Long Form - Storm Water Data Report

Dist-County-Route: 07-LA-101
Post Mile Limits: 33.0/34.4
Project Type: Interchange Improvements
Project ID (or EA): 0700001840 (EA 257200)
Program Identification: HE-11
Phase: ☐ PID ☒ PA/ED ☐ PS&E

Regional Water Quality Control Board(s): Los Angeles (Region 4)

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: 4.37 acres Risk Level: Two (2)
Estimated: Construction Start Date: February 1, 2013 Construction Completion Date: December 31, 2014
Notification of Construction (NOC) Date to be submitted: January 1, 2013

Erosivity Waiver Yes ☐ Date: _____ No ☒
Notification of ADL reuse (if Yes, provide date) Yes ☐ Date: _____ No ☒
Separate Dewatering Permit (if yes, permit number) Yes ☐ Permit # _____ 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.

Nicholas Roberts, 4/13/2012
Registered Project Engineer

Andranik Arzumanian 4/17/2012
Caltrans Designated Oversight Representative

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

Ravi Ghate, Project Manager 4/18/2012

Roger Castillo, Designated ~~Maintenance~~ Representative 04-18-12

Ron Russak, Designated Landscape Architect Representative 05-08-12

[Stamp Required for PS&E only] Shirley Pak, District/Regional Design SW Coordinator or Designee 5/8/2012

STORM WATER DATA INFORMATION

1. Project Description

- The California Department of Transportation (Caltrans) and The City of Agoura Hills (City), propose to construct improvements at the US 101/Palo Comado Canyon Road interchange (PM 33.0/34.4), in Los Angeles County within in the City of Agoura Hills (see **Figure 1**). The project would include widening the Palo Comado Canyon Road and Palo Comado Canyon Road Overcrossing over US 101 and modification of the interchange ramps in order to improve traffic circulation, safety, and bicycle/pedestrian access.
- The project would include widening the entire length of Palo Comado Canyon Road, between Driver Avenue to the north and Chesebro Road to the south; from two to four lanes. Within these limits, the Palo Comado Canyon Road Overcrossing would be widened from one lane in each direction to provide two lanes in each direction, along with a dedicated lefthand turn lanes, for a total of five striped lanes. A Class II bike lane and sidewalks would be provided on both sides of the overcrossing.
- The project would maintain the existing layout of the interchange ramps; however, the northbound on- and off-ramps would be slightly re-configured, with an additional lane being provided on the northbound off-ramp at the Palo Comado Canyon Road intersection. The intersection of the northbound ramps and Palo Comado Road would be signalized; the remaining intersections would remain un-signalized.
- Existing utilities would be protected in place during construction. Overhead electric and telephone lines would need to be relocated or undergrounded in some areas to accommodate the build alternative, and portions of the street light systems will be relocated along Palo Comado Canyon Road. The existing storm drain systems would remain in place. New inlets would be installed along the modified northbound off-ramp, as well as the northbound on-ramp. A new inlet system would be added to accommodate the widening of Palo Comado Canyon Road south of the bridge.
- Total DSA is 4.37 acres (2.63 acres within Caltrans right of way) and has been calculated based on all areas that will require substantial earthwork activities and was determined using CAD software
- Total Net Increase in Impervious Area = 1.33 acres

  Total Net Increase in Impervious Area within Caltrans right-of-way = 0.57 acres

  Total Net Increase in Impervious Area outside of Caltrans right-of-way = 0.76 acres
- MS4 areas within the project limits are Los Angeles County and Caltrans storm drain facilities.

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

- The Los Angeles Regional Water Quality Control Board (Region 4) has jurisdiction within the project limits.
- The receiving water affected by the project is Malibu Creek. The proposed project is located within the upper reach of the Malibu Creek Watershed.
- The project area resides in the Santa Monica Bay Hydrologic Unit, Malibu Creek Hydrologic Area, and is within the Lindero Canyon Sub-Area, 404.23. Surface water from the proposed project site and immediate project vicinity is collected by designed flood control/storm drain facilities, and is eventually routed to Chesebro Creek, which discharges to Medea Creek which discharges to Malibu Lake, and then ultimately outfalls to Malibu Creek. The project site is approximately 2.3 miles upstream of Malibu Lake, which discharges into Malibu Creek.
- Chesebro Creek is the nearest receiving water for the proposed project.
- Chesebro Creek is not listed on the 2006 Clean Water Act Section 303(d) list of impaired waterways
- The following are the Total Maximum Daily Loads (TMDLs) for the other receiving waters.

Established TMDLs

Malibu Creek Watershed Bacteria TMDL

The Malibu Creek Watershed Bacteria TDML became effective on January 24, 2006. Caltrans is working cooperatively with a group of Responsible Agencies to jointly comply with the TMDL. Project Engineer shall consider treatment controls for the project and consult with the District NPDES Storm Water Coordinator.

Malibu Creek Watershed Trash TMDL

The Malibu Creek Trash TDML became effective on July 7, 2009. The TDML requires the Responsible Agencies, including Caltrans to reduce amount of trash deposited in the waterbody and in the storm water discharges to “zero” in eight (8) years. Responsible Agencies may implement a Minimum Frequency of Assessment and Collection Program in or adjacent to the waterbody or place full capture devices at the drainage outfalls. Project Engineer shall consider treatment controls for the project and consult with the District NPDES Storm Water Coordinator.

Santa Monica Bay Nearshore and Offshore Debris TMDL

The Santa Monica Bay Nearshore and Offshore Debris TMDL became effective on March 20, 2012. The TMDL requires the Responsible Agencies in the Santa Monica Bay, Ballona Creek and Malibu Creek Watersheds, including Caltrans, to reduce amount of trash and plastic pellets in the storm water discharges to “zero” in eight (8) years. Responsible Agencies may

implement a Minimum Frequency of Assessment and Collection (MFAC) Program in or adjacent to the waterbody or place full capture devices at the drainage outfalls. Project Engineer shall consider treatment controls for the project and consult with the District NPDES Storm Water Coordinator.

Santa Monica Bay Total Maximum Daily Load for DDT and PCBs

The Santa Monica Bay Total Maximum Daily Load for DT and PCBs was adopted by the United States Environmental Protection Agency (USEPA) on March 26, 2012. The TDML assigns waste load allocations for DDT and PCB to the Responsible Agencies in the Santa Monica Bay, Ballona Creek and Malibu Creek Watersheds, including Caltrans. Project Engineer shall consider treatment controls for the project and consult with the District NPDES Storm Water Coordinator.

- There are no drinking water reservoirs or recharge facilities within the project limits.
- The regulatory agencies seasonal construction and construction exclusion dates or restrictions have not been determined. This will be determined during the PS&E phase.
- A 401 Certification will not be required for this project.
- The Interchange project is located in Agoura Hills, California. Agoura Hills is described as sub-humid mesothermal climate having a mean annual precipitation between 12 in. and 22 in. of rain a year. Rainy season for this area according to the Irrigation Training and Research Center (ITRC) is from the month of October 1 through May 1. Average January temperature is 45 degrees to 55 degrees Fahrenheit, average July temperature is between 67 degrees to 79 degrees Fahrenheit, and the mean annual temperature is 55 degrees to 62 degrees Fahrenheit. The average frost free season is 200 to 330 days.
- Soils found within or near the proposed project site, according to the NRCS soil survey website, are Cumulic Haploxerolls, 0 to 9 percent slopes and Linne Silty Clay loam, 9 to 15 percent slopes. These soils, according to the NRCS, are classified in Hydrologic Soils Groups B and C respectively. Depth to groundwater level has not been determined at this time, but will be identified during the PS&E phase of the project, it is anticipated that the groundwater levels are deep and therefore no dewatering will be required for the construction of this project.
- Soil has not been identified for containing Aerially Deposited Lead (ADLs). The Initial Site Assessment (ISA) was approved by Caltrans on June 21, 2011. The ISA recommended ADL testing prior to or during construction. The City intends to complete ADL testing during the design phase (PS&E) of the project.
- The total disturbed soil area of the project is 4.37 acres.
- Areas outside the Caltrans right-of-way may be required for staging. These areas will be south of the freeway at the cul-de-sac on Dorothy Drive and will remain within the City Right of way.
- No additional right-of-way will be required for BMPs and maintenance. The proposed treatment BMPs are capable of fitting within the existing right-of-way.

