor, PE 916-286-0332 7-16-2014
Name *Phone No.* *Date*

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

CALTRANS IMPROVEMENTS

I. ROADWAY ITEMS:

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost	Section Cost
Roadway Excavation	608,130	CY	$ 25.00	$ 15,203,250	
Imported Borrow	474,700	CY	$ 15.00	$ 7,120,500	
Clearing & Grubbing	1	LS	$ 300,000.00	$ 300,000	
Existing Pavement Excavation	553,200	CY	$ 25.00	$ 13,830,000	
				Subtotal Earthwork	$ 36,453,750

Section 2 Structural Section					
HMA (Type A)	146,900	TON	$ 85.00	$ 12,486,500	
Aggregate Base Class II	149,000	CY	$ 50.00	$ 7,450,000	
Pavement Reinforcing Fabric	337,600	SQYD	$ 1.50	$ 506,400	
Minor Concrete (Curb, Gutter, Sidewalk)	600	CY	$ 485.00	$ 291,000	
Cold Plane AC Pavement	499,700	SQYD	$ 2.00	$ 999,400	
				Subtotal Structural Section	$ 21,733,300

Section 3 Drainage					
Remove Existing Drainage Facilities	1	LS	$ 300,000.00	$ 300,000	
Project Drainage	1	LS	$ 19,177,500.00	$ 19,177,500	
(X-Drains, overside, etc.)					
Ditch Excavation	1	LS	$ 200,000.00	$ 200,000	
				Subtotal Drainage	$ 19,677,500

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

I. ROADWAY ITEMS (Cont'n)

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Retaining Walls	12,070	SF	$ 65.00	$ 784,550	
Noise Barriers	155,700	SF	$ 20.00	$ 3,114,000	
Barriers and Guardrails	10,740	LF	$ 45.00	$ 483,300	
Highway Planting	1	LS	$ 5,000,000.00	$ 5,000,000	
Replacement Planting	1	LS	$ 2,000,000.00	$ 2,000,000	
Erosion Control	1	LS	$ 335,000.00	$ 335,000	
Water Pollution Control	1	LS	$ 100,000.00	$ 100,000	
Hazardous Waste Mitigation Work	1	LS	$ 2,322,478.00	$ 2,322,478	
Storm Water Treatment BMPs	1	LS	$ 3,500,000.00	$ 3,500,000	
Prepare SWPPP	1	LS	$ 30,000.00	$ 30,000	
Storm Water Construction BMPs	1	LS	$ 1,500,000.00	$ 1,500,000	
Environmental Mitigation	1	LS	$ 250,000.00	$ 250,000	
Resident Engineer Office Space	1	LS	$ 250,000.00	$ 250,000	
				Subtotal Specialty Items	$ 19,669,328

Section 5 Traffic Items					
Lighting	1	LS	$ 5,500,000.00	$ 5,500,000	
Traffic Striping	228,300	LF	$ 5.00	$ 1,141,500	
Traffic Signs	1	LS	$ 40,000.00	$ 40,000	
Traffic Signals	1	EA	$ 300,000.00	$ 300,000	
COZEEP/FSP	780	DAYS	$ 4,000.00	$ 3,120,000	
Traffic Control	780	DAYS	$ 3,000.00	$ 2,340,000	
Public Information	1	LS	$ 100,000.00	$ 100,000	
New Ramp Meter Installation	1	LS	$ 250,000.00	$ 250,000	
Temporary Railing (Type K)	66,800	LF	$ 18.00	$ 1,202,400	
				Subtotal Traffic Items	$ 13,993,900

TOTAL SECTIONS 1 thru 5	$ 111,527,778

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

I. ROADWAY ITEMS (Cont'n)

			Item Cost	Section Cost
Section 6 Minor Item				
Subtotal Sections 1-5	$ 111,527,778	x 8%	$ 8,922,200	
		Total Minor Items		$ 8,922,200
Section 7 Roadway Mobilization				
	$ 120,449,978 (Subtotal Sections 1 thru 6)	x 10%	$ 12,045,000	
		Total Roadway Mobilization		$ 12,045,000
Section 8 Roadway Additions				
Supplemental Work	$ 120,449,978 (Subtotal Sections 1 thru 6)	x 5%	$ 6,022,500	
Contingencies*	$ 120,449,978 (Subtotal Sections 1 thru 6)	x 20%	$ 24,090,000	
		Total Roadway Additions		$ 30,112,500
		TOTAL ROADWAY ITEMS (Total of Sections 1-8)		$ 162,607,478

Estimate Prepared By:	Lauren Proctor, PE	916-286-0332	7-16-2014
	(Print Name)	Phone#	Date
Estimate Checked By:	John O'Reilly	916-563-2598	7-23-2014
	(Print Name)	Phone#	Date

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

II. STRUCTURE ITEMS

Bridge Name	Area (Sq-Ft)	Cost/Sq-Ft	Demolition Cost	Total Cost
E80/N65 Connector	108,918	$ 275	$ 190,500	$ 30,143,000
80/65 HOV Connector	91,541	$ 275	$ -	$ 25,173,800
Miners Ravine Bridge (Widen)	1,694	$ 350	$ 7,900	$ 600,800
S65/E80 Connector	135,807	$ 275	$ 138,330	$ 37,485,300
S65/W80 Connector	11,558	$ 300	$ -	$ 3,467,400
"T" Undercrossing (Left)	11,875	$ 300	$ -	$ 3,562,500
"T" Undercrossing (Right)	14,007	$ 300	$ -	$ 4,202,100
Taylor Road OC (Replace)	35,880	$ 300	$ 338,600	$ 11,102,600
E. Roseville Viaduct	258,416	$ 250	$ 553,395	$ 65,157,400
Roseville PKWY Tieback Wall	1,184	$ 125	$ -	$ 148,000
Galleria BLVD Tieback Wall	3,694	$ 125	$ -	$ 461,700

SUBTOTAL STRUCTURES ITEMS (Sum of Total Cost for Structures)	$ 181,504,600

Railroad Related Costs:

Flagging (Day): 250 Days @ $1000/Day	$ 250,000.00	$ 250,000
Flagging (Night): 250 Nights @ $2000/Night	$ 500,000.00	$ 500,000
SUBTOTAL RAILROAD ITEMS		$ 750,000

TOTAL STRUCTURES ITEMS (Sum of Structures Items plus Railroad Items)	$ 182,254,600

Estimate Prepared By	Jennifer Elwood, PE	916-286-0267	7-16-2014
	(Print Name)	Phone #	Date

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

III. RIGHT OF WAY ITEMS

A.	Acquisition, including excess lands, damage to remainder(s) and Goodwill	$ 3,246,573	
B.	Project Permit Fees		
C.	Utility Relocation (Agency Share)	$ 150,000	
D.	Relocation Assistance	$ 20,000	
E.	Clearance/Demolition	$ 15,000	
F.	Title and Escrow Fees	$ 16,500	
	TOTAL RIGHT OF WAY ITEMS (Escalated Value)		**$ 3,449,000**

Anticipated Date of Right of Way Certification (Date to which values are escalated) _____

H. Construction Contract Work

Brief Description of Work:

_____

_____

_____

_____

_____

Right of Way Branch Cost Estimate for Work* _____

*This dollar amount is to be included in the Roadway and/or Structure Items of Work, as appropriate. DO NOT include in Right of Way Items.

Estimate Prepared By Lauren Proctor, PE (Print Name) 916-286-0332 Phone # 7-16-2014 Date

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

Project Description: I-80/SR 65 SYSTEM INTERCHANGE IMPROVEMENTS

Limits: I-80 FROM DOUGLAS BLVD TO ROCKLIN ROAD AND
Alternative: SR 65 FROM I-80 TO PLEASANT GROVE BLVD
ALTERNATIVE 2 - COLLECTOR DISTRIBUTOR RAMPS

Proposed Improvement (Scope): UPGRADE THE I-80/SR 65 INTERCHANGE AND ADJACENT TRANSPORTATION FACILITIES TO REDUCE TRAFFIC CONDITIONS COMPLY WITH CURRENT DESIGN STANDARDS. ALTERNATIVE 2 PROPOSES AN EASTBOUND COLLECTOR-DISTRIBUTOR SYSTEM TO PROVIDE ACCESS TO TAYLOR ROAD

TOTAL ROADWAY ITEMS	**$ 151,560,000**
TOTAL STRUCTURE ITEMS	**$ 194,600,000**
SUBTOTAL CONSTRUCTION COSTS	**$ 346,160,000**
TOTAL RIGHT OF WAY ITEMS	**$ 5,400,000**
TOTAL PROJECT CAPITAL OUTLAY COST	**$ 351,560,000**
3% COMPOUNDED TO 2027	**$ 516,278,000**

Prepared by	Lauren Proctor, PE	916-286-0332	7-16-2014
	Name	*Phone No.*	*Date*

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

CALTRANS IMPROVEMENTS

I. ROADWAY ITEMS:

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost	Section Cost
Roadway Excavation	188,400	CY	$ 25.00	$ 4,710,000	
Imported Borrow	847,200	CY	$ 15.00	$ 12,708,000	
Clearing & Grubbing	1	LS	$ 300,000.00	$ 300,000	
Existing Pavement Excavation	190,700	CY	$ 25.00	$ 4,767,500	
				Subtotal Earthwork	$ 22,485,500

Section 2 Structural Section					
HMA (Type A)	158,100	TON	$ 85.00	$ 13,438,500	
Aggregate Base	154,900	CY	$ 50.00	$ 7,745,000	
Pavement Reinforcing Fabric	309,700	SQYD	$ 1.50	$ 464,550	
Concrete (Curb, Gutter, Sidewalk)	540	CY	$ 485.00	$ 261,972	
Cold Plane AC Pavement	106,500	SQYD	$ 2.00	$ 213,000	
				Subtotal Structural Section	$ 22,123,022

Section 3 Drainage					
Remove Existing Drainage Facilities	1	LS	$ 300,000.00	$ 300,000	
Project Drainage (X-Drains, overside, etc.)	1	LS	$ 17,559,500.00	$ 17,559,500	
Ditch Excavation	1	LS	$ 200,000.00	$ 200,000	
				Subtotal Drainage	$ 18,059,500

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

I. ROADWAY ITEMS (Cont'n)

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Retaining Walls	109,000	SF	$ 65.00	$ 7,085,000	
Noise Barriers	155,700	SF	$ 20.00	$ 3,114,000	
Barriers and Guardrails	29,100	LF	$ 45.00	$ 1,309,500	
Highway Planting	1	LS	$ 5,000,000.00	$ 5,000,000	
Replacement Planting	1	LS	$ 2,000,000.00	$ 2,000,000	
Erosion Control	1	LS	$ 335,000.00	$ 335,000	
Water Pollution Control	1	LS	$ 100,000.00	$ 100,000	
Hazardous Waste Mitigation Work	1	LS	$ 947,537.00	$ 947,537	
Storm Water Treatment BMPs	1	LS	$ 2,500,000.00	$ 2,500,000	
Prepare SWPPP	1	LS	$ 30,000.00	$ 30,000	
Storm Water Construction BMPs	1	LS	$ 1,500,000.00	$ 1,500,000	
Environmental Mitigation	1	LS	$ 300,000.00	$ 300,000	
Resident Engineer Office Space	1	LS	$ 250,000.00	$ 250,000	
				Subtotal Specialty Items	$ 24,471,037

Section 5 Traffic Items					
Lighting	1	LS	$ 5,500,000.00	$ 5,500,000	
Traffic Striping	737,500	LF	$ 5.00	$ 3,687,500	
Traffic Signs	1	LS	$ 40,000.00	$ 40,000	
COZEEP/FSP	780	DAYS	$ 4,000.00	$ 3,120,000	
Traffic Control	780	DAYS	$ 3,000.00	$ 2,340,000	
Public Information	1	LS	$ 100,000.00	$ 100,000	
New Ramp Meter Installation	1	LS	$ 200,000.00	$ 200,000	
Temporary Railing (Type K)	101,200	LF	$ 18.00	$ 1,821,600	
				Subtotal Traffic Items	$ 16,809,100

TOTAL SECTIONS 1 thru 5	$ 103,948,159

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

I. ROADWAY ITEMS (Cont'n)

			Item Cost	Section Cost
Section 6 Minor Item				
Subtotal Sections 1-5	$ 103,948,159	x 8%	$ 8,315,900	
		Total Minor Items		$ 8,315,900
Section 7 Roadway Mobilization				
	$ 112,264,059 (Subtotal Sections 1 thru 6)	x 10%	$ 11,226,400	
		Total Roadway Mobilization		$ 11,226,400
Section 8 Roadway Additions				
Supplemental Work	$ 112,264,059 (Subtotal Sections 1 thru 6)	x 5%	$ 5,613,200	
Contingencies*	$ 112,264,059 (Subtotal Sections 1 thru 6)	x 20%	$ 22,452,800	
		Total Roadway Additions		$ 28,066,000
		TOTAL ROADWAY ITEMS (Total of Sections 1-8)		$ 151,556,459

Estimate Prepared By:	Lauren Proctor, PE	916-286-0267	7-16-2014
	(Print Name)	Phone#	Date
Estimate Checked By:	John O'Reilly	916-563-2598	7-23-2014
	(Print Name)	Phone#	Date

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

II. STRUCTURE ITEMS

Bridge Name	Area (Sq-Ft)	Cost/Sq-Ft	Demolition Cost	Total Cost
NB SR-65 On Ramp ("CD3")	8,736	$ 300	$ -	$ 2,620,800
EB I-80 On Ramp ("CD4")	35,867	$ 300	$ -	$ 10,760,100
E80/N65 Connector ("EN")	115,185	$ 275	$ 190,500	$ 31,866,400
80/65 HOV Connector ("HOV")	90,888	$ 275	$ -	$ 24,994,200
Miners Ravine Bridge ("CD1")	9,547	$ 300	$ -	$ 2,864,100
S65/E80 Connector ("SE")	130,581	$ 275	$ 138,300	$ 36,048,100
Taylor Road OC (Replace) "TR"	41,177	$ 300	$ 338,600	$ 12,691,700
Eureka Road On Ramp UC	17,820	$ 350	$ -	$ 6,237,000
E. Roseville Viaduct	258,416	$ 250	$ 553,395	$ 65,157,400
Roseville PKWY Tieback Wall	1,184	$ 125	$ -	$ 148,000
Galleria BLVD Tieback Wall	3,694	$ 125	$ -	$ 461,700

SUBTOTAL STRUCTURES ITEMS (Sum of Total Cost for Structures)		$ 193,849,500
Railroad Related Costs:		$ -
Flagging (Day): 250 Days @ $1000/Day	$ 250,000.00	$ 250,000
Flagging (Night): 250 Nights @ $2000/Night	$ 500,000.00	$ 500,000
SUBTOTAL RAILROAD ITEMS		$ 750,000
TOTAL STRUCTURES ITEMS (Sum of Structures Items plus Railroad Items)		$ 194,599,500

Estimate Prepared By Jennifer Elwood, PE (Print Name) 916-286-0267 Phone # 7-16-2014 Date

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

III. RIGHT OF WAY ITEMS

		2008 VALUE
A.	Acquisition, including excess lands, damage to remainder(s) and Goodwill	$ 2,750,252
B.	Project Permit Fees	
C.	Utility Relocation (Agency Share)	$ 2,300,000
D.	Relocation Assistance	$ 20,000
E.	Clearance/Demolition	$ 150,000
F.	Title and Escrow Fees	$ 180,000

TOTAL RIGHT OF WAY ITEMS **$ 5,400,260**
(Escalated Value)

Anticipated Date of Right of Way Certification
(Date to which values are escalated)

F. Construction Contract Work

Brief Description of Work:

Right of Way Branch Cost Estimate for Work*

*This dollar amount is to be included in the Roadway and/or Structure Items of Work, as appropriate. DO NOT include in Right of Way Items.