- Slopes will be stable. Slopes for the project will be no less than 4:1.
- Right of Way Certification is not required for the PA/ED submittal. The need for certification will be evaluated during the PS&E phase.
- On the north side of US-101, local land uses in the area are high density residential R4 apartment complexes, gas stations, and Agoura Park. On the south side of US-101, there is a plant nursery, and commercial and industrial buildings.
- Topography of the project area is considered foothills, where slopes average about 5%.
- There is no presence of dry weather flow within the project.
- The project cannot be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical areas.
- There are no bridges over live streams as part of this project.
- Several methods to minimize erosion from slopes will be employed such as:
    - Disturbing existing slopes only when necessary
    - Minimizing cut and fill areas to reduce slope lengths
    - Incorporating retaining walls
    - Avoiding soils and formations that are difficult to stabilize
    - Providing cut and fill slopes that are flat enough to allow re-vegetation and limit erosion
    - Rounding and shaping slopes to reduce concentrated flow
    - Collecting concentrated flows in stabilized drains and channels.
- The project design allows for the ease of maintaining BMPs.
- The project will be scheduled or phased to minimize soil-disturbing work during the rainy season.
- Permanent storm water pollution controls will be installed early in the construction process to provide additional protection and to possibly utilize them in addressing storm water impacts.
- The net impervious area increase in the Caltrans right-of-way is 0.57 acres, and the net impervious area increase for the total project (including work within the City of Agoura Hills right of way) is 1.33 acres.
- Regulatory agencies seasonal construction and construction exclusions dates have not been identified at this time and will further be researched at PS&E.
- Treatment BMP's are required to be considered because the project is a major reconstruction project that is being proposed on a freeway in which a district directive (DD#92) and a corridor study has determined several retrofit BMP's should be considered if a proposed project impacts the areas in which these facilities are found to be feasible. Bioswale treatment BMP's being considered at this time and soil classification, permeability, erodibility and depth to groundwater and any contaminated soils within the project area will be determined at PS&E to determine additional BMP feasibility

- The construction site has been determined as Level 2 Risk. R factor based on the project construction schedule and site location has been determined to be 73.28. The K x LS factor was determined to be 1.6 from the sediment map and there are not 303-d bodies of water impaired for sediment or water bodies with beneficial uses of Spawn/Cold/Migratory resulting in a receiving waters risk factor of LOW.

3. Regional Water Quality Control Board Agreements

- There have been no discussions, agreements, or meetings with local agencies or RWQCB in regards to this project to date. There have been no discussions with federal, state, or local agencies in regards to seasonal construction and construction exclusion dates or restrictions to date.
- This project will be constructed within Caltrans right-of-way. Therefore, NPDES-Caltrans Statewide Permit (Order No. 99-06-DWQ) (NPDES No. CAS 000003 and Construction General Permit (Order No. 2009-0008-DWQ) (NPDES No. CAS000002) apply to this project. The City of Agoura Hills will file a Notice of Intent (NOI) with the State Water Resources Board at least 30 days prior to the start of construction. The re-use of lead-contaminated soil may be proposed with this project pending the ADL study; therefore, a notification of ADL reuse to the RWQCB could be required.

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

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

- The project will increase velocity and volume of downstream flow due to the additional impervious area. However, the increase will be minimal. Total paved area was reduced to the maximum extent practical.
- The project is within both Caltrans and the City of Agoura Hills right-of-way. The total net increase in impervious pavement within the project is 1.33 acres. The total net increase in impervious pavement within the Caltrans right-of-way only is 0.57 acres. Post construction conditions will feature slopes that are less than 4:1. Retaining walls will be placed in areas along the project to avoid steep slopes and grade changes due to the new interchange alignment.
- The project will discharge to unlined, vegetated roadway drainage swales that will tie into the existing drainage swales. Two locations have been identified as bioswales, and will be used to treat runoff for water quality.
- Energy dissipation devices are included where appropriate. Transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.
- There is potential for increased sediment loading due to the new grading and additional impervious area required for the project. However, this sediment loading will be minor, since slopes are 4:1 or flatter, and slope lengths are greater than 20 ft in only 0.58 acres of the disturbed area of the project.
- Existing drainage patterns have been maintained for the proposed project. There will not be changes that affect downstream channel stability.

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

- The proposed interchange project will result in existing slopes being cut and new slopes being created.
- This portion of US-101 is classified as “landscaped” - following Caltrans Policy all planting that is disturbed or removed will be replaced. All disturbed slopes will be stabilized with landscaping. Benches, rounded slopes, and other measures will be considered to reduce concentrated flow.
- RUSLE 2 erosion prediction procedure may be provided at the PS&E stage of the project.
- Paving will consist of the proposed roadway areas. Rip rap aprons used as energy dissipaters at culvert outlets will be provided when necessary.
- Existing and proposed vegetation will be analyzed to determine appropriate planting strategies. Overland and concentrated flow depths and velocities will be minimized.
- Hard surfaces are required for this project.

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

- This project will create and modify drainage ditches, berms, dikes, swales, etc. The project will create new slopes and modify existing slopes. A majority of surface water from the project will be diverted to proposed biofiltration swales or designed collection devices adjacent to the freeway.
- Downdrains will be considered per the HDM. Paved spillways are not applicable for this project.
- Flared end sections or headwalls will be placed at culvert entrances and exits.
- Outlet protection and velocity dissipation devices at outlets will be utilized for the project.

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

- The project design has considered minimizing the project footprint and matching the existing grading as close as possible in order to preserve as much of the existing vegetation as possible.
- Clearing and grubbing will be planned to maximize the preservation of existing vegetation.
- Impacts to preserved vegetation will be considered while work is occurring in disturbed areas.
- Areas to be preserved have not been identified to date along with a site evaluation to determine soil types for appropriate vegetation, planting strategies and length of time for vegetation establishment. This will be determined during the PS&E phase.

- Any landscaping that is disturbed will be replaced following Caltrans replacement planting policy. Erosion control that is disturbed will also be replaced following the Caltrans erosion control policy.

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

Treatment BMP Strategy, Checklist T-1

- The storm water treatment BMP's considered for this project will treat approximately 11.87 acres of impervious area. The project's total proposed increase of impervious area has been calculated to be 1.33 acres. Thus the BMP's will treat well over 100% of the new impervious area. The total water quality volume treated from the BMP's is approximately 32,600 Cubic Feet. The projects total water quality volume based on the new impervious are is approximately 3,620 cubic feet. The storm water BMP's will treat approximately 901% of the project's required water quality volume.
- This project will be required to consider the proposed Treatment BMP's per the District Directive #92 and the Route 101 Corridor Storm Water Management Study (January 26, 2010) (Corridor Study). The study was prepared to evaluate locations that may be able to treat the existing impervious freeway runoff.
- The net increase in new impervious area in the Caltrans right-of-way is 0.57 acres for the project. There are two biofiltration swale locations designed for the project to treat Caltrans and City tributary flows. These biofiltration swale areas have been analyzed according to Caltrans standards. The preliminary design is outlined under the biofiltration swale section below.
- According to the Caltrans Water Quality Planning Tool, there are no Targeted Design Constituents (TDCs) identified for Chesebro Creek.
- 100% of the net increased impervious area proposed with the construction of this project (within City and Caltrans right of ways) will be treated with these two proposed treatment facilities. Additional treatment will occur from the recommended treatment BMP's per the Corridor Study as described in more detail below.
- The Corridor Study recommended treatment facilities within the projects post mile limits (251, 254, 257, 259A/B, 260, 261, 262, 263) are considered feasible at this stage of the project and funds will be allocated for their construction with this project. Additional studies will be required during PS&E to ensure these facilities are sized adequately and can be implemented as they are proposed in the corridor study. The table below identifies these facility types and post miles. Funding for these BMP's has been allocated in the cost estimate.

Corridor Study Recommended BMP's			
BMP No.	Post Mile Location	BMP Type	General Location
251	33.4	Media Filter (Austin Sand Filter)	Shoulder of S/B US-101
254	33	Media Filter (Austin Sand Filter)	Shoulder of N/B US-101
257	33.5	Bioswale & Gross Solids Removal Device	Shoulder of S/B US-101
259A	33.9	Biostrip	Shoulder of S/B US-101
259B	33.8	Bioswale & Gross Solids Removal Device	Inside Loop of S/B US-101 on-ramp from Palo Comado Canyon Rd
260	33.8	Media Filter (Austin Sand Filter)	Shoulder of S/B US-101 off-ramp to Palo Comado Canyon Rd
261	33.7	Biostrip	Shoulder of N/B US-101
262	33.8	Biostrip	Shoulder of N/B US-101 on-ramp from Palo Comado Canyon Rd
263	34.2	Biostrip	Shoulder of N/B US-101 on-ramp from Palo Comado Canyon Rd

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

The Corridor Study recommends biofiltration bmp facilities including; 2 bioswales and 4 biostrips. The project will consider these facilities and allocate funding to construct the facilities. During the PS&E phase the project will continue to analyze and design these BMP's. As long as they remain feasible and constructible with the proposed project they will be implemented with the project. Below is a summary of these BMP facilities per the Corridor Study.

Site ID	Post Mile	Available Area (sq ft)	General Location	Paved Drainage Area (acre)	WQV (cubic feet)	Selected BMP
257	33.5	2000	Shoulder of S/B US-101	1.2	3349	Bioswale & Gross Solids Removal Device
261	33.7	7000	Inside Loop of S/B US-101 on-ramp from Palo Comado Canyon Rd	1	2723	Biostrip
262	33.8	6000	Shoulder of S/B US-101 off-ramp to Palo Comado Canyon Rd	0.3	844	Biostrip
263	34.2	19000	Shoulder of N/B US-101	1.9	5200	Biostrip
259A	33.9	11000	Shoulder of N/B US-101 on-ramp from Palo Comado Canyon Rd	1	2831	Biostrip
259B	33.8	1000	Shoulder of N/B US-101 on-ramp from Palo Comado Canyon Rd	0.7	1824	Bioswale & Gross Solids Removal Device
Totals		46000		6.1	16771	

- Because of the changes in the geometrics from the Corridor Study two additional biofiltration swales are determined to be feasible and are proposed for this project. One biofiltration swale is on the south side of the US-101 northbound off-ramp. The biofiltration swale is approximately 195 ft long and is contained within the Caltrans right-of-way. The water quality flow rate is 0.19 cfs. The biofiltration swale will be treating 1.03 acres of total area which consists of 0.90 acres of impervious area and 0.13 acres of pervious area.
- The second biofiltration swale is located on the west side of Palo Comado Canyon Road, just south of the intersection of Dorothy Drive. The bioswale is approximately 495 ft long and 4 ft wide, is outside of the Caltrans right-of-way, and is to be owned and maintained by the City of Agoura. The water quality flow rate is 0.13 cfs. The bioswale will be treating 0.74 acres of total area which consists of 0.60 acres of impervious area and 0.14 acres of pervious area.
- Total Net Increase in Impervious Area for the proposed project = 1.33 acres

  Total Net Increase in Impervious Area within Caltrans right-of-way = 0.57 acres

  Total Net Increase in Impervious Area outside of Caltrans right-of-way = 0.76 acres
- Cost for Treatment BMPs has been estimated using the US 101 Stormwater Quality management Study cost estimates as a baseline for the two additional proposed biofiltration swale facilities. The proposed bioswales #259B per the corridor study has a total construction cost of $230,919.87 and with 1.9 acres of treatment the total construction cost of $119,030.86 per acre of treated area. Thus we have an approximate unit cost for the biofiltration swales to apply to the other two proposed facilities. Below are the costs for each facility based on the Corridor Cost Estimate.
- City Bioswale – 0.74 acres of treatment x $96,440 ≈ $71,366
- Caltrans Bioswale – 1.03 acres of treatment x $96,440 ≈ $99,333
- The Corridor Study biofiltration treatment BMP's costs and project proposed BMP's are summarized in the table below.

Site ID	Post Mile	Selected BMP	Treatment BMP Construction Cost	Drainage System Retrofit Construction Cost	Total Construction Cost	Cost per Acre Treated
257	33.5	Bioswale & Gross Solids Removal Device	$183,704	$0	$183,704	$149,353
261	33.7	Biostrip	$29,120	$35,295	$64,415	$64,415
262	33.8	Biostrip	$23,573	$26,520	$50,093	$161,591
263	34.2	Biostrip	$81,900	$68,510	$150,410	$78,749
259A	33.9	Biostrip	$43,853	$18,785	$62,638	$60,229
259B	33.8	Bioswale & Gross Solids Removal Device	$183,236	$47,684	$230,920	$344,657
City		Bioswale	$71,366	$0	$71,366	$96,440
Caltrans		Bioswale	$99,333	$0	$99,333	$96,440
Totals			$716,085	$196,794	$912,879	

- The total amount of funding allocated towards biofiltration treatment BMP's (and Gross Solids Removal Devices) to be considered for the project is approximately $913,000.

Dry Weather Diversion, Checklist T-1, Parts 1 and 3

- Dry Weather Flow Diversions are not feasible and not recommended by the Route 101 Corridor Study.

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

- Infiltration devices are not feasible and not recommended by the Route 101 Corridor Study.

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

Detention devices are not feasible and not recommended by the Route 101 Corridor Study.

Gross Solids Removal Devices (GSRDs), Checklist T-1, Parts 1 and 6

- The Corridor Study refers to GSRD facilities that are also designed as biofiltration swales, 257 and 259B. The GSRD's are identified above in the biofiltration BMP section and costs associated with these facilities are included above, funds are allocated for these facilities within the project.

Traction Sand Traps, Checklist T-1, Parts 1 and 7

- Traction sand traps are not feasible and not recommended by the Route 101 Corridor Study.

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

- The corridor study proposes three Media Filter BMP facilities; 251, 254 and 260. Further design will be required to implement these facilities during the PS&E phase of the propose project. Funds have been allocated to constructing these facilities with the proposed project.
- The corridor study has found that the Austin Sand Filter type of media filter was the best fit for the corridor due to the lower costs and similar treatment efficiencies compared with the Delaware Sand filters. Below is a summary of the media filter BMP facilities that will continue to be considered for implementation with the proposed project throughout the PS&E phase of the project.

Site ID	Post Mile	Available Area (sq ft)	General Location	Paved Drainage Area (acre)	WQV (cubic feet)	Selected BMP
251	33.4	3000	Shoulder of S/B US-101	1.7	4665	Media Filter (Austin Sand Filter)
254	33	3000	Shoulder of N/B US-101	1.2	3321	Media Filter (Austin Sand Filter)
260	33.8	4000	Shoulder of S/B US-101	1.1	3076	Media Filter (Austin Sand Filter)
Total		10000		4	11062	

- The allocated funds for the proposed media filter facilities are approximately $ 768,000 and are summarized below based on the Corridor Study data.

Site ID	Post Mile	Selected BMP	Treatment BMP Construction Cost	Drainage System Retrofit Construction Cost	Total Construction Cost	Cost per Acre Treated
251	33.4	Media Filter (Austin Sand Filter)	$199,186	$90,428	$289,614	$169,365
254	33	Media Filter (Austin Sand Filter)	$199,186	$38,259	$237,445	$194,627
260	33.8	Media Filter (Austin Sand Filter)	$199,186	$42,172	$241,358	$213,592
Totals			$597,558	$170,859	$768,417	

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

MCTTs are not feasible and not recommended by the Route 101 Corridor Study.

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

- Wet basins are not feasible and not recommended by the Route 101 Corridor Study.

Costs

- The total cost of treatment BMP's to be considered for the project is approximately $1,680,000.

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

- Temporary construction site BMPs will be deployed under a contractor prepared SWPPP. Temporary concrete washouts, stabilized construction entrances/exits, Fiber rolls, Temporary Silt Fence, gravel bag berms, temporary check dams, temporary storm drain inlet protections, and temporary erosion controls (BFM) are proposed on to reduce erosion and transportation of sediments. These items are included as line bid items below. Additional items may be identified during the PS&E phase.
- Dewatering will not be required for this project.
- It is not anticipated that Active Treatment Systems (ATS) will be used on-site.
- The amount of disturbed soil area anticipated for the project is 4.37 acres. All of the project area will consist of slopes that are 4:1 or flatter.
- The project lies within Rainfall Area 4. The combination of soil stabilization, sediment barriers, and other construction site BMP's will be used per the latest/current stormwater pollution prevention plan (SWPPP) preparation manual.
- The construction site has been determined as Level 2 Risk. Monitoring locations and activities will be determined for the SWPPP preparation during the PS&E phase of the project.
- Monitoring and sampling to be per the SWPPP manual.
- To protect existing vegetation and reduce erosion on the construction site, staging areas will be designated for construction vehicles, construction processes, material delivery, and material storage for each phase of construction. Locations will be chosen near the interchange based on access to the construction site and available area.
- Construction Entrance will be used to reduce tracking of dirt onto roadways. Concrete Washout will also be used to avoid cement flowing to the drainage systems. Locations of these Temporary BMPs are subject to the contractor's phasing of work and timing of operations. The Contractor is ultimately responsible for developing a SWPPP that complies with the permit.

- Construction Site BMPS that have been designated as separate Bid Line Items are:

    - 074029, SC-1, Temporary Silt Fence
    - 074031A, SC-6 , Temporary Gravel Bag Berm
    - 074028, SC-5, Fiber Rolls
    - 074035, SC-4, Temporary Check Dam
    - 074033, TC-1, Temporary Stabilized Construction Entrance
    - 074032, WM-8, Concrete Washout (Facility)
    - 074038, SC-10,Temporary Storm Drain Inlet Protection
    - 074041, SC-7, Street Sweeping/ Vacuuming
    - 203019, SS-3, Temporary Erosion Control (BFM)
    - 194001, SS-9, Earth Dikes/Drainage Swales & Lined Ditches

  - 074019, Prepare Storm Water Pollution Prevention Plan
  - 074016, Construction Site Management
  - 074056, Rain Event Action Plan
  - 074057, Storm Water Annual Report
  - 066597, Storm Water Sampling and Analysis
  - 074058, Storm Water Sampling and Analysis Day
  - 066596, Additional Water Pollution Control
  - 066595, Water Pollution Control Maintenance Sharing

- Construction Site BMPS that have been incorporated as a lump sum in the Construction Site Management Item are:
  - Material Delivery and Storage
  - Material Use
  - Stockpile Management
  - Spill Prevention and Control
  - Solid Waste Management
  - Hazardous Waste Management
  - Concrete Waste Management
  - Sanitary/ Septic Waste Management
  - Water Conservation Practices
  - Paving and Grinding Operations
  - Illicit Connection/Illegal Discharge Detection and Reporting
  - Vehicle and Equipment Cleaning
  - Vehicle and Equipment Fueling
  - Vehicle and Equipment Maintenance
  - Concrete Curing
  - Concrete Finishing
  - Scheduling
  - Preservation of Existing Vegetation
  - Contaminated Soil Management

- Total cost for Construction Site BMP's is $566,363
- Cost for Construction Site BMPs have been estimated have been calculated based on the proposed projects disturbances, duration of construction, site conditions and historical construction costs from the PPDG Appendix F.
- On January 10, 2011, Aythem Al-Saleh, District Construction Stormwater Coordinator agreed to the construction site BMP strategy used for the scope of work of this project.

7. Maintenance BMPs (Drain Inlet Stenciling)

Drain Inlet Stenciling will be required on all drain inlets within the City right of way. Specific stencil types and names of contacts that recommended stencil types or locations will be included in the project plans and specifications.