Estimate Prepared By Lauren Proctor, PE '916-286-0332 7-16-2014
(Print Name) Phone # Date

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

Project Description: I-80/SR 65 SYSTEM INTERCHANGE IMPROVEMENTS

Limits: I-80 FROM DOUGLAS BLVD TO ROCKLIN ROAD AND
Alternative: SR 65 FROM I-80 TO PLEASANT GROVE BLVD
ALTERNATIVE 3 - TAYLOR ROAD INTERCHANGE ELIMINATED

Proposed Improvement (Scope): UPGRADE THE I-80/SR 65 INTERCHANGE AND ADJACENT TRANSPORTATION FACILITIES TO REDUCE TRAFFIC CONDITIONS COMPLY WITH CURRENT DESIGN STANDARDS. ALTERNATIVE 3 REMOVES THE EXISITNG TAYLOR ROAD INTERCHANGE. TAYLOR ROAD WOULD BE ACCESSED FROM THE ADJACENT INTERCHANGES

TOTAL ROADWAY ITEMS	**$ 150,740,000**
TOTAL STRUCTURE ITEMS	**$ 185,910,000**
SUBTOTAL CONSTRUCTION COSTS	**$ 336,650,000**
TOTAL RIGHT OF WAY ITEMS	**$ 5,400,000**
TOTAL PROJECT CAPITAL OUTLAY COST	**$ 342,050,000**
3% COMPOUNDED TO 2027	**$ 502,312,000**

Prepared by	Dave Melis, PE	916-363-4210	7-16-2014
	Name	*Phone No.*	*Date*

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

CALTRANS IMPROVEMENTS

I. ROADWAY ITEMS:

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost	Section Cost
Roadway Excavation	206,300	CY	$ 25.00	$ 5,157,500	
Imported Borrow	476,800	CY	$ 15.00	$ 7,152,000	
Clearing & Grubbing	1	LS	$ 300,000.00	$ 300,000	
Existing Pavement Excavation	513,100	CY	$ 25.00	$ 12,827,500	
				Subtotal Earthwork	$ 25,437,000
Section 2 Structural Section					
HMA (Type A)	162,800	TON	$ 85.00	$ 13,838,000	
Aggregate Base	163,800	CY	$ 50.00	$ 8,190,000	
Pavement Reinforcing Fabric	325,300	SQYD	$ 1.50	$ 487,950	
Minor Concrete (Curb, Gutter, Sidewalk)	1,290	CY	$ 485.00	$ 625,650	
Cold Plane AC Pavement	106,500	SQYD	$ 2.00	$ 213,000	
				Subtotal Structural Section	$ 23,354,600
Section 3 Drainage					
Remove Existing Drainage Facilities	1	LS	$ 300,000.00	$ 300,000	
Project Drainage	1	LS	$ 16,809,000.00	$ 16,809,000	
(X-Drains, overside, etc.)			.		
Ditch Excavation	1	LS	$ 200,000.00	$ 200,000	
				Subtotal Drainage	$ 17,309,000

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

I. ROADWAY ITEMS (Cont'n)

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Retaining Walls	109,000	SF	$ 65.00	$ 7,085,000	
Noise Barriers	155,700	SF	$ 20.00	$ 3,114,000	
Barriers and Guardrails	34,000	LF	$ 45.00	$ 1,530,000	
Highway Planting	1	LS	$ 5,000,000.00	$ 5,000,000	
Replacement Planting	1	LS	$ 2,000,000.00	$ 2,000,000	
Erosion Control	1	LS	$ 335,000.00	$ 335,000	
Water Pollution Control	1	LS	$ 100,000.00	$ 100,000	
Hazardous Waste Mitigation Work	1	LS	$ 1,438,600.00	$ 1,438,600	
Storm Water Treatment BMPs	1	LS	$ 3,500,000.00	$ 3,500,000	
Prepare SWPPP	1	LS	$ 30,000.00	$ 30,000	
Storm Water Construction BMPs	1	LS	$ 1,500,000.00	$ 1,500,000	
Environmental Mitigation	1	LS	$ 25,000.00	$ 25,000	
Resident Engineer Office Space	1	LS	$ 250,000.00	$ 250,000	
				Subtotal Specialty Items	$ 25,907,600

Section 5 Traffic Items					
Lighting	1	LS	$ 5,500,000.00	$ 5,500,000	
Traffic Striping	268,600	LF	$ 5.00	$ 1,343,000	
Traffic Signs	1	LS	$ 40,000.00	$ 40,000	
COZEEP/FSP	1	LS	$ 4,000.00	$ 4,000	
Traffic Control	780	DAYS	$ 3,000.00	$ 2,340,000	
Public Information	1	LS	$ 100,000.00	$ 100,000	
New Ramp Meter Installation	1	LS	$ 200,000.00	$ 200,000	
Temporary Railing (Type K)	103,100	LF	$ 18.00	$ 1,855,800	
				Subtotal Traffic Items	$ 11,382,800

TOTAL SECTIONS 1 thru 5	$ 103,391,000

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

I. ROADWAY ITEMS (Cont'n)

			Item Cost	Section Cost
Section 6 Minor Item				
Subtotal Sections 1-5	$ 103,391,000	x 8%	$ 8,271,300	
		Total Minor Items		$ 8,271,300
Section 7 Roadway Mobilization				
	$ 111,662,300 (Subtotal Sections 1 thru 6)	x 10%	$ 11,166,200	
		Total Roadway Mobilization		$ 11,166,200
Section 8 Roadway Additions				
Supplemental Work	$ 111,662,300 (Subtotal Sections 1 thru 6)	x 5%	$ 5,583,100	
Contingencies*	$ 111,662,300 (Subtotal Sections 1 thru 6)	x 20%	$ 22,332,500	
		Total Roadway Additions		$ 27,915,600
		TOTAL ROADWAY ITEMS (Total of Sections 1-8)		$ 150,744,100

Note: Import/Export quantities do no account for shrinkage or swell.

Estimate Prepared By:	Dave Melis, PE	916-286-0267	7-16-2014
	(Print Name)	Phone#	Date
Estimate Checked By:	John O'Reilly	916-563-25922-3954	7-23-2014
	(Print Name)	Phone#	Date

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

II. STRUCTURE ITEMS

Bridge Name	Area (Sq-Ft)	Cost/Sq-Ft	Demolition Cost	Total Cost
NB SR-65 On Ramp ("CD3")	8,736	$ 300	$ -	$ 2,620,800
EB I-80 On Ramp ("CD4")	35,867	$ 300	$ -	$ 10,760,100
E80/N65 Connector ("EN")	115,185	$ 275	$ 190,500	$ 31,866,400
80/65 HOV Connector ("HOV")	90,888	$ 275	$ -	$ 24,994,200
S65/E80 Connector ("SE")	130,581	$ 275	$ 138,300	$ 36,048,100
Taylor Road OC (Replace) ("TR")	35,840	$ 300	$ 338,600	$ 11,090,600
E. Roseville Viaduct	258,416	$ 250	$ 553,395	$ 65,157,400
Miners Ravine Bridge (Widen) ("E5")	6,665	$ 300	$ 14,085	$ 2,013,600
Roseville PKWY Tieback Wall	1,184	$ 125	$ -	$ 148,000
Galleria BLVD Tieback Wall	3,694	$ 125	$ -	$ 461,700

SUBTOTAL STRUCTURES ITEMS (Sum of Total Cost for Structures)	$185,160,900

Railroad Related Costs:

Flagging (Day): 250 Days @ $1000/Day	$ 250,000.00	$ 250,000
Flagging (Night): 250 Nights @ $2000/Night	$ 500,000.00	$ 500,000
SUBTOTAL RAILROAD ITEMS		$ 750,000

TOTAL STRUCTURES ITEMS (Sum of Structures Items plus Railroad Items)	$185,910,900

Estimate Prepared By	Jennifer Elwood, PE	916-286-0267	7-16-2014
	(Print Name)	Phone #	Date

NOTE: If appropriate, attach additional pages and backup.

COST ESTIMATE SUMMARY

District-County-Route	03-PLA-80, 03-PLA-65
PM	80: 1.9-6.1/65: R4.8-R7.3
Type of Estimate	Draft PR
EA	03-4E3200

III. RIGHT OF WAY ITEMS

A.	Acquisition, including excess lands, damage to remainder(s) and Goodwill	$ 2,750,252	
B.	Project Permit Fees		
C.	Utility Relocation (Agency Share)	$ 2,300,000	
D.	Relocation Assistance	$ 20,000	
E.	Clearance/Demolition	$ 150,000	
F.	Title and Escrow Fees	$ 180,000	
	TOTAL RIGHT OF WAY ITEMS (Escalated Value)		**$ 5,400,260**

Anticipated Date of Right of Way Certification (Date to which values are escalated) _____

F. Construction Contract Work

Brief Description of Work:

_____

_____

_____

_____

_____

Right of Way Branch Cost Estimate for Work* _____

*This dollar amount is to be included in the Roadway and/or Structure Items of Work, as appropriate. DO NOT include in Right of Way Items.

Estimate Prepared By	Lauren Proctor, PE	916-286-0332	7-16-2014
	(Print Name)	Phone #	Date

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	PLA	80/65	80 1.9-6.1 65 R4.8-R7.3		

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PLANS APPROVAL DATE

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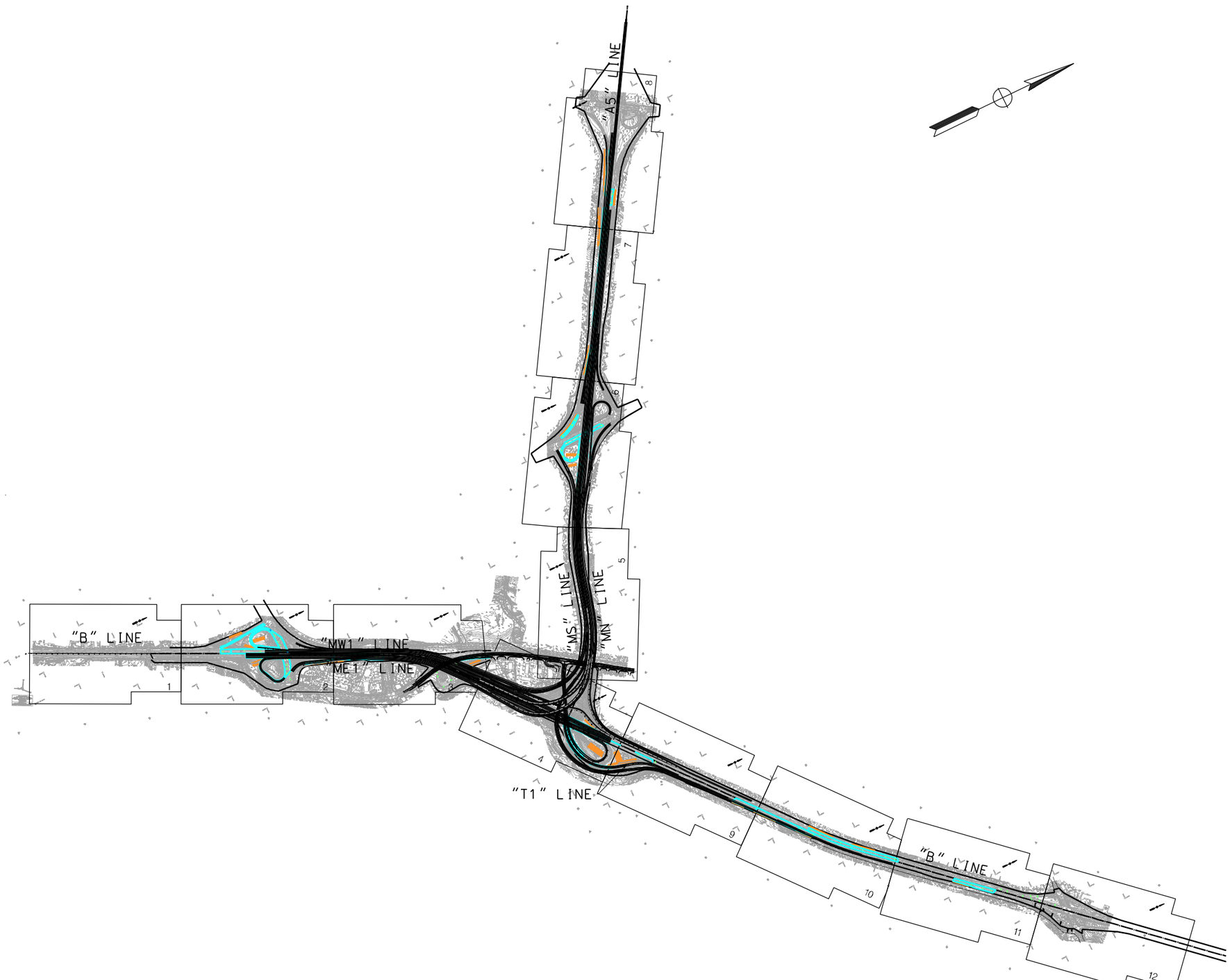

TBMP LOCATION KEY PLAN

SCALE: 1"= 1000'

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LEGEND:

POTENTIAL BMP LOCATION

APPROX TREATED IMPERVIOUS AREA

FLOW DIRECTION

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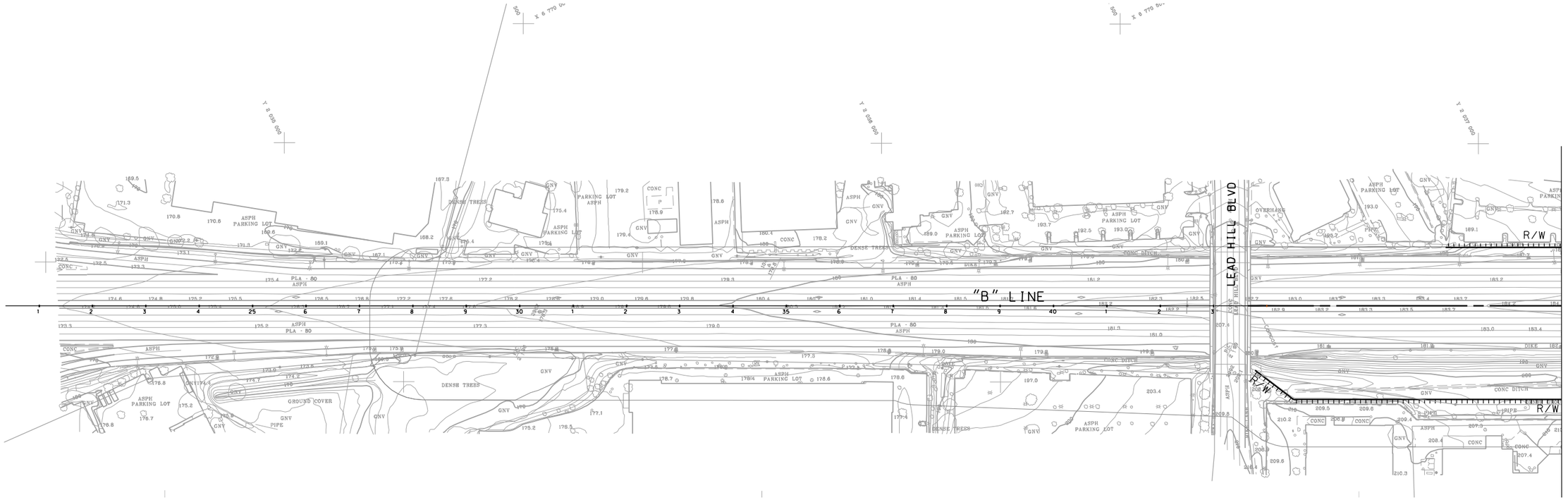