Required Attachments

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

Supplemental Attachments

- 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)
- Pertinent Correspondence with RWQCB (if requested or recommended by District/Regional NPDES Storm Water Coordinator or Designated Reviewer)
- 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)
- Checklists T-1, Parts 1–10 (Treatment BMPs)
- Calculations and cross sections related to BMPs (if requested by District/Regional Design Storm Water Coordinator)
- Conceptual Drainage Map or Drainage Plans, if available (if requested by District/Regional Design Storm Water Coordinator for review)

DATE: 04/13/2012

Project ID (or EA): 257200

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**. *Los Angeles County* 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. ***0.57 ac*** *(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

Checklist SW-1, Site Data Sources

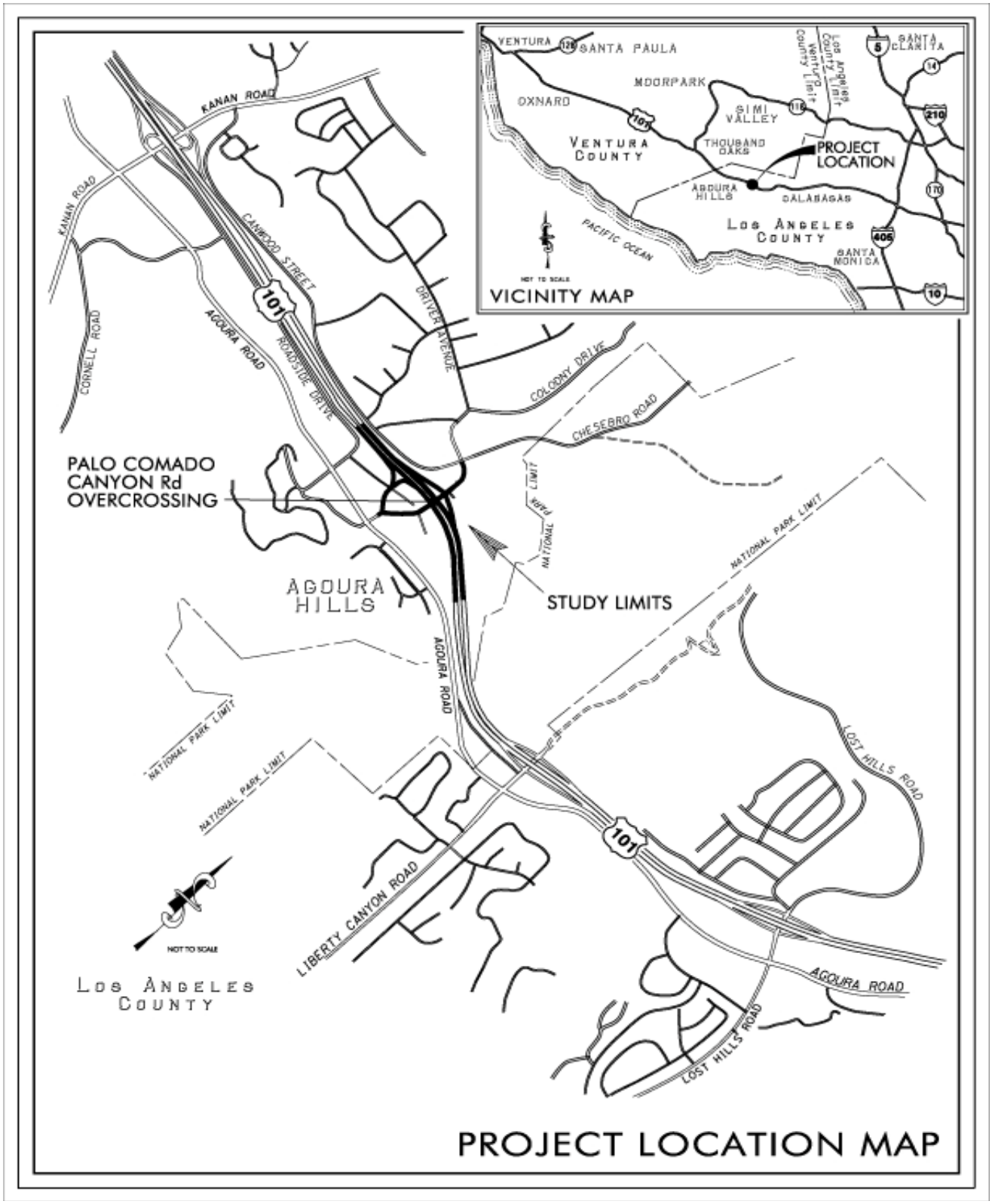
Prepared by: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

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 Quadrangle Maps	Varies
• Aerial Topographic mapping – Chris Nelson Surveys	August 2009
•	
Hydraulic	
• Palo Comado Canyon Road 101 Interchange PA/ED Plans	October 2010
•	
•	
Soils	
• http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm	June 2008
•	
•	
Climatic	
• http://www.itrc.org	November 2008
•	
•	
Water Quality	
• Caltrans Water Quality Planning Tool	November 2008
•	
•	
Other Data Categories	
• Heschel West School Draft EIR	March 2005
• Caltrans Project Planning & Design Guide (PPDG)	July 2010
• Route 101 Corridor Storm Water Management Study	January 2010

Figure 1: Project Vicinity Map

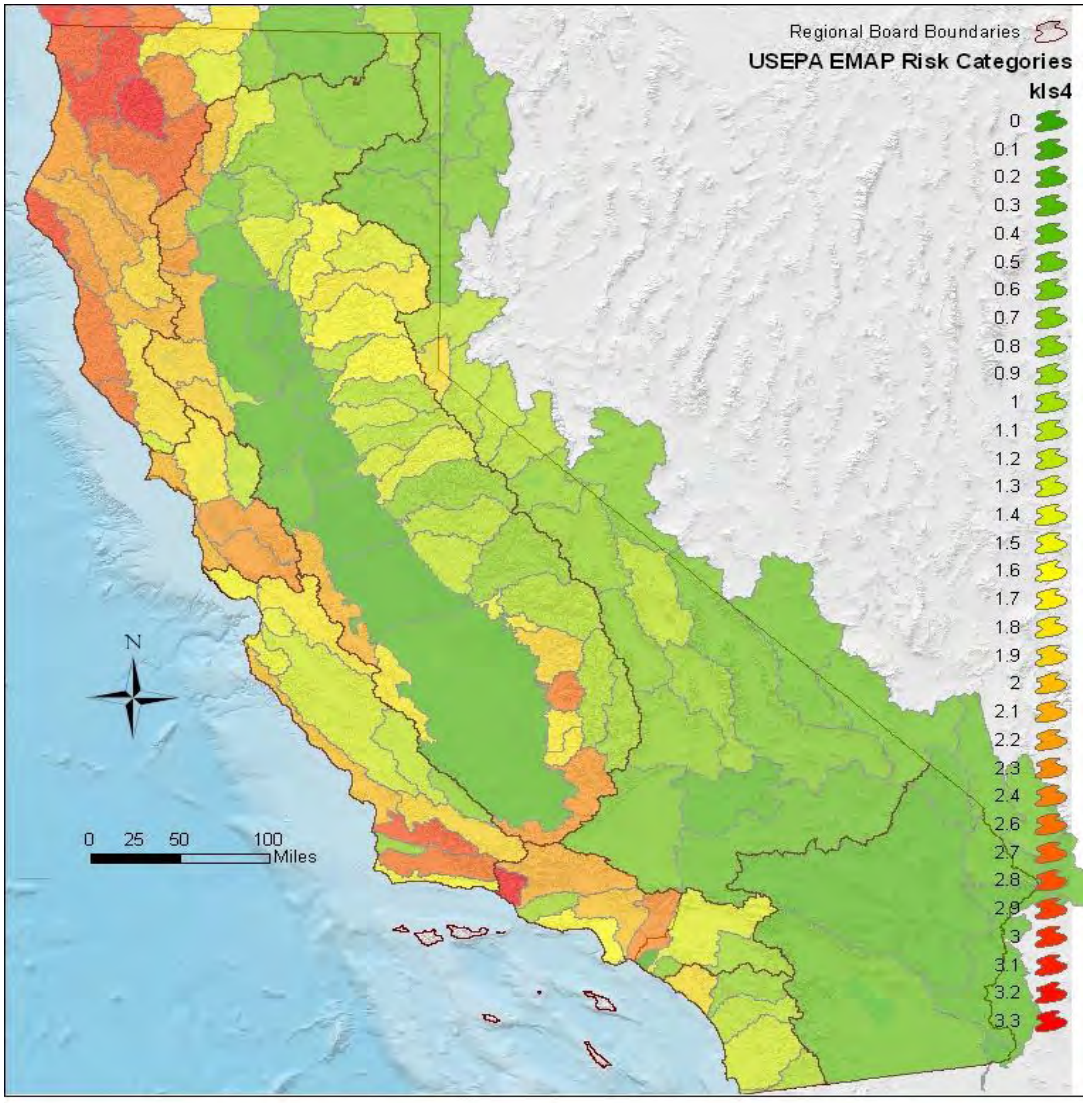


Dist-County-Route	07-LA-101
Post Mile Limits	33.0/34.4
Project EA	0700001840

	A	B	C	D
1	**Sediment Risk Factor Worksheet**		**Entry**	
2	**A) R Factor**			
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.			
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm			
5	**R Factor Value**		73.28	
6	**B) K Factor (weighted average, by area, for all site soils)**			
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.			
8	Site-specific K factor guidance			
9	**K Factor Value**		1.6	KxLS
10	**C) LS Factor (weighted average, by area, for all slopes)**			From Sed Map
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.			
12	LS Table			
13	**LS Factor Value**		1	
14				
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**		117.248	
16	**Site Sediment Risk Factor**		**High**	
17	Low Sediment Risk: < 15 tons/acre			
18	Medium Sediment Risk: >=15 and <75 tons/acre			
19	High Sediment Risk: >= 75 tons/acre			
20				

For the GIS Map Method, the R factor for the project is calculated using the online calculator at (see cell to right). The product of K and LS are shown on the figure below. To determine soil loss in tons per acre, multiply the R factor times the value for K times LS from the map.

http://cfpub.epa.gov/npdes/stormw



KxLs

1.6

Basic Information
eNOI
Municipal MS4s
Construction Activities
Industrial Activities
Road-Related MS4s
Menu of BMPs
Green Infrastructure
Urban BMP Tool

Stormwater Home

NPDES Topics Alphabetical Index Glossary About NPDES

Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: Palo Comado/US 101
Start Date: 02/01/2013
End Date: 12/31/2014
Latitude: 34.1432
Longitutde: -118.7380

Erosivity Index Calculator Results

AN EROSIVITY INDEX VALUE OF **73.28** HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **02/01/2013** - **12/31/2014**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do not qualify for a waiver from NPDES permitting requirements**.