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-1

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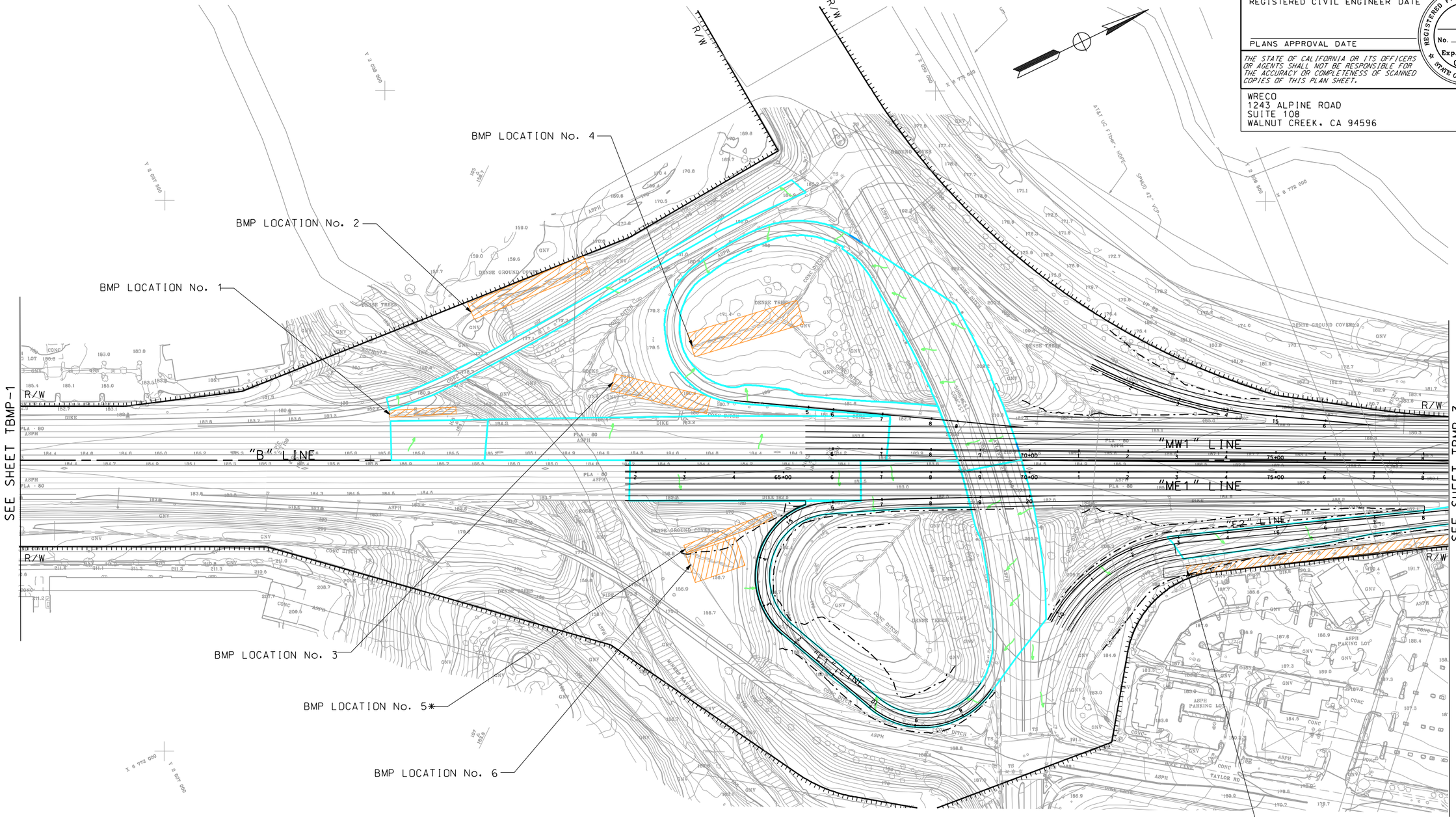

NOTE: * BMP LOCATION No. 5 AND 7 ARE PROPOSED FOR ALTERNATIVES 1 AND 3, BUT NOT FOR ALTERNATIVE 2.

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-2

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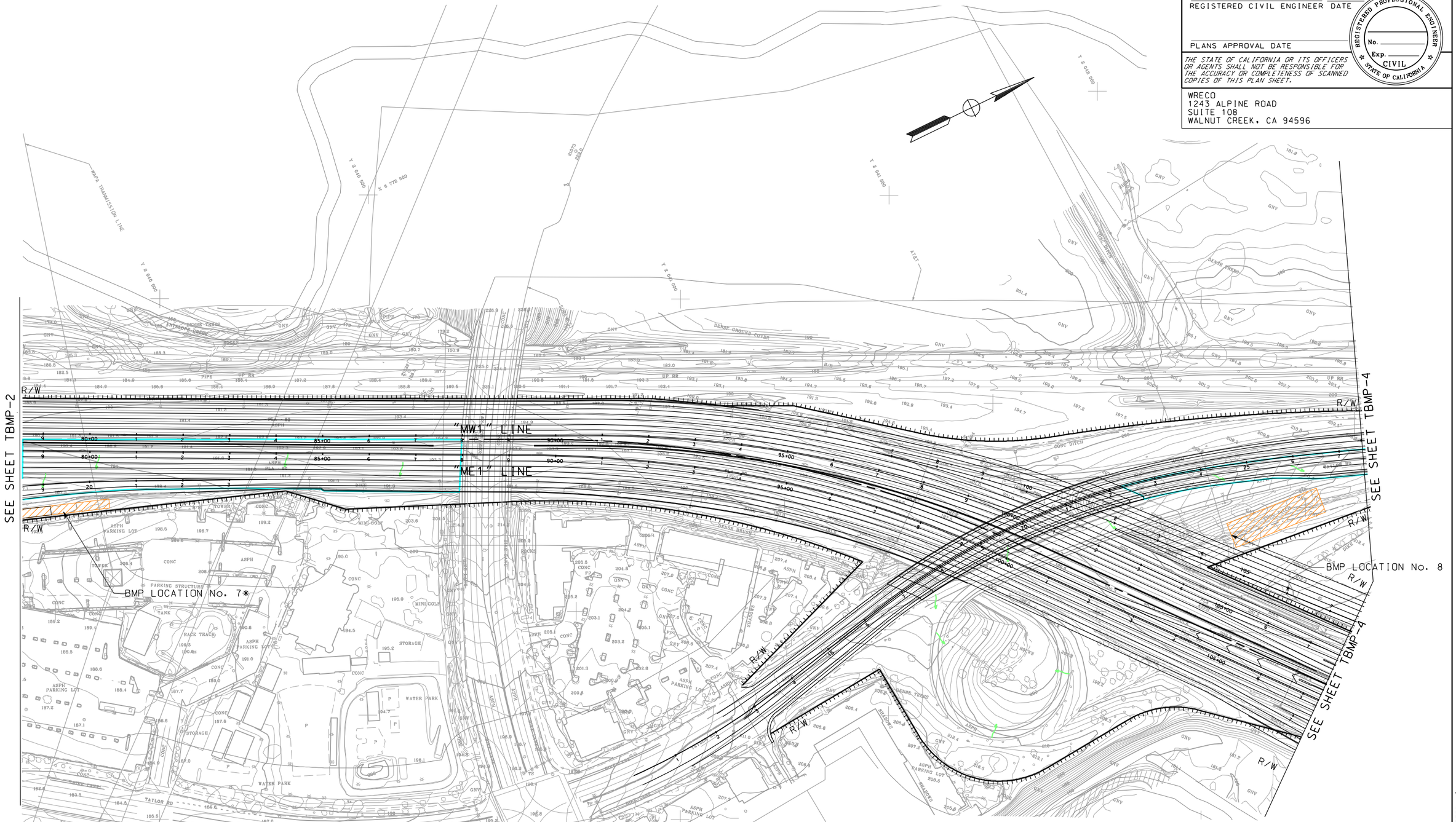

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

TBMP-3

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UNIT 0714

PROJECT NUMBER & PHASE 04120001951

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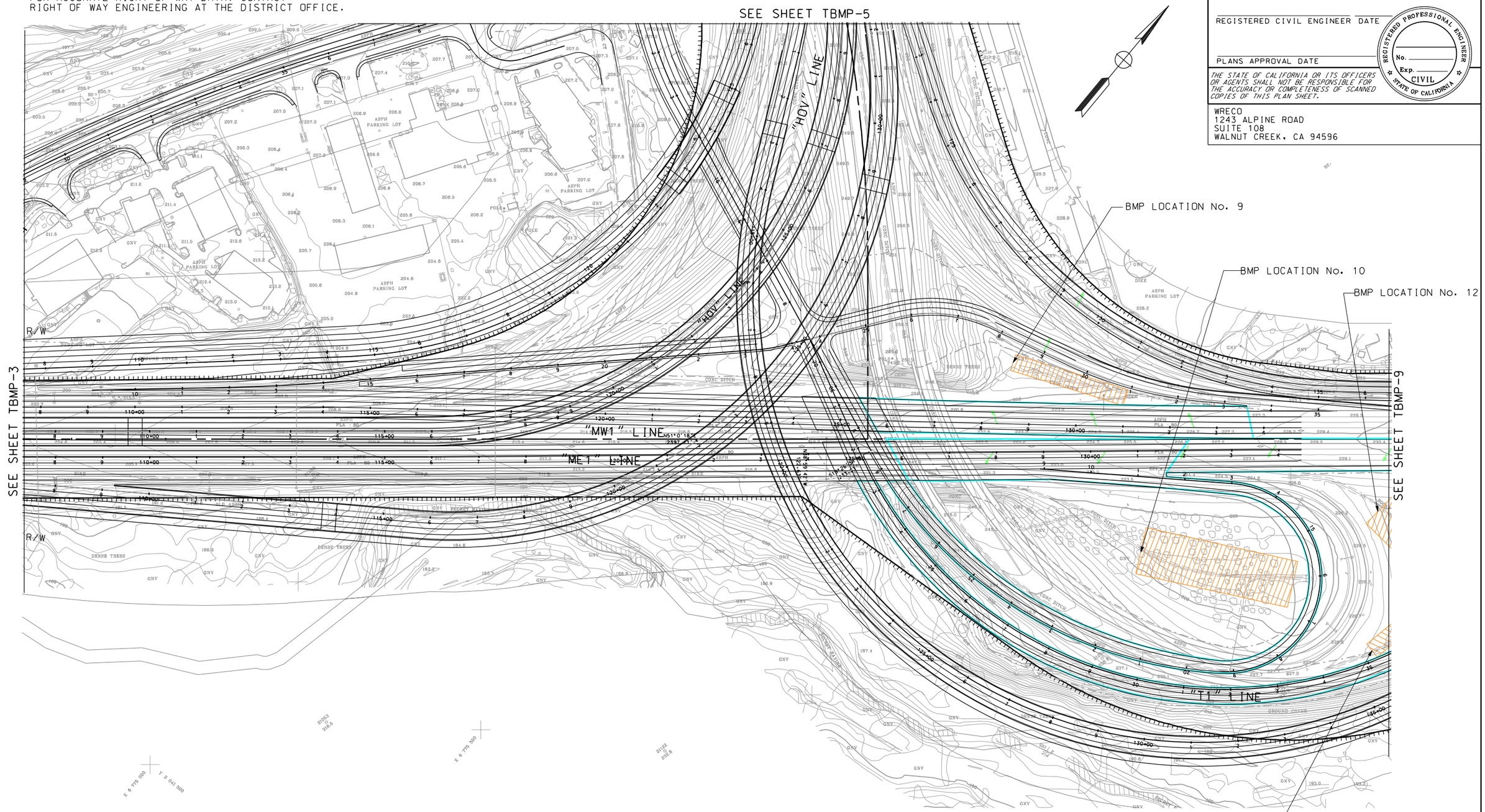

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

TBMP-4

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FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-5

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BMP LOCATION No. 14

BMP LOCATION No. 13

BMP LOCATION No. 15

"MS" LINE

"MN" LINE

SEE SHEET TBMP-5

SEE SHEET TBMP-7

R/W

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-6

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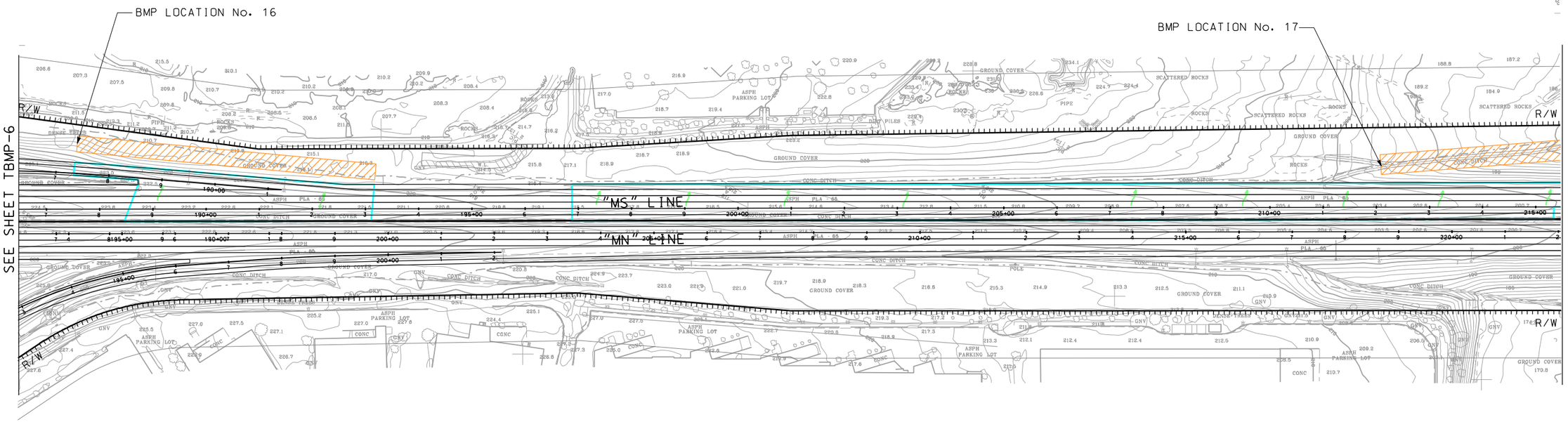

POTENTIAL TREATMENT
BMP PLAN

SCALE: 1"= 100'

TBMP-7

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

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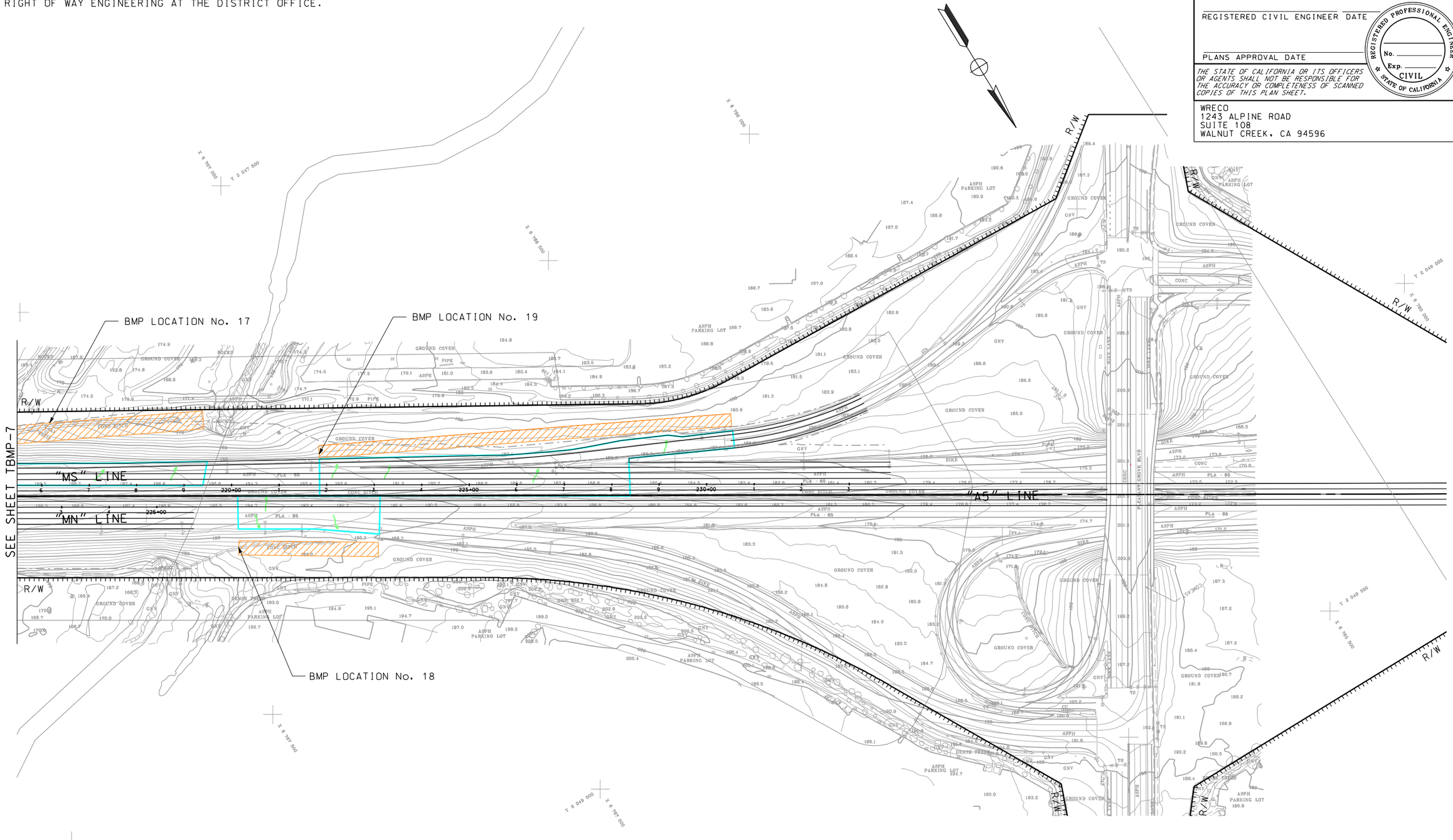

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-8

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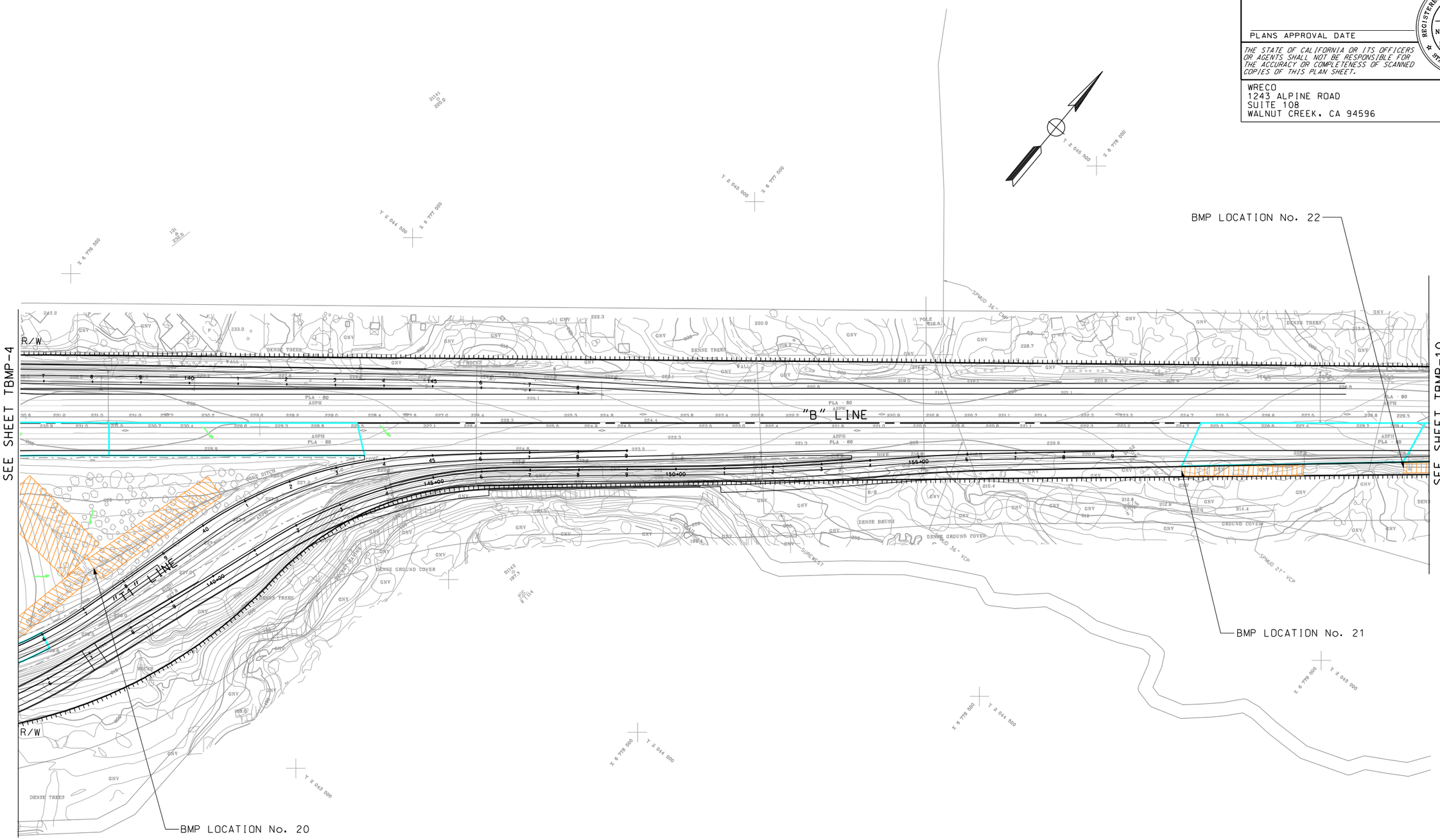

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-9

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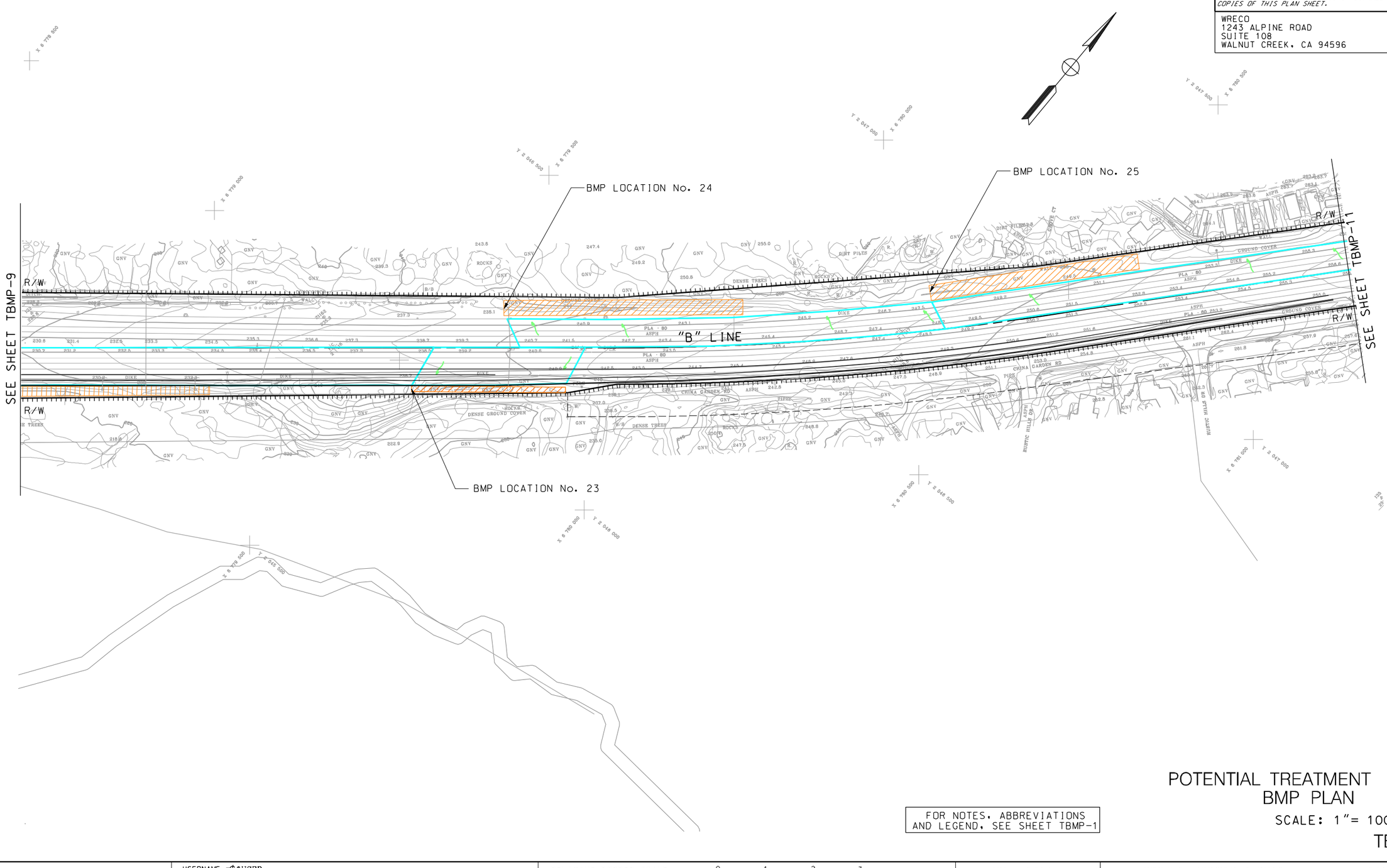

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-10

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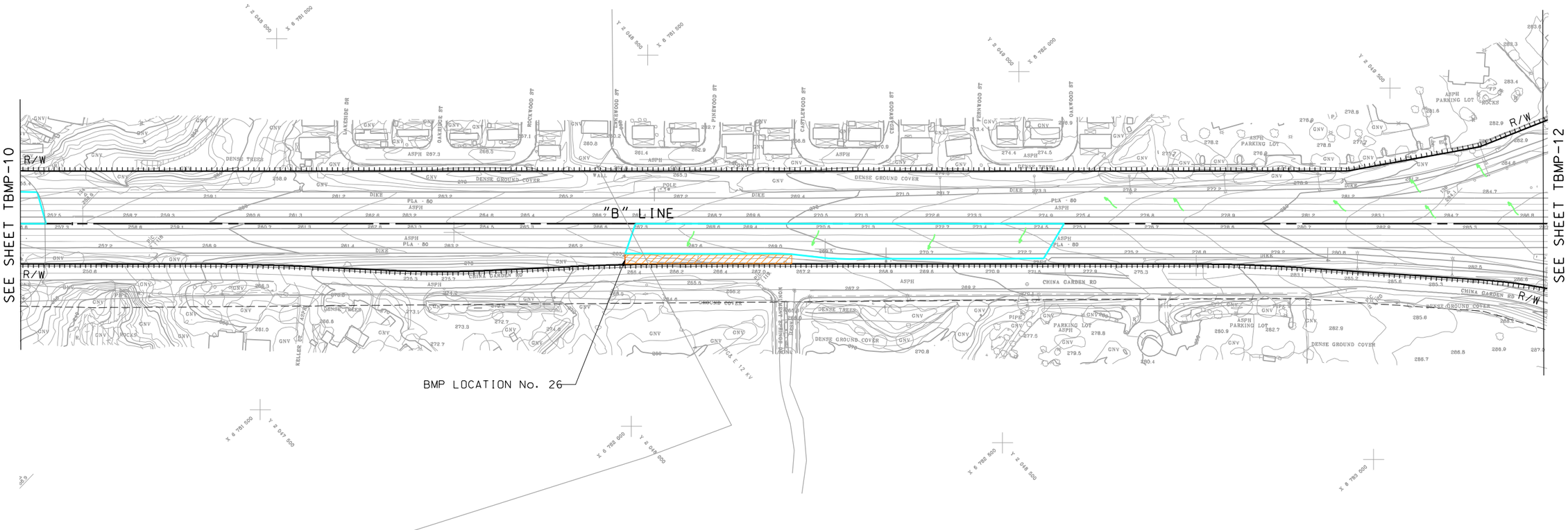