Start Over

Stormwater Information
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FAQs
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Regulations
Training & Meetings
Links
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Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below: 2006 Approved Sediment-impared WBs Worksheet http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml	**No**	**Low**
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp		

Palo Comado Interchange Project falls within the Malibu Creek Watershed (See pg 5 of link below:)

Storm Water BMP Cost Summary

Project Name:	**US 101 Palo Comado Road Interchange Improvements**
District:	**7**
EA:	**257200**
County:	**LA**
Route:	**101**
Postmile:	**33**
End Postmile:	**34.4**

Total Treatment BMP Costs	$ 1,681,296
Total Design Pollution Prevention BMP Costs	$ 120,000
Total Permanent Storm Water BMP Costs	$ 1,801,296

Subtotal Soil Stabilization BMPs	$ 88,000
Subtotal Sediment Control BMPs	$ 237,850
Subtotal Wind Erosion Control BMPs	$ -
Subtotal Tracking Control BMPs	$ 40,000
Subtotal Waste Management & Materials Handling BMPs	$ 9,000
Subtotal Non-Storm Water Management	$ 100,000
Subtotal Miscellaneous Items	$ 91,513
Total Construction Site BMP Costs	$ 566,363

TOTAL COST FOR STORM WATER BMPs	$ 2,367,658

Note: Please enter data in the fields shaded on this and the following pages. The totals will be reflected on this sheet automatically.

9000
40000
2000

Storm Water BMP Cost Summary

Treatment BMPs

BMP ID	Pollution Prevention BMPs PPDG Appendix A	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost ($)
251	LA			1	LS	$289,614	$ 289,614
254	Media Filter (Austin sand Filter)			1	LS	$237,445	$ 237,445
257	Bioswale/Gross Solid Removal Device			1	LS	$183,704	$ 183,704
260	Media Filter (Austin sand Filter)			1	LS	$241,358	$ 241,358
261	Biostrip			1	LS	$64,415	$ 64,415
262	Biostrip			1	LS	$50,093	$ 50,093
263	Biostrip			1	LS	$150,410	$ 150,410
259A	Biostrip			1	LS	$62,638	$ 62,638
259B	Bioswale/Gross Solid Removal Device			1	LS	$230,920	$ 230,920
Caltrans	Bioswale			1	LS	$71,366	$ 71,366
City	Bioswale			1	LS	$99,333	$ 99,333
							$ -
						Total Treatment BMP Costs	$ 1,681,296

Design Pollution Prevention BMPs

BEES	Pollution Prevention BMPs PPDG Appendix A	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost ($)
	Downstream Effects/Increased Flow Mitigation				LS		$ -
	Slope/Surface Protection Systems-Hard Surfaces						
	- Slope Paving				ft^2		$ -
721008	- Rock Slope Protection			1	LS	$15,000	$ 15,000
	Slope/Surface Protection Systems-Vegetated Surfaces						
200001	- Landscape Planting			1	LS	$60,000	$ 60,000
208000	Irigation System			1	LS	$30,000	$ 30,000
	- Erosion Control [Erosion Control (Type D), Erosion Control Blanket, etc.]				ft^2		$ -
	Concentrated Flow Conveyance Systems						
206401	Maintain Existing Irrigation Facilities			1	LS	$10,000	$ 10,000
204096	- Preservation of Existing Vegetation			1	LS	$50,000	$ 5,000
						Total Design Pollution Prevention BMP Costs	$ 120,000

Total Permanent Storm Water BMP Costs	**$ 1,801,296**

Storm Water BMP Cost Summary

Temporary Construction Site BMPs

ID	BEES	Temporary BMPs - PPDG Appendix C	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost ($)
	LA	***Temporary Soil Stabilization***						
SS-1	074037	Move-In/Move-out (Temporary Erosion Control)	07-485	No	10	EA	800	$ 8,000
SS-1		Scheduling		No	1	LS	20,000	$ 20,000
SS-2		Preservation of Exist Vegetation		No		LS		$ -
SS-2	071325	Temporary Fence (Type ESA)	07-446	Yes		ft		$ -
SS-2		Environmentally Sensitive Area	S5-760	No		LS		$ -
SS-2		Preservation of Property	07-450	No		LS		$ -
SS-3	074039	Hydraulic Mulch	07-350	No		ft^2		$ -
SS-3	074039	Temp. Hydraulic Mulch (Bonded Fiber Matrix)	07-381	No	120000	ft^2	1	$ 60,000
SS-3	074040	Temp. Hydraulic Mulch (Polymer Stabilized Fiber Matrix)	07-382	No		ft^2		$ -
SS-4	074023	Temporary Erosion Control (Hydroseeding)	07-350	No		ft^2		$ -
SS-5	074025	Soil Binders		No		ft^2		$ -
SS-5	074040	Bonded Fiber Matrix	07-XYZ	No		ft^2		$ -
SS-6		Straw Mulch	07-350	No		ft^2		$ -
						ft^2		$ -
SS-7	074034	Plastic Covers	07-395	Yes		ft^2		$ -
SS-7	074027	Erosion Control Blankets/Mats	07-390	Yes		ft^2		$ -
SS-8		Wood Mulching		No		ft^2		$ -
SS-8	074026	Temporary Mulch	07-380	No		ft^2		$ -
		Earthwork w/edits for Trackwalking	19-010	No		ft^2		$ -
		Temporary Concentrated Flow Conveyance Controls						
SS-9		Earth Dikes/Drainage Swales & Lined Ditches		No		ft		$ -
SS-10		Outlet Protection/Velocity Dissipation Devices				EA		$ -
SS-10		Flared Culvert End Sections	70-1.02C			EA		
SS-11		Slope Drains		No		ft		$ -
SS-11		Overside Drains	69-010, 020, 030, 100, 500			ft		$ -
SS-12		Streambank Stabilization				ft		$ -
						Subtotal Soil Stabilization BMPs		**$ 88,000**

Storm Water BMP Cost Summary

ID	BEES	*Temporary Sediment Control*	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost
SC-1	074029	Silt Fence	07-430	Yes	20000	ft	$3	$ 50,000
SC-2		Sediment/Desilting Basin		No		EA		$ -
SC-2		Temporary Sediment Basin	07-436	Yes		EA		$ -
SC-3		Sediment Trap		No		EA		$ -
SC-4		Check Dam				EA		$ -
SC-4	074035	Temporary Check Dams	07-415	Yes	9000	ft	$6	$ 54,000
SC-5	074028	Fiber Rolls	07-420	Yes	40000	ft	$2	$ 88,000
SC-6	074031	Gravel Bag Berm	07-470	No	2000	ft	$10	$ 20,000
SC-7	074041	Street Sweeping and Vacuuming	07-360	No	1	LS	$20,000	$ 20,000
SC-8		Sandbag Barrier		No		ft		$ -
SC-9	074030	Straw Bale Barrier	07-460	Yes		ft		$ -
SC-10	074038	Storm Drain Inlet Protection	07-490	Yes	30	EA	$195	$ 5,850
	070069	DI Marker and Install DI Marker		Yes		EA		$ -
	700617	Drainage Inlet Marker	07-015	Yes		EA		$ -
							Subtotal Sediment Control BMPs	**$ 237,850**

ID	BEES	*Temporary Wind Erosion Control*	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost
WE-1		Wind Erosion Control		No		LS		$ -
SS-5		Dust Palliative	18-010	No		ton		$ -
SS-7	074034	Plastic Covers	07-395	Yes		ft^2		$ -
							Subtotal Wind Erosion Control BMPs	**$ -**

ID	BEES	*Temporary Tracking Control*	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost
TC-1	074033	Stabilized Constr. Entrance/Exit	07-480	Yes	10	EA	4,000	$ 40,000
TC-2		Stabilized Construction Roadway	07-481	Yes		LS		$ -
TC-3		Entrance/Outlet Tire Wash		No		EA		$ -
							Subtotal Tracking Control BMPs	**$ 40,000**