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-11

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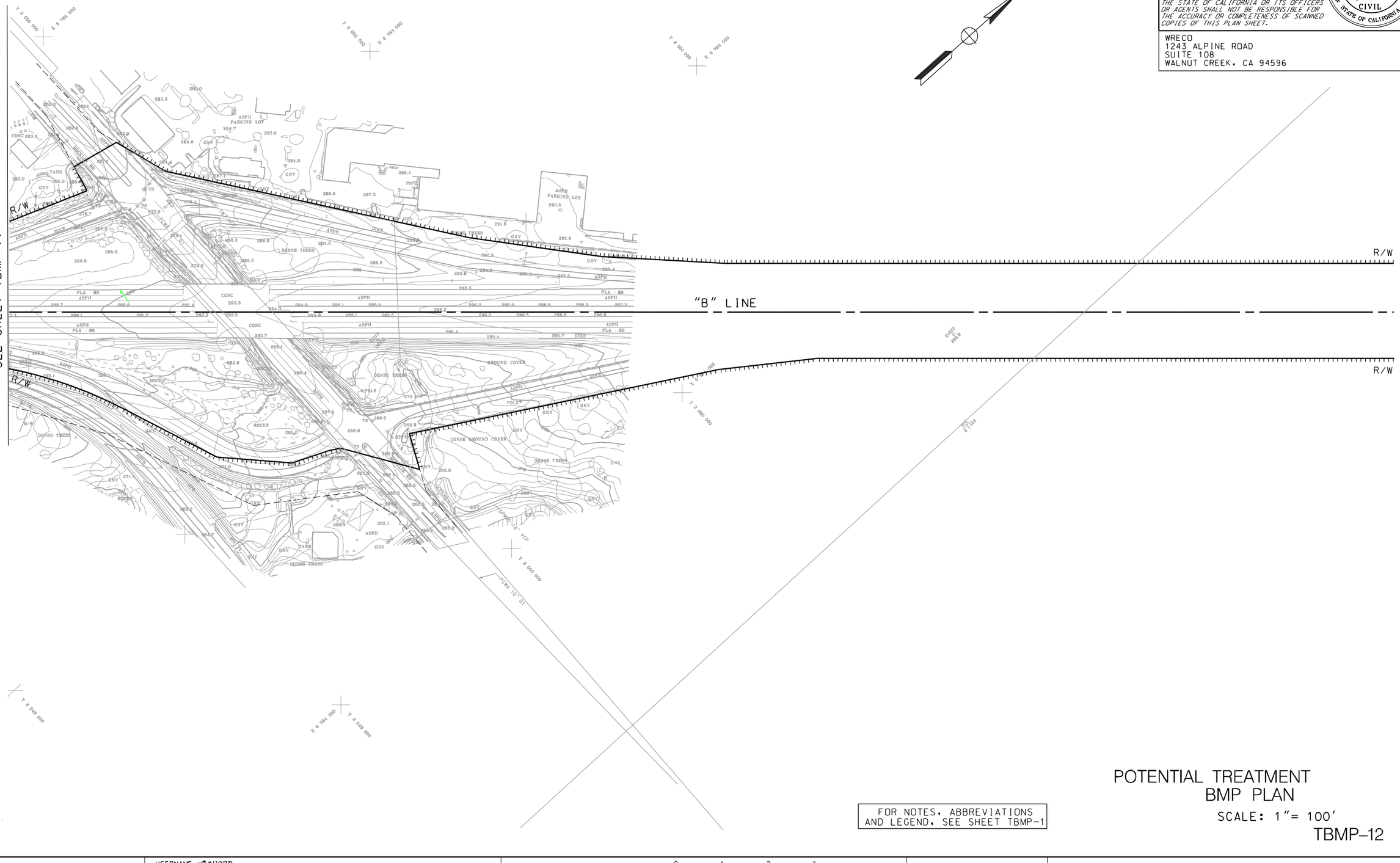

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TBMP-1

POTENTIAL TREATMENT BMP PLAN

SCALE: 1"= 100'

TBMP-12

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UNIT 0714

PROJECT NUMBER & PHASE 04120001951

Strip and Swale Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 1
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	15752	15752
Total impervious area	ft^2	0	15752	15752
Net new impervious (NNI) area	ft^2	0	15752	15752
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	1288	1288
WQV	ft^3	0	1288	1288
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	1350	1350
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	1350	1350
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.88	0.88
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.66	0.66
Volume of total runoff infiltrated, ft^3	ft^3	N/A	268	268
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**21%**	21%

Strip and Swale Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 2
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	21734	21734
Total impervious area	ft^2	0	21734	21734
Net new impervious (NNI) area	ft^2	0	21734	21734
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	1777	1777
WQV	ft^3	0	1777	1777
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	2537	2537
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	2537	2537
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.88	0.88
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.58	0.58
Volume of total runoff infiltrated, ft^3	ft^3	N/A	503	503
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**28%**	28%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 3
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	71799	71799
Total impervious area	ft^2	0	71799	71799
Net new impervious (NNI) area	ft^2	0	71799	71799
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	5870	5870
WQV	ft^3	0	5870	5870
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	4000	4000
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	4000	4000
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.74	0.74
Volume of total runoff infiltrated, ft^3	ft^3	N/A	793	793
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**14%**	14%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 4
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	98075	98075
Total impervious area	ft^2	0	98075	98075
Net new impervious (NNI) area	ft^2	0	98075	98075
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	8018	8018
WQV	ft^3	0	8018	8018
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	5100	5100
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	5100	5100
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.75	0.75
Volume of total runoff infiltrated, ft^3	ft^3	N/A	1011	1011
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**13%**	13%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 5 (for Alternatives 1 and 3)
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	38676	38676
Total impervious area	ft^2	0	38676	38676
Net new impervious (NNI) area	ft^2	0	38676	38676
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	3162	3162
WQV	ft^3	0	3162	3162
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	2274	2274
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	2274	2274
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.73	0.73
Volume of total runoff infiltrated, ft^3	ft^3	N/A	451	451
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**14%**	14%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 6
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	91417	91417
Total impervious area	ft^2	0	91417	91417
Net new impervious (NNI) area	ft^2	0	91417	91417
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	7473	7473
WQV	ft^3	0	7473	7473
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	4770	4770
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	4770	4770
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.75	0.75
Volume of total runoff infiltrated, ft^3	ft^3	N/A	946	946
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**13%**	13%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 7 (for Alternatives 1 and 3)
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	127815	127815
Total impervious area	ft^2	0	127815	127815
Net new impervious (NNI) area	ft^2	0	127815	127815
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	10449	10449
WQV	ft^3	0	10449	10449
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	7270	7270
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	7270	7270
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.73	0.73
Volume of total runoff infiltrated, ft^3	ft^3	N/A	1441	1441
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**14%**	14%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 8
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	25919	25919
Total impervious area	ft^2	0	25919	25919
Net new impervious (NNI) area	ft^2	0	25919	25919
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	2119	2119
WQV	ft^3	0	2119	2119
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	2065	2065
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	2065	2065
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.88	0.88
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.67	0.67
Volume of total runoff infiltrated, ft^3	ft^3	N/A	409	409
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**19%**	19%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 9
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	55274	55274
Total impervious area	ft^2	0	55274	55274
Net new impervious (NNI) area	ft^2	0	55274	55274
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	4519	4519
WQV	ft^3	0	4519	4519
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	3750	3750
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	3750	3750
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.70	0.70
Volume of total runoff infiltrated, ft^3	ft^3	N/A	744	744
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**16%**	16%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 10
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	101779	101779
Total impervious area	ft^2	0	101779	101779
Net new impervious (NNI) area	ft^2	0	101779	101779
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	8320	8320
WQV	ft^3	0	8320	8320
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	6600	6600
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	6600	6600
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.71	0.71
Volume of total runoff infiltrated, ft^3	ft^3	N/A	1309	1309
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**16%**	16%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 11
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	48385	48385
Total impervious area	ft^2	0	48385	48385
Net new impervious (NNI) area	ft^2	0	48385	48385
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	3955	3955
WQV	ft^3	0	3955	3955
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	3300	3300
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	3300	3300
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.70	0.70
Volume of total runoff infiltrated, ft^3	ft^3	N/A	654	654
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**17%**	17%

Strip and Swale Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 12
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	44177	44177
Total impervious area	ft^2	0	44177	44177
Net new impervious (NNI) area	ft^2	0	44177	44177
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	3611	3611
WQV	ft^3	0	3611	3611
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	3000	3000
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	3000	3000
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.70	0.70
Volume of total runoff infiltrated, ft^3	ft^3	N/A	595	595
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**16%**	16%

Strip and Swale Infiltration Tool Results

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 13
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	38549	38549
Total impervious area	ft^2	0	38549	38549
Net new impervious (NNI) area	ft^2	0	38549	38549
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	3151	3151
WQV	ft^3	0	3151	3151
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	2250	2250
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	2250	2250
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.73	0.73
Volume of total runoff infiltrated, ft^3	ft^3	N/A	446	446
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**14%**	14%

Basin Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 14
BMP type	Detention basin

SITE CHARACTERISTICS

Drainage Area Information		
Runoff coefficient for CDA to the basin	0.90	
Contributing drainage area (CDA) to basin	81271	ft²
Basin area to drainage area ratio	0.10	
Total impervious area	81271	ft²
Area upstream of the strip or swale		
Runoff coefficient for CDA	0.90	
CDA	81271	ft²
Runoff volume from CDA	6644	ft³
Water Quality Volume Calculation		
Water quality volume	6644	ft³
Net new impervious area	81271	ft²
Additional impervious area seeking treatment	0	ft²

BASIN CHARACTERISTICS

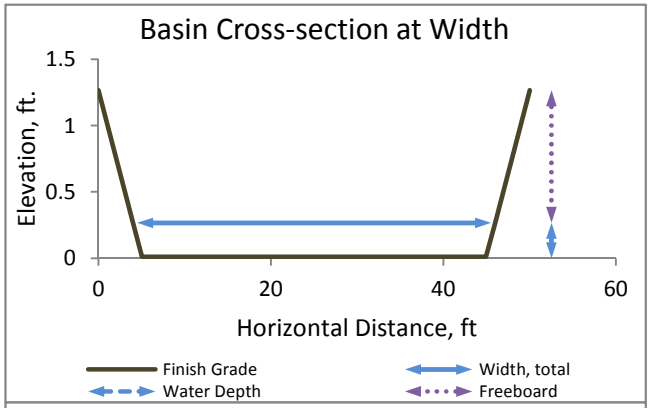
Note: The basin is trapezoidal with a rectangular footprint		
Unit basin storage volume	1.09	in
Drawdown time used in Basin Sizer	72	hr
Target basin capture volume	6644	ft³
Length, basin (at WQV water surface)	190	ft
Width, basin (at WQV water surface)	42	ft
Area, basin (at WQV water surface)	7980	ft²
Side slope	4	: 1
Geometry-based volume	2068	ft³
Maximum water level	0	ft
Length, invert	188	ft
Width, invert	40	ft
Area, invert	7488	ft²

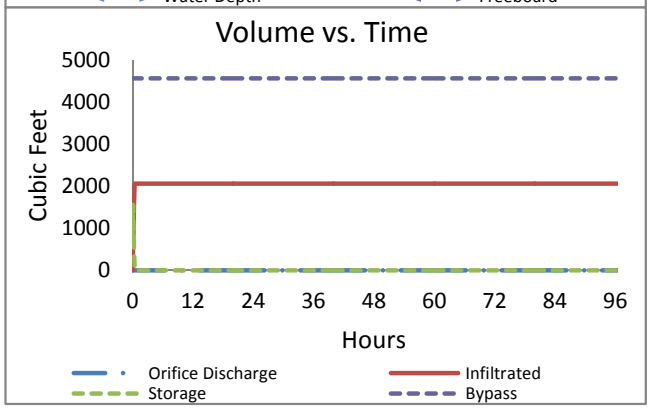
SOIL CHARACTERISTICS

Invert soil infiltration rate	8	in/hr
Side slope soil infiltration rate	8	in/hr

ORIFICE CHARACTERISTICS

Orifice height above the invert	0.00	ft
Orifice coefficient, C	0.6	
Orifice diameter	8/16	in





WATER BALANCE (CUBIC FEET)

Area	Rainfall	Losses prior to the basin	Runoff infiltrated in the basin	Total discharge (including bypass)
Basin CDA	7382	738	2065	4579
Impervious area	7382	738	2065	4579
NNI area	7382	738	2065	4579

WATER QUALITY VOLUME RESULTS

Drawdown time	72 hours
Impervious runoff infiltrated upstream of the basin expressed as a percentage of WQV	0%
Impervious runoff infiltrated in the basin expressed as a percentage of WQV	31%
Total impervious runoff infiltrated expressed as a percentage of WQV (Use for T-1, 7c)	**31%**
% of the WQV treated in the basin only	31%

Strip and Swale Infiltration Tool Results

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 15
BMP type	Biostrip

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	17511	17511
Total impervious area	ft^2	0	17511	17511
Net new impervious (NNI) area	ft^2	0	17511	17511
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	1432	1432
WQV	ft^3	0	1432	1432
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	11973	11973
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	11973	11973
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.81	0.81
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.00	0.00
Volume of total runoff infiltrated, ft^3	ft^3	N/A	1432	1432
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**100%**	100%

Strip and Swale Infiltration Tool Results

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 16
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	40703	40703
Total impervious area	ft^2	0	40703	40703
Net new impervious (NNI) area	ft^2	0	40703	40703
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	3327	3327
WQV	ft^3	0	3327	3327
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	5626	5626
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	5626	5626
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.87	0.87
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.53	0.53
Volume of total runoff infiltrated, ft^3	ft^3	N/A	1115	1115
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**34%**	34%

Strip and Swale Infiltration Tool Results

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 17
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	146030	146030
Total impervious area	ft^2	0	146030	146030
Net new impervious (NNI) area	ft^2	0	146030	146030
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	11938	11938
WQV	ft^3	0	11938	11938
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	7342	7342
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	7342	7342
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.75	0.75
Volume of total runoff infiltrated, ft^3	ft^3	N/A	1456	1456
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**12%**	12%

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 18
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	21513	21513
Total impervious area	ft^2	0	21513	21513
Net new impervious (NNI) area	ft^2	0	21513	21513
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	1759	1759
WQV	ft^3	0	1759	1759
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	2940	2940
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	2940	2940
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.87	0.87
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.53	0.53
Volume of total runoff infiltrated, ft^3	ft^3	N/A	583	583
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**33%**	33%

Strip and Swale Infiltration Tool Results

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 19
BMP type	Biostrip

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	66027	66027
Total impervious area	ft^2	0	66027	66027
Net new impervious (NNI) area	ft^2	0	66027	66027
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	5398	5398
WQV	ft^3	0	5398	5398
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	22633	22633
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	22633	22633
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.85	0.85
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.11	0.11
Volume of total runoff infiltrated, ft^3	ft^3	N/A	4487	4487
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**83%**	83%

Strip and Swale Infiltration Tool Results

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 20
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	34703	34703
Total impervious area	ft^2	0	34703	34703
Net new impervious (NNI) area	ft^2	0	34703	34703
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	2837	2837
WQV	ft^3	0	2837	2837
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	3000	3000
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	3000	3000
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.88	0.88
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.65	0.65
Volume of total runoff infiltrated, ft^3	ft^3	N/A	595	595
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**21%**	21%

Strip and Swale Infiltration Tool Results

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PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 21
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	38632	38632
Total impervious area	ft^2	0	38632	38632
Net new impervious (NNI) area	ft^2	0	38632	38632
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	3158	3158
WQV	ft^3	0	3158	3158
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	2500	2500
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	2500	2500
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.71	0.71
Volume of total runoff infiltrated, ft^3	ft^3	N/A	496	496
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**16%**	16%

Strip and Swale Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 22
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	69524	69524
Total impervious area	ft^2	0	69524	69524
Net new impervious (NNI) area	ft^2	0	69524	69524
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	5684	5684
WQV	ft^3	0	5684	5684
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	4500	4500
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	4500	4500
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.71	0.71
Volume of total runoff infiltrated, ft^3	ft^3	N/A	892	892
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**16%**	16%