ID	BEES	*Temporary Waste Management Control*	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost
WM-1	CSM*	Material Delivery and Storage	07-346	No		LS		$ -
WM-2	CSM*	Material Use	07-346	No		LS		$ -
WM-3	CSM*	Stockpile Management	07-346	No		LS		$ -
WM-4	CSM*	Spill Prevention and Control	07-346	No		LS		$ -
WM-5	CSM*	Solid Waste Management	07-346	No		LS		$ -
WM-6	CSM*	Hazardous Waste Management	07-346	No		LS		$ -
WM-7	CSM*	Contaminated Soil Management	07-346	No		LS		$ -
WM-8		Concrete Waste Management	07-346	No		LS		$ -
WM-8	074032	Temporary Concrete Washout	07-405	Yes	6	EA	1,500	$ 9,000
WM-8	074042	Temp Conc Washout (Portable)	07-406	No		LS		$ -
		Grinding PCC (Displ of PCC Pavemt Grooving & Grinding Residues)	42-600	No		LS		$ -
WM-9	CSM*	Sanitary/Septic Waste Managemt	07-346	No		LS		$ -
WM-10	CSM*	Liquid Waste Management	07-346	No		LS		$ -
							Subtotal Waste Management & Materials Handling BMPs	$ 9,000

Storm Water BMP Cost Summary

ID	BEES	*Temporary Non-Storm Water Management*	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost
NS-1	CSM*	Water Conservation Practices	07-346	No		LS		$ -
NS-2	CSM*	Dewatering Operations	07-341	No		LS		$ -
NS-3	CSM*	Paving & Grinding Operations				LS		$ -
		Pavements	S5-250	No		ft^2		$ -
NS-4		Temporary Stream Crossing	07-495	No		LS		$ -
NS-5		Clear Water Diversion		No		LS		$ -
NS-6	CSM*	Illicit Connection/Illegal Discharge Detection and Reporting	07-346	No		LS		$ -
NS-7	CSM*	Potable Water/Irrigation	07-346	No		LS		$ -
NS-8	CSM*	Vehicle and Equipment Cleaning	07-346	No		LS		$ -
NS-9	CSM*	Vehicle and Equipment Fueling	07-346	No		LS		$ -
NS-10	CSM*	Vehicle and Equipmt Maintenance	07-346	No		LS		$ -
NS-11	CSM*	Pile Driving Operations	07-346	No		LS		$ -
NS-12	CSM*	Concrete Curing	07-346	No		LS		$ -
NS-13	CSM*	Material & Equipmt use over water	07-346	No		LS		$ -
NS-14	CSM*	Concrete Finishing	07-346	No		LS		$ -
NS-15	CSM*	Structure Demolition/Removal Over or Adjacent to Water	07-346	No		LS		$ -
NS-16		Temporary Batch Plants				LS		$ -
NS-17		Streambank Stabilization				LS		$ -
	CSM*	***Construction Site Management**	07-346	No	1	LS	100,000	$ 100,000
						Subtotal Non-Storm Water Management		$ 100,000

ID	BEES	*Miscellaneous Items*	SSP/nSSP (#, Y or N)	STD. Det. (Y or N)	Quantity	Unit	Unit Cost ($/Unit)	Cost
	074017	Prepare Water Pollution Control Program	07-340	No		LS		$ -
	074019	Prepare Storm Water Pollution Prevention Plan	07-345	No	1	LS	15,533	$ 15,533
	074020	Water Pollution Control				LS		$ -
	066596	Additional Water Pollution Control			1	LS	6,000	$ 6,000
	066595	Water Pollution Control Maintenance Sharing			1	LS	36,263	$ 36,263
	066597	Storm Water Sampling and Analysis		No	1	LS	6,000	$ 6,000
	74056	Rain Event Action Plan		No	1	LS	22,500	$ 22,500
	74057	Storm Water Annual Report			2	EA	2,000	$ 4,000
		Payments (< 1 acre)	S5-250			LS		$ -
		Rock Blanket	20-080			LS		$ -
		Slope Protection	72-010			LS		$ -
		Slope Paving	72-200			LS		$ -
		Temporary Sand Bag Barrier				LS		$ -
		Temporary Sediment Basin				LS		$ -
	074058	Storm Water Sampling and Analysis Day			1	LS	1,217	$ 1,217
		Temporary Creek Diversion System				LS		$ -
		Relations w/RWQCB	S5-630			LS		$ -
		Order of Work	05-020			LS		$ -
						Subtotal Miscellaneous Items		**$ 91,513**

Total Construction Site BMP Costs	**$ 566,363**

Rain Event Action Plan Estimate Worksheet

Project Location
Latitude: 34.1432
Longitutde: -118.7380

Station Name Used From (http://cdo.ncdc.noaa.gov/climatenormals/clim20/state-pdf/ca.pdf).
Canoga Park Pierce College, CA

Yearly Average Number of Days producing 0.1 inches of rain or more.
23.4

Number of Days of Construction
698

Number of Years
1.9123288
0 24 3

Number of Rain days during construction requiring a REAP.
44.748493
45 Round up

Budgeted Rain Event Action Plan ($500 per REAP)
$22,500.00

Storm Water Annual Report

Number of years of Construction

2

$2000 per yearly report

Total Cost of Storm Water Annual Report

$4,000.00

Cost Estimate for Stormwater Sampling and Analysis

Stormwater Sampling and Analysis (BEES Item 066597)

The Supplemental Work item for Stormwater Sampling and Analysis covers the cost of lab tests for water quality samples. Estimate this item using the same rate as for Prepare SWPPP less RQM.

Rate for Prepare SWPPP = Storm Water Sampling and Analysis

$6,000

Additional Water Pollution Control

Bees (66596)

Additional Water Pollution Control (BEES Item: 066596)

The Supplemental Work item for Additional Water Pollution Control will cover additional WPC BMPs suggested by the RE or Contractor. This change order work is expected to be minor for most projects. Estimate this item using the same rate as Prepare SWPPP, less RQM for SWPPP jobs. For WPCP jobs estimate at the same rate as Prepare WPCP.

Rate for Prepare SWPPP = Additional Water Pollution Control

$6,000

Cost Estimate for Pollution Control Maintenance Sharing

Water Pollution Control Maintenance Sharing (BEES Item: 066595)

The Supplemental Work item for Water Pollution Control Maintenance Sharing still exists but has been shifted to the individual separate item BMPs that allow for cost sharing. Water Pollution Control Maintenance Sharing cost should be no lower than the amount estimated for Prepare SWPPP (or Prepare WPCP). The following may be used to estimate BMP maintenance costs based upon input from Districts where this approach was piloted. The aggregate total of estimated maintenance costs would be combined into item WPC Maintenance Sharing:

- Temporary Silt Fence, estimate at 10% of the separate item cost per rainy season.
- Temporary Fiber Roll, estimate at 10% of the separate item cost per rainy season.
- Temporary Erosion Control and other hydraulically applied soil stabilization BMPs, estimate at 10% of the separate item cost per rainy season.
- Temporary Gravel Bag Berm, estimate at 25% of the item cost per rainy season.
- Temporary Drainage Inlet Protection, estimate at 25% of the item cost per rainy season.
- Temporary Construction Entrance, estimate at 25% of the item cost per rainy season.

	0	24	3
BMP	Estimated Cost	Percentage Allocated to Maintenance Sharing	Cost Allocated to Maintenance Sharing
Temporary Silt Fence	$50,000.00	10.00%	$5,000.00
Temporary Fiber Roll	$88,000.00	10.00%	$8,800.00
Temporary Erosion Control (BFM)	$60,000.00	10.00%	$6,000.00
Temporary Gravel Bag Berm	$20,000.00	25.00%	$5,000.00
Temporary Drainage Inlet Protection	$5,850.00	25.00%	$1,462.50
Temporary Construction Entrance	$40,000.00	25.00%	$10,000.00
Total Cost for Pollution Control Maintenance Sharing			**$36,262.50**

Storm Water Sampling and Analysis Day (BEES Item: 074058)

Storm Water Sampling and Analysis (monitoring) costs have become more discernable due to new requirements of the CGP; consequently, the cost is to be associated with a unit price in the PS&E. Monitoring costs for compliance with the CGP can be estimated using the procedures and equations described below. Be sure to use only those procedures applicable to the RL of the project and the associated representative number of rain days. This contract item is non-adjustable.

The estimating procedure outlined below accounts for sampling and analysis costs based primarily on the precipitation characteristics, discharge locations, and construction duration of the project. The sections below outline the types of sampling and analysis required for different RL 2 and RL 3 projects and how to develop associated cost estimates.

Storm Water Monitoring for pH and Turbidity: Sampling and analysis of storm water runoff for pH and turbidity is required at all RL 2 and RL 3 projects. At a minimum, 3 samples must be collected per day of qualifying storm events, which are those producing precipitation of 0.5-inch or more at the time of discharge.

The cost of storm water monitoring (SWM) is a function of the precipitation frequency, construction duration, and the number of sampling locations for the project, as well as the cost per sample. The SWM cost can be estimated using Equation 2 as follows:

$$SWM\ Cost = M \times \{[Days_{0.5"} \times \$1000] + \$2000\ (1 + 0.1\ (Months/12))\} \qquad \textit{(Eqn. 2)}$$

where:

M = cost multiplier based on the number of anticipated discharge sampling points. When M = 1, the cost estimate assumes that up to 7 locations can be sampled by one fully equipped staff per event. Sites with 8 to 14 sampling locations assumes that one additional staff-day will be required, thus M=2. For sites with 15 – 21 sampling locations M=3, and so forth.