Strip and Swale Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 23
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	25260	25260
Total impervious area	ft^2	0	25260	25260
Net new impervious (NNI) area	ft^2	0	25260	25260
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	2065	2065
WQV	ft^3	0	2065	2065
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	3230	3230
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	3230	3230
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.88	0.88
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.55	0.55
Volume of total runoff infiltrated, ft^3	ft^3	N/A	640	640
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**31%**	31%

Strip and Swale Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 24
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	53065	53065
Total impervious area	ft^2	0	53065	53065
Net new impervious (NNI) area	ft^2	0	53065	53065
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	4338	4338
WQV	ft^3	0	4338	4338
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	5020	5020
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	5020	5020
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.88	0.88
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.63	0.63
Volume of total runoff infiltrated, ft^3	ft^3	N/A	995	995
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**23%**	23%

Strip and Swale Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 25
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	54709	54709
Total impervious area	ft^2	0	54709	54709
Net new impervious (NNI) area	ft^2	0	54709	54709
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	4472	4472
WQV	ft^3	0	4472	4472
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	4423	4423
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	4423	4423
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.88	0.88
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.67	0.67
Volume of total runoff infiltrated, ft^3	ft^3	N/A	877	877
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**20%**	20%

Strip and Swale Infiltration Tool Results

Version 3.01.034

PROJECT INFORMATION

Project	I-80/ SR 65 Interchange Improvements Project
Sub-watershed	BMP 26
BMP type	Bioswale

USER INPUT AND INTERMEDIATE CALCULATIONS	Units	Existing	Proposed Design	Isolated NNI
Input from Basin Sizer				
Unit basin storage volume from Basin Sizer, where C = 1.0	in	1.09	1.09	1.09
Drawdown time used in Basin Sizer	hr	72	72	72
Rainfall rate from Basin Sizer "Caltrans Water Quality Flows"	in/hr	0.16	0.16	0.16
Drainage and Runoff to the Strip or Swale				
Contributing drainage area (CDA), including all impervious area	ft^2	0	50509	50509
Total impervious area	ft^2	0	50509	50509
Net new impervious (NNI) area	ft^2	0	50509	50509
Additional impervious area seeking treatment credit	ft^2	0	0	0
CDA runoff volume (including WQV)	ft^3	0	4129	4129
WQV	ft^3	0	4129	4129
Native Soil				
Pervious area for non-amended infiltration	ft^2	0	3170	3170
Native or fill (underlying) HSG soil type	-	D	D	D
Bulk density of native soil or fill	g/cm^3	1.6	1.6	1.6
Specific gravity of soil particles	-	2.65	2.65	2.65
Infiltration rate of native soil or fill	in/hr	0.05	0.05	0.05
Amended Soil				
BMP amendment area	ft^2	0	3170	3170
Depth of amendment placement	in	0	4	4
Depth of incorporation	in	0	11	11
Specific gravity of amendment particles	-	0.80	0.80	0.80
Bulk density of amendment	g/cm^3	0.50	0.50	0.50
Final bulk density of amended soil	g/cm^3	N/A	1.25	1.25
Infiltration rate of amended soil	in/hr	N/A	3.08	3.08

RESULTS: Native Soil or Fill (rate-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	-	N/A	0.89	0.89
Volume of total runoff from CDA infiltrated	ft^3	0	0	0
Percentage of WQV from net new impervious area that is infiltrated with native soil or fill (use for T-1, 5b)	**-**	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Units	Existing	Proposed Design	Isolated NNI
Runoff coefficient for downstream BMP after amendment	-	N/A	0.72	0.72
Volume of total runoff infiltrated, ft^3	ft^3	N/A	629	629
Percentage of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	**-**	N/A	**15%**	15%

Checklist SW-1, Site Data Sources

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Information for the following data categories should be obtained, reviewed and referenced as necessary throughout the project planning phase. Collect any available documents pertaining to the category and list them and reference your data source. For specific examples of documents within these categories, refer to Section 5.5 of this document. Example categories have been listed below; add additional categories, as needed. Summarize pertinent information in Section 2 of the SWDR.

DATA CATEGORY/SOURCES	Date
Topographic	
• USGS Topo	Access Date: May 2013
Hydraulic	
• Federal Management Emergency Agency. Flood Insurance Study.	2009
Soils	
• USDA-NRCS. Soil Survey.	Access Date: May 2013
• Blackburn Consulting. Structures Preliminary Geotechnical Report.	June 2013
Climatic	
• Caltrans. Caltrans Storm Water Quality Handbooks, Construction Site Best Management Practices Manual.	2009
• National Oceanic and Atmospheric Administration Atlas Precipitation Frequency Data Server.	Access Date: May 2013
Water Quality	
• Central Coast Regional Water Quality Control Board. 2010 CWA Section 303(d) List.	2010
• Central Valley Regional Water Quality Control Plan (Basin Plan).	October 2011
Other Data Categories	
• Caltrans. CT Water Quality Planning Tool.	Access Date: August 2014
• ICF International. Delineation of Potential Waters of the United States, Including Wetlands for the I80/SR 65 Interchange Improvement Project.	May 2014
• Baker, Chad. Project Study Report for I-80/SR 65 Interchange Modification.	June 2009
• Blackburn Consulting. Draft Initial Site Assessment Update.	August 2014
• City of Rocklin. General Plan.	October 2012
• City of Roseville. General Plan 2025.	April 2014

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

The following questions provide a guide to collecting critical information relevant to project stormwater quality issues. Complete responses to applicable questions, consulting other Caltrans functional units (Environmental, Landscape Architecture, Maintenance, etc.) and the District/Regional Storm Water Coordinator as necessary. Summarize pertinent responses in Section 2 of the SWDR. **To be completed during the PS&E phase

1.	Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	☒Complete	☐NA
2.	For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	☒Complete	☐NA
3.	Determine if there are any municipal or domestic water supply reservoirs or groundwater percolation facilities within the project limits. Consider appropriate spill contamination and spill prevention control measures for these new areas.	☒Complete	☐NA
4.	Determine the RWQCB special requirements, including TMDLs, effluent limits, etc.	☒Complete	☐NA
5.	Determine regulatory agencies seasonal construction and construction exclusion dates or restrictions required by federal, state, or local agencies.	☒Complete	☐NA
6.	Determine if a 401 certification will be required.	☒Complete	☐NA
7.	List rainy season dates.	☒Complete	☐NA
8.	Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	☒Complete	☐NA
9.	If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	☒Complete	☐NA
10.	Determine contaminated soils within the project area.	☒Complete	☐NA
11.	Determine the total disturbed soil area of the project.	☒Complete	☐NA
12.	Describe the topography of the project site.	☒Complete	☐NA
13.	List any areas outside of the Caltrans right-of-way that will be included in the project (e.g. contractor's staging yard, work from barges, easements for staging, etc.). TBD	☒Complete	☐NA
14.	Determine if additional right-of-way acquisition or easements and right-of-entry will be required for design, construction and maintenance of BMPs. If so, how much?	☒Complete	☐NA
15.	Determine if a right-of-way certification is required.	☒Complete	☐NA
16.	Determine the estimated unit costs for right-of-way should it be needed for Treatment BMPs, stabilized conveyance systems, lay-back slopes, or interception ditches. TBD	☐Complete	☐NA
17.	Determine if project area has any slope stabilization concerns.	☒Complete	☐NA
18.	Describe the local land use within the project area and adjacent areas.	☒Complete	☐NA
19.	Evaluate the presence of dry weather flow.	☐Complete	☒NA

Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water Impacts

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

The PE must confer with other functional units, such as Landscape Architecture, Hydraulics, Environmental, Materials, Construction and Maintenance, as needed to assess these issues. Summarize pertinent responses in Section 2 of the SWDR. **To be completed during the PS&E phase

Options for avoiding or reducing potential impacts during project planning include the following:

1.	Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?	☒Yes	☐No	☐NA
2.	Can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?	☒Yes	☐No	☐NA
3.	Can any of the following methods be utilized to minimize erosion from slopes:			
	a. Disturbing existing slopes only when necessary?	☒Yes	☐No	☐NA
	b. Minimizing cut and fill areas to reduce slope lengths?	☒Yes	☐No	☐NA
	c. Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?	☒Yes	☐No	☐NA
	d. Acquiring right-of-way easements (such as grading easements) to reduce steepness of slopes?	☒Yes	☐No	☐NA
	e. Avoiding soils or formations that will be particularly difficult to re-stabilize?	☒Yes	☐No	☐NA
	f. Providing cut and fill slopes flat enough to allow re-vegetation and limit erosion to pre-construction rates?	☒Yes	☐No	☐NA
	g. Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?	☐Yes	☐No	☒NA
	h. Rounding and shaping slopes to reduce concentrated flow?	☒Yes	☐No	☐NA
	i. Collecting concentrated flows in stabilized drains and channels?	☒Yes	☐No	☐NA
4.	Does the project design allow for the ease of maintaining all BMPs?	☒Yes	☐No	
5.	Can the project be scheduled or phased to minimize soil-disturbing work during the rainy season?	☒Yes	☐No	
6.	Can permanent storm water pollution controls such as paved slopes, vegetated slopes, basins, and conveyance systems be installed early in the construction process to provide additional protection and to possibly utilize them in addressing construction storm water impacts?	☒Yes	☐No	☐NA

Design Pollution Prevention BMPs

Checklist DPP-1, Part 1

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Consideration of Design Pollution Prevention BMPs **To be completed during the PS&E phase

Consideration of Downstream Effects Related to Potentially Increased Flow [to streams or channels]

Will project increase velocity or volume of downstream flow?	☒Yes	☐No	☐NA
Will the project discharge to unlined channels?	☒Yes	☐No	☐NA
Will project increase potential sediment load of downstream flow?	☒Yes	☐No	☐NA
Will project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?	☒Yes	☐No	☐NA

If Yes was answered to any of the above questions, consider ***Downstream Effects Related to Potentially Increased Flow***, complete the DPP-1, Part 2 checklist.

Slope/Surface Protection Systems

Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA

If Yes was answered to the above question, consider ***Slope/Surface Protection Systems***, complete the DPP-1, Part 3 checklist.

Concentrated Flow Conveyance Systems

Will the project create or modify ditches, dikes, berms, or swales?	☒Yes	☐No	☐NA
Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA
Will it be necessary to direct or intercept surface runoff?	☒Yes	☐No	☐NA
Will cross drains be modified?	☒Yes	☐No	☐NA

If Yes was answered to any of the above questions, consider ***Concentrated Flow Conveyance Systems***; complete the DPP-1, Part 4 checklist.

Preservation of Existing Vegetation

It is the goal of the Storm Water Program to maximize the protection of desirable existing vegetation to provide erosion and sediment control benefits on all projects. ☒Complete

Consider ***Preservation of Existing Vegetation***, complete the DPP-1, Part 5 checklist.

Design Pollution Prevention BMPs

Checklist DPP-1, Part 2

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Downstream Effects Related to Potentially Increased Flow

**To be completed during the PS&E phase

1.	Review total paved area and reduce to the maximum extent practicable.	☒Complete
2.	Review channel lining materials and design for stream bank erosion control.	☐Complete
	(a) See Chapters 860 and 870 of the HDM.	☐Complete
	(b) Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.	☐Complete
3.	Include, where appropriate, energy dissipation devices at culvert outlets.	☐Complete
4.	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.	☐Complete
5.	Include, if appropriate, peak flow attenuation basins or devices to reduce peak discharges.	
6.	Calculate the water quality volume infiltrated by DPP BMPs within the project limits. Include the percentage of the water quality volume for each BMP and subwatershed, as appropriate, for site conditions. These calculations will be used later in the T-1 checklist.	☐Complete

Design Pollution Prevention BMPs

Checklist DPP-1, Part 3

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Slope / Surface Protection Systems **To be completed during the PS&E phase

1.	What are the proposed areas of cut and fill? (attach plan or map)	☒Complete	
2.	Were benches or terraces provided on high cut and fill slopes to reduce concentration of flows? NA	☐Yes	☐No
3.	Were slopes rounded and/or shaped to reduce concentrated flow?	☒Yes	☐No
4.	Were concentrated flows collected in stabilized drains or channels?	☒Yes	☐No
5.	Are new or disturbed slopes > 4:1 horizontal:vertical (h:v)?	☒Yes	☐No
	If Yes, District Landscape Architect must prepare or approve an erosion control plan, at the District's discretion.		
6.	Are new or disturbed slopes > 2:1 (h:v)?	☒Yes	☐No
	If Yes, Geotechnical Services must prepare a Geotechnical Design Report, and the District Landscape Architect should prepare or approve an erosion control plan. Concurrence must be obtained from the District Maintenance Storm Water Coordinator for slopes steeper than 2:1 (h:v).		
7.	Estimate the net new impervious area that will result from this project. Alt 1:32, Alt 2: 29, and Alt 3: 27 acres	☒Complete	

VEGETATED SURFACES

1.	Identify existing vegetation.	☒Complete
2.	Evaluate site to determine soil types, appropriate vegetation and planting strategies.	☒Complete
3.	How long will it take for permanent vegetation to establish?	☐Complete
4.	Minimize overland and concentrated flow depths and velocities.	☐Complete

HARD SURFACES

1.	Are hard surfaces required?	☒Yes	☐No
	If Yes, document purpose (safety, maintenance, soil stabilization, etc.), types, and general locations of the installations.	☐Complete	

Review appropriate SSPs for Vegetated Surface and Hard Surface Protection Systems. ☐Complete

Design Pollution Prevention BMPs

Checklist DPP-1, Part 4

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Concentrated Flow Conveyance Systems **To be completed during the PS&E phase

Ditches, Berms, Dikes and Swales

1. Consider Ditches, Berms, Dikes, and Swales as per Topics 813, 834.3, and 835, and Chapter 860 of the HDM. ☒Complete
2. Evaluate risks due to erosion, overtopping, flow backups or washout. ☐Complete
3. Consider outlet protection where localized scour is anticipated. ☒Complete
4. Examine the site for run-on from off-site sources. ☐Complete
5. Consider channel lining when velocities exceed scour velocity for soil. ☒Complete

Overside Drains

1. Consider downdrains, as per Index 834.4 of the HDM. ☒Complete
2. Consider paved spillways for side slopes flatter than 4:1 h:v. ☒Complete

Flared Culvert End Sections

1. Consider flared end sections on culvert inlets and outlets as per Chapter 827 of the HDM. ☒Complete

Outlet Protection/Velocity Dissipation Devices

1. Consider outlet protection/velocity dissipation devices at outlets, including cross drains, as per Chapters 827 and 870 of the HDM. ☒Complete

Review appropriate SSPs for Concentrated Flow Conveyance Systems. ☐Complete

Design Pollution Prevention BMPs

Checklist DPP-1, Part 5

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Preservation of Existing Vegetation **To be completed during the PS&E phase

1. Review Preservation of Property, (Clearing and Grubbing) to reduce clearing and grubbing and maximize preservation of existing vegetation. ☐ Complete
2. Has all vegetation to be retained been coordinated with Environmental, and identified and defined in the contract plans? ☐ Yes ☐ No
3. Have steps been taken to minimize disturbed areas, such as locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling? ☒ Complete
4. Have impacts to preserved vegetation been considered while work is occurring in disturbed areas? ☒ Yes ☐ No
5. Are all areas to be preserved delineated on the plans? ☐ Yes ☐ No

Treatment BMPs

Checklist T-1, Part 1

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Consideration of Treatment BMPs –**To be completed during the PS&E phase

This checklist is used for projects that require the consideration of Approved Treatment BMPs, as determined from the process described in Section 4 (Project Treatment Consideration) and the Evaluation Documentation Form (EDF). This checklist will be used to determine which Treatment BMPs should be considered for each watershed and sub-watershed within the project. Supplemental data will be needed to verify siting and design applicability for final incorporation into a project.