$Days_{0.5"}$ = estimated number of days over project timeline with precipitation event greater than 0.5 inches. However, it is recommended that the difference between the mean number of days for both precipitation events greater than 0.5 inches and 0.1 inches be used. Use climate data from a nearby representative station identified in the Water Quality Planning Tool or published by the National Climatic Data Center of the National Oceanic Atmospheric Association at: (http://cdo.ncdc.noaa.gov/climatenormals/clim20/state-pdf/ca.pdf).

months = the number of months the project will be occurring, including from initial site work through the construction until the site is completely stabilized after construction.

$1000 = daily cost to perform sampling and analysis, as well as reporting, using one staff at up to 7 discharge locations, excluding equipment.

$2000 = purchase cost for field turbidimeter, pH meter, calibration solutions, rain gauge, and all ancillary sampling equipment. A maintenance and calibration estimate of 10% per year is included in the equation.

The cost of storm water sampling and analysis per day can be estimated using Equation 3 as follows:

$$Storm\ Water\ Sampling\ and\ Analysis\ Day = SWM\ Cost / Days_{0.5"} \qquad \textit{(Eqn. 3)}$$

M	1
Months	23
Days0.5	11
SWM cost	13383.33

Storm Water Sampling and Day Analysis
SWSaAD 1216.667

Cost Estimate for Preparing Storm Water Pollution Prevention Plan

Based on PPDG Appendix F Table F-6

Table F-6. Construction Site Water Pollution Control		
a) Total Construction Cost	Prepare SWPPP	Prepare WPCP
$0 to $500,000	$2,200 + RQM	$1,000
$500,000 to $1,000,000	$2,700 + RQM	$1,100
$1,000,000 to $1,500,000	$2,800 + RQM	$1,100
$1,500,000 to $12,000,000	$3,200 + RQM	$1,200
Greater than $12,000,000	$6,000 + RQM	-

Note: Information derived from 2009 average bid costs using Caltrans Cost Database with an additional mark-up to account for qualified developers of the SWPPP.

Project Cost is greater than $12,000,000 $6000+RQM

RQM	Months	N	Labor Rate
$9,533.33	23	7	$100.00

Total Cost for SWPPP Preperation

$15,533.33

Routine Quarterly Non-Storm Water Monitoring (RL 1, 2, and 3): All projects required to develop a SWPPP regardless of the RL are to conduct quarterly, non-storm water monitoring and storm-triggered visual monitoring. To develop cost estimates for routine, quarterly, non-storm water monitoring, equation 1 (Eqn. 1) below should be used. The costs for storm-triggered visual monitoring is assumed to already be included in the costs for preparing a SWPPP, as this was already a Caltrans requirement prior to the development of the new CGP.

The cost of routine, quarterly monitoring (RQM) for non-storm water discharges is a function of the project duration, the drainage area, and the cost per inspection, and can be estimated using Equation 1 as follows:

RQM Cost = (months/3 + 1) x (N + 4) x Labor *(Eqn. 1)*

where:

Months = the number of months the project will be occurring, including from initial site work through the construction until soil is completely stabilized after construction. This is used to estimate the number of required quarterly inspections.

N = calculated number of discharge locations. It is assumed that each discharge area can be reviewed within 1 hour. An additional 4 hours is provided to account for the time required to complete reporting and follow-up.

Labor = estimated hourly labor rate for a qualified inspector. Assume $100 per hour is appropriate.

Storm Water Sampling and Analysis Day (BEES Item: 074058)

Storm Water Sampling and Analysis (monitoring) costs have become more discernable due to new requirements of the CGP; consequently, the cost is to be associated with a unit price in the PS&E. Monitoring costs for compliance with the CGP can be estimated using the procedures and equations described below. Be sure to use only those procedures applicable to the RL of the project and the associated representative number of rain days. This contract item is non-adjustable.

The estimating procedure outlined below accounts for sampling and analysis costs based primarily on the precipitation characteristics, discharge locations, and construction duration of the project. The sections below outline the types of sampling and analysis required for different RL 2 and RL 3 projects and how to develop associated cost estimates.

Storm Water Monitoring for pH and Turbidity: Sampling and analysis of storm water runoff for pH and turbidity is required at all RL 2 and RL 3 projects. At a minimum, 3 samples must be collected per day of qualifying storm events, which are those producing precipitation of 0.5-inch or more at the time of discharge.

The cost of storm water monitoring (SWM) is a function of the precipitation frequency, construction duration, and the number of sampling locations for the project, as well as the cost per sample. The SWM cost can be estimated using Equation 2 as follows:

$$SWM\ Cost = M \times \{[Days_{0.5"} \times \$1000] + \$2000\ (1 + 0.1\ (Months/12))\} \qquad \textit{(Eqn. 2)}$$

where:

M = cost multiplier based on the number of anticipated discharge sampling points. When M = 1, the cost estimate assumes that up to 7 locations can be sampled by one fully equipped staff per event. Sites with 8 to 14 sampling locations assumes that one additional staff-day will be required, thus M=2. For sites with 15 – 21 sampling locations M=3, and so forth.

$Days_{0.5"}$ = estimated number of days over project timeline with precipitation event greater than 0.5 inches. However, it is recommended that the difference between the mean number of days for both precipitation events greater than 0.5 inches and 0.1 inches be used. Use climate data from a nearby representative station identified in the Water Quality Planning Tool or published by the National Climatic Data Center of the National Oceanic Atmospheric Association at: (http://cdo.ncdc.noaa.gov/climatenormals/clim20/state-pdf/ca.pdf).

months = the number of months the project will be occurring, including from initial site work through the construction until the site is completely stabilized after construction.

$1000 = daily cost to perform sampling and analysis, as well as reporting, using one staff at up to 7 discharge locations, excluding equipment.

$2000 = purchase cost for field turbidimeter, pH meter, calibration solutions, rain gauge, and all ancillary sampling equipment. A maintenance and calibration estimate of 10% per year is included in the equation.

The cost of storm water sampling and analysis per day can be estimated using Equation 3 as follows:

$$Storm\ Water\ Sampling\ and\ Analysis\ Day = SWM\ Cost / Days_{0.5"} \qquad \textit{(Eqn. 3)}$$

M	1
Months	23
Days0.5	11
SWM cost	13383.33

Storm Water Sampling and Day Analysis
SWSaAD 1216.667

Cost Estimate for Preparing Storm Water Pollution Prevention Plan

Based on PPDG Appendix F Table F-6

Table F-6. Construction Site Water Pollution Control		
a) Total Construction Cost	Prepare SWPPP	Prepare WPCP
$0 to $500,000	$2,200 + RQM	$1,000
$500,000 to $1,000,000	$2,700 + RQM	$1,100
$1,000,000 to $1,500,000	$2,800 + RQM	$1,100
$1,500,000 to $12,000,000	$3,200 + RQM	$1,200
Greater than $12,000,000	$6,000 + RQM	-

Note: Information derived from 2009 average bid costs using Caltrans Cost Database with an additional mark-up to account for qualified developers of the SWPPP.

Project Cost is greater than $12,000,000 $6000+RQM

RQM	Months	N	Labor Rate
$9,533.33	23	7	$100.00

Total Cost for SWPPP Preperation

$15,533.33

Routine Quarterly Non-Storm Water Monitoring (RL 1, 2, and 3): All projects required to develop a SWPPP regardless of the RL are to conduct quarterly, non-storm water monitoring and storm-triggered visual monitoring. To develop cost estimates for routine, quarterly, non-storm water monitoring, equation 1 (Eqn. 1) below should be used. The costs for storm-triggered visual monitoring is assumed to already be included in the costs for preparing a SWPPP, as this was already a Caltrans requirement prior to the development of the new CGP.

The cost of routine, quarterly monitoring (RQM) for non-storm water discharges is a function of the project duration, the drainage area, and the cost per inspection, and can be estimated using Equation 1 as follows:

RQM Cost = (months/3 + 1) x (N + 4) x Labor *(Eqn. 1)*

where:

Months = the number of months the project will be occurring, including from initial site work through the construction until soil is completely stabilized after construction. This is used to estimate the number of required quarterly inspections.

N = calculated number of discharge locations. It is assumed that each discharge area can be reviewed within 1 hour. An additional 4 hours is provided to account for the time required to complete reporting and follow-up.

Labor = estimated hourly labor rate for a qualified inspector. Assume $100 per hour is appropriate.