Complete this checklist for each phase of the project, when considering Treatment BMPs. Use the responses to the questions as the basis when developing the narrative in Section 5 of the Storm Water Data Report to document that Treatment BMPs have been appropriately considered.

Answer all questions, unless otherwise directed. Questions 14 through 16 should be answered after all subwatershed (drainages) are considered using this checklist.

1. Is the project in a watershed with prescriptive TMDL treatment BMP requirements in an adopted TMDL implementation plan or does the project have a dual purpose facility requirement (e.g. flood control and water quality treatment or Design Pollution Prevention BMPs that provide infiltration and treatment)? ☐Yes ☒No

   If Yes, consult the District/Regional Storm Water Coordinator to determine whether the T-1 checklist should be used to propose alternative BMPs because the prescribed BMPs may not be feasible or other BMPs may be more cost-effective. Special documentation and regulatory response may be necessary.

2. Dry Weather Flow Diversion

   (a) Are dry weather flows generated by Caltrans anticipated to be persistent? ☐Yes ☒No

   (b) Is a sanitary sewer located on or near the site? ☒Yes ☐No

   If Yes to both 2 (a) and (b), continue to (c). If No to either, skip to question 3.

   (c) Is connection to the sanitary sewer possible without extraordinary plumbing, features or construction practices? ☐Yes ☐No

   (d) Is the domestic wastewater treatment authority willing to accept flow? ☐Yes ☐No

   If Yes was answered to all of these questions consider ***Dry Weather Flow Diversion***, complete and attach **Part 3** of this checklist.

3. Is the receiving water on the 303(d) list for litter/trash or has a TMDL been issued for litter/trash? ☐Yes ☒No

If Yes, consider ***Gross Solids Removal Devices (GSRDs)***. Complete and attach **Part 6** of this checklist. Note: Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins also can capture litter. Before considering GSRDs for stand-alone installation or in sequence with other BMPs, consult with District/Regional NPDES Storm Water Coordinator to determine whether Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins should be considered instead of GSRDs to meet litter/trash TMDL.

4. Is the project located in an area (e.g., mountain regions) where traction sand is applied more than twice a year? ☐Yes ☒No

   If Yes, consider ***Traction Sand Traps*** Complete and attach **Part 7** of this checklist.

5. Maximizing Biofiltration Strips and Swales

   Objectives:

   1) Quantify infiltration from biofiltration alone

   2) Identify highly infiltrating biofiltration (i.e. > 90%) and skip further BMP consideration.

   3) Identify whether amendments can substantially improve infiltration.

   (a) Have biofiltration strips and swales been designed for runoff from all project areas, including sheet flow and concentrated flow conveyance? If no, document justification in Section 5 of the SWDR. ☒Yes ☐No

   (b) Based on existing site conditions, estimate what percentage of the WQV[1] can be infiltrated. When calculating the WQV, use a drawdown time appropriate for the site conditions.

   _X_ < 20%
   ___20 % - 50%
   ___ 50% - 90%
   ___ > 90%

   ☒Complete

   (c) Is infiltration greater than 90 percent? If Yes, skip to question 13. ☐Yes ☒No

   If No, Continue to 5 (d).

[1] A complete methodology for determining WQV infiltration is available at: http://www.dot.ca.gov/hq/oppd/stormwtr/index.htm

(d) Can the infiltration ranking in question 5(b) above be increased by using soil amendments?. ☒Yes ☐No

If Yes, consider including soil amendments (increasing the infiltration ranking of strips and swales shows performance comparable to other BMPs). Record the new infiltration estimate below. If No, continue to 5 (e).

___ < 20% (skip to 6)
_X_ 20 % - 50% (skip to 6)
___ 50% - 90% (skip to 6)
___ >90%

☐Complete

(e) Is infiltration greater than 90 percent? If Yes, skip to question 13. If No, continue to 5 (f). ☐Yes ☒No

(f) Is infiltration greater than 50 percent and is biofiltration preferred? If yes to both, skip to question 13. ☐Yes ☒No

6. Biofiltration in Rural Areas

Is the project in a rural area (outside of urban areas that is covered under an NPDES Municipal Stormwater Permit[2])? If Yes, proceed to question 13. ☐Yes ☒No

7. Estimating Infiltration for BMP Combinations

Objectives:

1) Identify high-infiltration biofiltration or biofiltration and infiltration BMP combinations and skip further BMP consideration.

2) If high infiltration is infeasible, then identify the infiltration level of all feasible BMP combinations for use in the subsequent BMP selection matrices.

(a) Has concentrated infiltration (i.e., via earthen basins) been prohibited? Consult your District/Regional Storm Water Coordinator and/or environmental documents. ☐Yes ☒No

If No, continue to 7 (b); if Yes, skip to question 8 and do not consider earthen basin-type BMPs

[2] See pages 39 and 40 of the Fact Sheets for the CGP.
http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_factsheet.pdf

(b) Can the infiltration ranking be increased by infiltrating the un-infiltrated remaining WQV from question 5, with an infiltration BMP[1]? If yes, record the new infiltration estimate below. If no, proceed to 7(c). ☐Yes ☒No

___ < 20% (do not consider this BMP combination)
___ 20% - 50%
___ 50% - 90%
___ >90%

Is at least 90 percent infiltration estimated? If Yes, proceed to 13. If No, proceed to 7(c). ☐Yes ☐No

(c) Assess infiltration of biofiltration combined with an approved earthen BMP. This assessment will be used in subsequent BMP selection matrices.

Earthen Detention Basin

___ < 20% ☐Complete
___ 20% - 50%
___ > 50%

Continue to Question 8

8. Identifying BMPs based on the Target Design Constituents

(a) Does the project discharge to a 303(d) impaired water body or a water body that has a TMDL adopted? If "No," use Matrix A to select BMPs, consider designing to treat 100% of the WQV, then skip to question 12. ☒Yes ☐No

If Yes, is the identified pollutant(s) considered a Targeted Design Constituent (TDC) (check all that apply below)? **No TDC.**

☐ sediments
☐ phosphorus
☐ nitrogen
☐ copper (dissolved or total)
☐ lead (dissolved or total)
☐ zinc (dissolved or total)
☐ general metals (dissolved or total)[2]

(b) Treating Sediment. Is sediment a TDC? If Yes, use Matrix A to select BMPs, then skip to question 12. Otherwise, proceed to question 9. ☐Yes ☒No

[1] Assess the combined infiltration of the WQV by both biofiltration and infiltration BMPs. As site constraints allow, size the infiltration BMP up to the un-infiltrated WQV remaining after the biofiltration BMP.

[2] General metals is a designation used by Regional Water Boards when specific metals have not yet been identified as causing the impairment.

BMP Selection Matrix A: General Purpose Pollutant Removal			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Strip: HRT > 5 Austin filter (concrete) Austin filter (earthen) Delaware filter MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Swale MCTT Wet basin	Austin filter (concrete) Delaware filter MCTT Wet basin
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

9. Treating both Metals and Nutrients.

   Is copper, lead, zinc, or general metals *AND* nitrogen or phosphorous a TDC? If Yes, use Matrix D to select BMPs, then skip to question 12. Otherwise, proceed to question 10. ☐Yes ☒No

10. Treating Only Metals.

    Are copper, lead, zinc, or general metals listed TDCs? If Yes, use Matrix B below to select BMPs, and skip to question 12. Otherwise, proceed to question 11. ☐Yes ☒No

BMP Selection Matrix B: Any metal is the TDC, but not nitrogen or phosphorous			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	MCTT Wet basin Austin filter (earthen) Austin filter (concrete) Delaware filter	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Biofiltration Strip Biofiltration Swale Wet basin
Tier 2	Strip: HRT > 5 Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

11. Treating Only Nutrients.

Are nitrogen and/or phosphorus listed TDCs? If "Yes," use Matrix C to select BMPs. If "No", please check your answer to 8(a). At this point one of the matrices should have been used for BMP selection for the TDC in question, unless no BMPs are feasible. ☐ Yes ☒ No

BMP Selection Matrix C: Phosphorous and / or nitrogen is the TDC, but no metals are the TDC			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Austin filter (earthen) Austin filter (concrete) Delaware filter**	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches*	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Wet basin Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale Wet basin	Austin filter (concrete) Delaware filter Wet basin
* Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			
** Delaware filters would be ranked in Tier 2 if the TDC is nitrogen only, as opposed to phosphorous only or both nitrogen and phosphorous.			

BMP Selection Matrix D: Any metal, plus phosphorous and / or nitrogen are the TDCs			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Wet basin* Austin filter (earthen) Austin filter (concrete) Delaware filter**	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches***	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches*** Biofiltration Strip Biofiltration Swale
Tier 2	Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
* The wet basin should only be considered for phosphorus			
** In cases where earthen BMPs can infiltrate, Delaware filters are ranked in Tier 2 if the TDC is nitrogen only, but they are Tier 1 for phosphorous only or both nitrogen and phosphorous.			
*** Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

12. Does the project discharge to a 303(d) waterbody that is listed for mercury or low dissolved oxygen? ☐Yes ☒No

    If Yes, contact the District/Regional NPDES Storm Water Coordinator to determine if standing water in a Delaware filter, wet basin, or MCTT would be a risk to downstream water quality.

13. After completing the above, identify and attach the checklists shown below for every Treatment BMP under consideration. (use one checklist every time the BMP is considered for a different drainage within the project) ☒Complete

    __X__ Biofiltration Strips and Biofiltration Swales: Checklist T-1, Part 2
    ____ Dry Weather Diversion: Checklist T-1, Part 3
    __X__ Infiltration Devices: Checklist T-1, Part 4
    __X__ Detention Devices: Checklist T-1, Part 5
    ____ GSRDs: Checklist T-1, Part 6
    ____ Traction Sand Traps: Checklist T-1, Part 7
    __X__ Media Filter [Austin Sand Filter and Delaware Filter]: Checklist T-1, Part 8
    __X__ Multi-Chambered Treatment Train: Checklist T-1, Part 9
    __X__ Wet Basins: Checklist T-1, Part 10

14. Estimate what percentage of the net WQV (for all new impervious surfaces within the project) or WQF (depending upon the Treatment BMP selected) will be treated by the preferred Treatment BMP(s): See Table 7%* ☐Complete

15. Estimate what percentage of the net WQV (for all new impervious surfaces within the project) that will be infiltrated by the preferred treatment BMP(s): 22.7 (for Alternative 1) %** ☒Complete

16. Prepare cost estimate, including right-of-way, and site specific determination of feasibility (Section 2.4.2.1) for selected Treatment BMPs and include as supplemental information for SWDR approval. TBD ☐Complete

*Note: The amount of treatment should be calculated for each BMP and each subwatershed, unless all BMPs within a project are the same. Document in SWDR.

**Note: The Water Quality Volume infiltrated should be documented for the entire project and also for each subwatershed. Document in SWDR.

Treatment BMPs

Checklist T-1, Part 2

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Biofiltration Swales / Biofiltration Strips **To be completed during the PS&E phase

Feasibility

1. Do the climate and site conditions allow vegetation to be established? ☒Yes ☐No

2. Are flow velocities from a peak drainage facility design event < 4 fps (i.e. low enough to prevent scour of the vegetated biofiltration swale as per HDM Table 873.3E)? ☐Yes ☐No

   If "No" to either question above, Biofiltration Swales and Biofiltration Strips are not feasible.

3. Are Biofiltration Swales proposed at sites where known contaminated soils or groundwater plumes exist? ☐Yes ☒No
   If "Yes", consult with District/Regional NPDES Coordinator about how to proceed.

4. Does adequate area exist within the right-of-way to place Biofiltration device(s)? ☒Yes ☐No
   If "Yes", continue to Design Elements section. If "No", continue to Question 5.

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Biofiltration devices and how much right-of-way would be needed to treat WQF? _____ acres ☐Yes ☐No
   If "Yes", continue to Design Elements section. If "No", continue to Question 6.

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of these Treatment BMPs into the project. ☐Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Has the District Landscape Architect provided vegetation mixes appropriate for climate and location? * ☐Yes ☐No

2.	Can the biofiltration swale be designed as a conveyance system under any expected flows > the WQF event, as per HDM Chapter 800? * (e.g. freeboard, minimum slope, etc.)	☐Yes	☐No
3.	Can the biofiltration swale be designed as a water quality treatment device under the WQF while meeting the required HRT, depth, and velocity criteria? (Reference Appendix B, Section B.2.3.1)*	☐Yes	☐No
4.	Is the maximum length of a biofiltration strip ≤ 100 ft? Strips > 100 ft. may still be considered as long as potential erosion issues have been addressed.**	☐Yes	☒No
5.	Has the minimum width (perpendicular to flow) of the invert of the biofiltration swale received the concurrence of Maintenance? *	☐Yes	☐No
6.	Can biofiltration swales be located in natural or low cut sections to reduce maintenance problems caused by animals burrowing through the berm of the swale? **	☐Yes	☐No
7.	Has the infiltration rate of the bio-filtration device been calculated and maximized through amendments where appropriate. **	☒Yes	☐No
8.	Have Biofiltration Systems been considered for locations upstream of other Treatment BMPs, as part of a treatment train? **	☐Yes	☐No

Treatment BMPs

Checklist T-1, Part 4

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Infiltration Devices **To be completed during the PS&E phase

Feasibility

1.	Does local Basin Plan or other local ordinance provide influent limits on quality of water that can be infiltrated, and would infiltration pose a threat to groundwater quality?	☐Yes	☐No
2.	Does infiltration at the site compromise the integrity of any slopes in the area?	☐Yes	☐No
3.	Per survey data or U.S. Geological Survey (USGS) Quad Map, are existing slopes at the proposed device site >15%?	☐Yes	☐No
4.	At the invert, does the soil type classify as NRCS Hydrologic Soil Group (HSG) D, or does the soil have an infiltration rate < 0.5 inches/hr? For Design Pollution Prevention BMPs, can the soil be amended to provide an adequate infiltration rate and void space.	☐Yes	☐No
5.	Is site located over a previously identified contaminated groundwater plume?	☐Yes	☒No
	If "Yes" to any question above, Infiltration Devices are not feasible; stop here and consider other approved Treatment BMPs.		
6.	(a) Does site have groundwater within 10 ft of basin invert?	☒Yes	☐No
	(b) Does site investigation indicate that the infiltration rate is significantly greater than 2.5 inches/hr?	☐Yes	☐No
	If "Yes" to either part of Question 6, the RWQCB must be consulted, and the RWQCB must conclude that the groundwater quality will not be compromised, before approving the site for infiltration.		
7.	Does adequate area exist within the right-of-way to place Infiltration Device(s)? If "Yes", continue to Design Elements sections. If "No", continue to Question 8.	☐Yes	☐No
8.	If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Infiltration Devices and how much right-of-way would be needed to treat WQV? _____ acres If Yes, continue to Design Elements section. If No, continue to Question 9.	☐Yes	☐No
9.	If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project.	☐Complete	

Design Elements – Infiltration Basin

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Has a detailed investigation been conducted, including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination? (This report must be completed for PS&E level design.) *	☐Yes	☐No
2.	Has an overflow spillway with scour protection been provided? *	☐Yes	☐No
3.	Is the Infiltration Basin size sufficient to capture the WQV while maintaining a 40-48 hour drawdown time? If the BMP is used in series with a biofiltration device, then does the total upstream infiltration plus the Infiltration Basin volume at least equal the WQV. *	☐Yes	☐No
4.	Can access be placed to the invert of the Infiltration Basin? *	☐Yes	☐No
5.	Can the Infiltration Basin accommodate the freeboard above the overflow event elevation (reference Appendix B.1.3.1)? *	☐Yes	☐No
6.	Can the Infiltration Basin be designed with interior side slopes no steeper than 4:1 (h:v) (may be 3:1 [h:v] with approval by District Maintenance)? *	☐Yes	☐No
7.	Can vegetation be established in the Infiltration Basin? **	☐Yes	☐No
8.	Can diversion be designed, constructed, and maintained to bypass flows exceeding the WQV? **	☐Yes	☐No
9.	Can a gravity-fed Maintenance Drain be placed? **	☐Yes	☐No

Design Elements – Infiltration Trench

1.	Has a detailed investigation been conducted, including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination? (This report must be completed for PS&E level design.) *	☐Yes	☐No
2.	Is the surrounding soil within Hydrologic Soil Groups (HSG) Types A or B? **	☐Yes	☐No
3.	Since this BMP is used in series with a pretreatment (see No. 7 below), then does the total upstream infiltration by the pretreatment plus the void space volume of the Infiltration Trench at least equal the WQV, while maintaining a drawdown time of ≤ 72 hours? **	☐Yes	☐No
4.	Is the depth of the Infiltration Trench ≤ 13 ft? *	☐Yes	☐No
5.	Can an observation well be placed in the trench? **	☐Yes	☐No
6.	Can access be provided to the Infiltration Trench? *	☐Yes	☐No
7.	Can pretreatment be provided to capture sediment in the runoff (such as using vegetation)? *	☐Yes	☐No
8.	Can flow diversion be designed, constructed, and maintained to bypass flows exceeding the Water Quality event? **	☐Yes	☐No

9. Can a perimeter curb or similar device be provided (to limit wheel loads upon the trench)? ** ☐Yes ☐No

Design Elements and Feasibility – Infiltration-DPP BMPs

* **Required** Design Element – (see definition above)

** **Recommended** Design Element – (see definition above)

1. Has a detailed soil investigation been conducted, to assure stability of the slope? ** ☐Yes ☐No
2. Does the soil have adequate infiltration rates or can the soil be amended to increase its infiltrating properties? ** ☐Yes ☐No
3. Are flow velocities from a peak drainage facility design event < 4 fps (i.e. low enough to prevent scour or erosion of DPP (swale or conveyance) as per HDM Table 873.3E)? Or has the BMP been designed to prevent scour or erosion for higher velocities (e.g. rock lined ditch). * ☐Yes ☐No

Treatment BMPs

Checklist T-1, Part 5

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Detention Devices **To be completed during the PS&E phase

Feasibility

1. Is there sufficient head to prevent objectionable backwater conditions in the upstream drainage systems? ☒Yes ☐No

2. 2a) Is the volume of the Detention Device equal to at least the WQV? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]). If the BMP is used in series with a biofiltration device, then does the total upstream infiltration plus the Detention Device volume at least equal the WQV?. ☒Yes ☐No

   Only answer (b) if the Detention Device is being used also to capture traction sand.

   2b) Is the total volume of the Detention Device at least equal to the WQV plus the anticipated volume of traction sand, while maintaining a minimum 12 inch freeboard (1 ft)? ☐Yes ☐No

3. Is basin invert ≥ 10 ft above seasonally high groundwater or can it be designed with an impermeable liner? (Note: If an impermeable liner is used, the seasonally high groundwater elevation must not encroach within 12 inches of the invert.) ☒Yes ☐No

If No to any question above, then Detention Devices are not feasible.

4. Does adequate area exist within the right-of-way to place Detention Device(s)? ☒Yes ☐No
   If Yes, continue to the Design Elements section. If No, continue to Question 5.

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Detention Device(s) and how much right-of way would be needed to treat WQV? _____ acres ☐Yes ☐No
   If Yes, continue to the Design Elements section. If No, continue to Question 6.

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Has the geotechnical integrity of the site been evaluated to determine potential impacts to surrounding slopes due to incidental infiltration? If incidental infiltration through the invert of an unlined Detention Device is a concern, consider using an impermeable liner. *	☐Yes	☐No
2.	Has the location of the Detention Device been evaluated for any effects to the adjacent roadway and subgrade? *	☐Yes	☐No
3.	Can a minimum freeboard of 12 inches be provided above the overflow event elevation? *	☐Yes	☐No
4.	Is an overflow outlet provided? *	☐Yes	☐No
5.	Is the drawdown time of the Detention Device within 24 to 72 hours? *	☒Yes	☐No
6.	Is the basin outlet designed to minimize clogging (minimum outlet orifice diameter of 0.5 inches)? *	☒Yes	☐No
7.	Are the inlet and outlet structures designed to prevent scour and re-suspension of settled materials, and to enhance quiescent conditions? *	☐Yes	☐No
8.	Can vegetation be established in an earthen basin at the invert and on the side slopes for erosion control and to minimize re-suspension? Note: Detention Basins may be lined, in which case no vegetation would be required for lined areas.*	☐Yes	☐No
9.	Has sufficient access for Maintenance been provided? *	☐Yes	☐No
10.	Is the side slope 4:1 (h:v) or flatter for interior slopes? ** (Note: Side slopes up to 3:1 (h:v) allowed with approval by District Maintenance.)	☐Yes	☐No
11.	If significant sediment is expected from nearby slopes, can the Detention Device be designed with additional volume equal to the expected annual loading? **	☐Yes	☐No
12.	Is flow path as long as possible (≥ 2:1 length to width ratio at WQV elevation is recommended)? **	☒Yes	☐No

Treatment BMPs

Checklist T-1, Part 8

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Media Filters **To be completed during the PS&E phase

Caltrans has approved two types of Media Filter: Austin Sand Filters and Delaware Filters. Austin Sand filters are typically designed for larger drainage areas, while Delaware Filters are typically designed for smaller drainage areas. The Austin Sand Filter is constructed with an open top and may have a concrete or earthen invert, while the Delaware is always constructed as a vault. See Appendix B, Media Filters, for a further description of Media Filters.

Feasibility – Austin Sand Filter

1. Is the volume of the Austin Sand Filter equal to at least the WQV using a 24 hour drawdown? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]) ☐Yes ☐No
2. Is there sufficient hydraulic head to operate the device (minimum 3 ft between the inflow and outflow chambers)? ☐Yes ☐No
3. If initial chamber has an earthen bottom, is initial chamber invert ≥ 3 ft above seasonally high groundwater? ☒Yes ☐No
4. If a vault is used for either chamber, is the level of the concrete base of the vault above seasonally high groundwater or is a special design provided? ☒Yes ☐No

   If No to any question above, then an Austin Sand Filter is not feasible.
5. Does adequate area exist within the right-of-way to place an Austin Sand Filter(s)? ☐Yes ☐No

   If Yes, continue to Design Elements sections. If No, continue to Question 6.
6. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres ☐Yes ☐No

   If Yes, continue to the Design Elements section.

   If No, continue to Question 7.
7. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

If an Austin Sand Filter meets these feasibility requirements, continue to the Design Elements – Austin Sand Filter below.

Feasibility- Delaware Filter

1. Is the volume of the Delaware Filter equal to at least the WQV using a 48 hour drawdown? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet], consult with District/Regional Design Storm Water Coordinator if a lesser volume is under consideration.) ☐Yes ☐No

2. Is there sufficient hydraulic head to operate the device (minimum 3 ft between the inflow and outflow chambers)? ☐Yes ☐No

3. Would a permanent pool of water be allowed by the local vector control agency? Confirm that check valves and vector proof lid as shown on standard detail sheets will be allowed, is used. ☐Yes ☐No

If No to any question, then a Delaware Filter is not feasible

4. Does adequate area exist within the right-of-way to place a Delaware Filter(s)? ☐Yes ☐No
   If Yes, continue to Design Elements sections. If No, continue to Question 5.

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres ☐Yes ☐No
   If Yes, continue to the Design Elements section. If No, continue to Question 6.

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

7. Does the project discharge to a water body that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, or low dissolved oxygen? ☐Yes ☒No

   If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.

   If a Delaware Filter is still under consideration, continue to the Design Elements – Delaware Filter section.

Design Elements – Austin Sand Filter

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Is the drawdown time of the 2nd chamber 24 hours? *	☐Yes	☐No
2.	Is access for Maintenance vehicles provided to the Austin Sand Filter? *	☐Yes	☐No
3.	Is a bypass/overflow provided for storms > WQV? *	☐Yes	☐No
4.	Is the flow path length to width ratio for the sedimentation chamber of the "full" Austin Sand Filter ≥ 2:1? **	☐Yes	☐No
5.	Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation)? **	☐Yes	☐No
6.	Can the Austin Sand Filter be placed using an earthen configuration? ** If No, go to Question 9.	☐Yes	☐No
7.	Is the Austin Sand Filter invert separated from the seasonally high groundwater table by ≥ 10 ft)? * If No, design with an impermeable liner.	☐Yes	☐No
8.	Are side slopes of the earthen chamber 3:1 (h:v) or flatter? *	☐Yes	☐No
9.	Is maximum depth ≤ 13 ft below ground surface? *	☐Yes	☐No
10.	Can the Austin Sand Filter be placed in an offline configuration? **	☐Yes	☐No

Design Elements – Delaware Filter

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Is the drawdown time of the 2nd chamber between 40 and 48 hours, typically 40-hrs? *	☐Yes ☐No
2.	Is access for Maintenance vehicles provided to the Delaware Filter? *	☐Yes ☐No
3.	Is a bypass/overflow provided for storms > WQV? **	☐Yes ☐No
4.	Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation)? **	☐Yes ☐No
5.	Is maximum depth ≤ 13 ft below ground surface? *	☐Yes ☐No

Treatment BMPs

Checklist T-1, Part 9

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

MCTT (Multi-chambered Treatment Train) –**To be completed during the PS&E phase

Feasibility

1. Is the proposed location for the MCTT located to serve a "critical source area" (i.e. vehicle service facility, parking area, paved storage area, or fueling station)? ☐Yes ☐No

2. Is the WQV ≥ 4,346 ft³ [0.1 acre-foot]? ☐Yes ☐No

3. Is there sufficient hydraulic head (typically ≥ 6 feet) to operate the device? ☐Yes ☐No

4. Would a permanent pool of water be allowed by the local vector control agency? Confirm that check valves and vector proof lid as shown on standard detail sheets be allowed. ☐Yes ☐No

   If No to any question above, then an MCTT is not feasible.

5. Does adequate area exist within the right-of-way to place an MCTT(s)? ☐Yes ☐No
   If Yes, continue to Design Elements sections. If No, continue to Question 6.

6. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres ☐Yes ☐No
   If Yes, continue to Design Elements section. If No, continue to Question 7.

7. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

8. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, low dissolved oxygen, or odors? ☐Yes ☒No

   If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Is the maximum depth of the 3rd chamber ≤ 13 ft below ground surface and has Maintenance accepted this depth? *	☐Yes	☐No
2.	Is the drawdown time in the 3rd chamber between 24 and 48 hours, typically designed for 24-hrs? *	☐Yes	☐No
3.	Is access for Maintenance vehicles provided to all chambers of the MCTT? *	☐Yes	☐No
4.	Is there sufficient hydraulic head to operate the device? *	☐Yes	☐No
5.	Has a bypass/overflow been provided for storms > WQV? *	☐Yes	☐No
6.	Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation)? **	☐Yes	☐No

Treatment BMPs

Checklist T-1, Part 10

Prepared by: WRECO Date: August 2014 District-Co-Route: 03-Pla-65/80

PM : (I-80) PM 1.9-6.1; (SR 65) PM R4.8-R7.3 Project ID (or EA): 03-4E3200 RWQCB: Region 5

Wet Basin –**To be completed during the PS&E phase

Feasibility

1.	Is the volume of the Wet Basin above the permanent pool equal to at least the WQV using a 24 to 96 hour drawdown (40 to 48 hour drawdown preferred)? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet] and the permanent pool must be at least 3x the WQV.)	☐Yes	☐No
2.	Is a permanent source of water available in sufficient quantities to maintain the permanent pool for the Wet Basin?	☐Yes	☐No
3.	Is proposed site in a location where naturally occurring wetlands do not exist?	☒Yes	☐No
	Answer either question 4 or question 5:		
4.	For Wet Basins with a proposed invert above the seasonally high groundwater, Are NRCS Hydrologic Soil Groups [HSG] C and D at the proposed invert elevation, or can an impermeable liner be used? (Note: If an impermeable liner is used, the seasonally high groundwater elevation must not encroach within 12 inches of the invert.)	☐Yes	☐No
5.	For Wet Basins with a proposed invert below the groundwater table: Can written approval from the local Regional Water Quality Control Board be obtained to place the Wet Basin in direct hydraulic connectivity to the groundwater?	☐Yes	☐No
6.	Is freeboard provided ≥ 1 foot?	☐Yes	☐No
7.	Is the maximum impoundment volume < 14.75 acre-feet?	☐Yes	☐No
8.	Would a permanent pool of water be allowed by the local vector control agency?	☐Yes	☐No
	If No to any question above, then a Wet Basin is not feasible.		
9.	Is the maximum basin width ≤ 49 ft as suggested in Section B.10.2?	☐Yes	☐No
	If No, consult with the local vector control agency and District Maintenance.		
10.	Does adequate area exist within the right-of-way to place a Wet Basin? If Yes, continue to Design Elements sections.	☐Yes	☐No
	If No, continue to Question 11.		

11. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres ☐Yes ☐No

    If Yes, continue to Design Elements section.

    If No, continue to Question 12.

12. Have the appropriate state and federal regulatory agencies been contacted to discuss location and potential to attract and harbor sensitive or endangered species? ☐Yes ☐No

    If No, contact the Regional/District NPDES Coordinator

13. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

14. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, low dissolved oxygen, or odors? ☐Yes ☒No

    If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Can a controlled outlet and an overflow structure be designed for storm events larger than the Water Quality event? *	☐Yes	☐No
2.	Is access for Maintenance vehicles provided? *	☐Yes	☐No
3.	Is the drawdown time for the WQV between 24 and 96 hours? *	☐Yes	☐No
4.	Has appropriate vegetation been selected for each hydrologic zone? *	☐Yes	☐No
5.	Can all design elements required by the local vector control agency be incorporated? *	☐Yes	☐No
6.	Has a minimum flow path length-to-width ration of at least 2:1 been provided? **	☐Yes	☐No
7.	Has an upstream bypass been provided for storms > WQV? **	☐Yes	☐No
8.	Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation, or a forebay)? **	☐Yes	☐No
9.	Can public access be restricted using a fence if proposed at locations accessible on foot by the public? **	☐Yes	☐No