Table 6-5: Potential BMPS along US-101 (Final Screening)

Site ID	Post Mile	Available Area (sq ft)	General Location	Paved Drainage Area (acre)	WQV (cubic feet)	Is Area & Inf Rate Adequate to Accommodate the WQV Using the Infiltration Device?	Is There Adequate Area & Hydraulic Head for Media Filters?	Is There Adequate Area for Bioswales?	Is There Adequate Area & Hyradulic Head for GSRDs?	Selected BMP	Drainage Modifications Necessary to Connnect to the Existing System	Treatment BMP Construction Cost*	Drainage System Retrofit Construction Cost**	Total Constrcution Cost	Cost per Acre Treated
251	33.4	3000	Shoulder of S/B US-101	1.7	4665	N	Y	N	N	MF (AVSF S-5000-3)	193'x18" AP, 126'x24" AP, 1 JS, 2 DI, Remove Existing Catch Basin	$199,186	$90,428	$289,614	$169,365
254	33	3000	Shoulder of N/B US-101	1.2	4669	N	Y	N	N	MF (AVSF S-5000-3)	22'x18" AP, 29'x24" AP, 1 JS, 2 DI, Remove 116 Existing Pipe, Remove Existing Catch Basin	$199,186	$38,259	$237,445	$194,627
257	33.5	2000	Shoulder of S/B US-101	1.2	6240	N	Y	N	N	BSW/GSRD	minor modifications	$183,704	$0	$183,704	$149,353
260	33.8	4000	Shoulder of S/B US-101	1.1	4204	N	Y	N	N	MF (AVSF S-5000-3)	83'x24" AP	$199,186	$42,172	$241,358	$213,592
261	33.7	7000	Inside Loop of S/B US-101 on-ramp from Palo Comado Canyon Rd	1	3335	N	N	Y	Y	BST	V-ditch	$29,120	$35,295	$64,415	$64,415
262	33.8	6000	Shoulder of S/B US-101 off-ramp to Palo Comado Canyon Rd	0.3	1285	N	Y	N	N	BST	1 DI	$23,573	$26,520	$50,093	$161,591
263	34.2	19000	Shoulder of N/B US-101	1.9	6251	N	N	Y	Y	BST	Remove 2 Existing DI	$81,900	$68,510	$150,410	$78,749
259A	33.9	11000	Shoulder of N/B US-101 on-ramp from Palo Comado Canyon Rd	1	4008	N	N	Y	Y	BST	V-ditch	$43,853	$18,785	$62,638	$60,229
259B	33.8	1000	Shoulder of N/B US-101 on-ramp from Palo Comado Canyon Rd	0.7	4936	N	N	Y	Y	BSW/GSRD	151'x18" AP, 14'x24" AP, 2 DI	$183,236	$47,684	$230,920	$344,657

PRELIMINARY, NOT FOR CONSTRUCTION, SUBJECT TO INDEPENDENT VERFICATION PRIOR TO FINAL DESIGN

MF No. 254 PARTIAL SEDIMENTATION VAULTED AUSTIN SAND FILTER S-5000-3	
L (FT)	57
W (FT)	27
D (FT)	3
WQV (CF)	4,669
P24 (IN)	0.75
CCOMP	0.97
HEAD (FT)	3.1
AVAIL H (FT)	4.0

07 LA,Ven 101 30.9/38.2, 0.0/1.8 49 176

B P Lee
REGISTERED CIVIL ENGINEER

2-1-88
DATE SIGNED

B. P. LEE No 33233 Exp 6/30/90

Not Constructed

288+90.34 BC ℄ Fwy

289+09.37 BC Ramp C-3

292+20.83 EC Ramp C-3

59' LI 293+72.71 ℄ Fwy = 293+65.59 End ℄ Ramp C-3

INSTALL DI
TG 837.5
Inv OUT 834.4

BMP 254
MF
Inv 830.0

29 LF-24" AP
Inv 829.0

BMP 254 AREA=1.1 AC

END CONC BARRIER (TYPE 50A)
BEGIN CONC BARRIER (TYPE 50A)

REMOVE AC DIKE
PLACE AC DIKE TYPE D

101 LF V-DITCH
Inv 832.0

22 LF-18" AP
INSTALL JS
RIM 837.5
Inv IN 834.1
Inv OUT 834.0

BMP 254
LANDSCAPE AREA=0.6 AC

59' RI 296+81.76 End ℄ Ramp C-4

291+12.64 PCC Ramp C-4

289+55.98 BC Ramp C-4

Ramp C-3

Ramp C-4

Liberty Canyon Rd

LINE

MATCH

LEGEND

AP	ALTERNATIVE PIPE
OSD	OVER-SIDE DRAIN
	DRAINAGE INLET
	MANHOLE OR JUNCTION STRUCTURE
	PROPOSED STORM DRAIN
	FLOW PATH
1	BMP ID
	POST 1994 ROAD WIDENING
	IMPERVIOUS DRAINAGE AREA
	LANDSCAPE BMP AREA
	PIPE TO BE REMOVED

AS BUILT PLANS
Contract No. 07-109054
Date Completed 4-14-89
Document No.

AS BUILT
CONTRACT NO. 109054
RESIDENT ENGR. G.C. Ethier
DATE 4-14-89

DRAINAGE PLAN
SCALE: 1" = 50'

US-101 BMP LAYOUT

NO SCALE

L-51

DATE | REVISED BY | DATE REVISED
CALCULATED BY
DESIGNED BY
CHECKED BY
PROJECT ENGINEER
B. P. LEE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

CU 07204

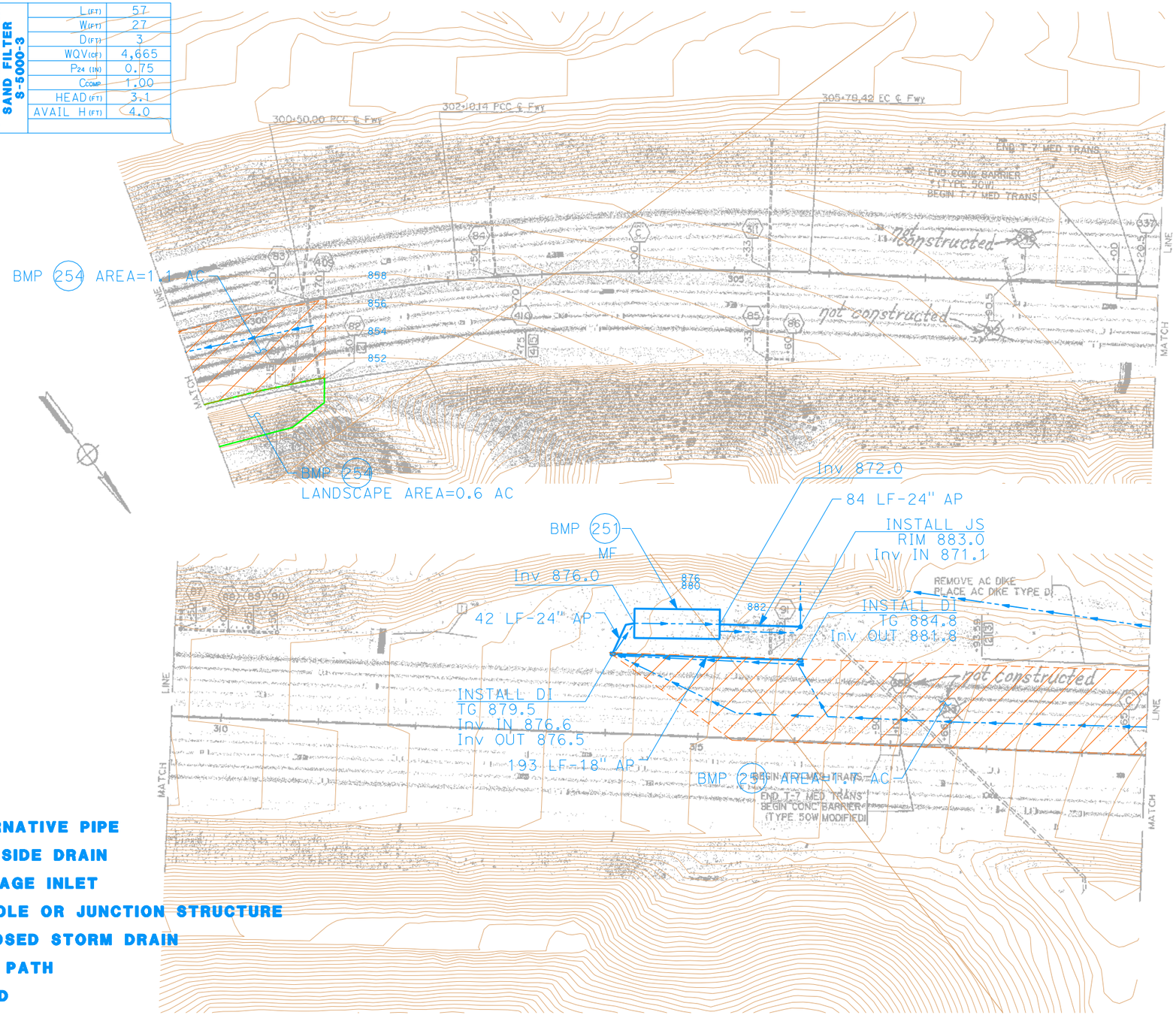
MF No. 251 PARTIAL SEDIMENTATION VAULTED AUSTIN SAND FILTER S-5000-3	
L(FT)	57
W(FT)	27
D(FT)	3
WQV(CF)	4,665
P24 (IN)	0.75
CCOMP	1.00
HEAD(FT)	3.1
AVAIL H(FT)	4.0

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO	TOTAL SHEETS
07	LA,Ven	101	30.9/38.2 0.0/1.8	50	176

REGISTERED CIVIL ENGINEER

2-1-88
PLANS APPROVAL DATE

B.P. LEE No. 33233 Exp 6/30/90 CIVIL STATE OF CALIFORNIA



LEGEND

AP	ALTERNATIVE PIPE
OSD	OVER-SIDE DRAIN
	DRAINAGE INLET
	MANHOLE OR JUNCTION STRUCTURE
	PROPOSED STORM DRAIN
	FLOW PATH
1	BMP ID
	POST 1994 ROAD WIDENING
	IMPERVIOUS DRAINAGE AREA
	LANDSCAPE BMP AREA
	PIPE TO BE REMOVED

AS BUILT PLANS
Contract No. 07-109054
Date Completed 4-14-89
Document No.

AS BUILT
CONTRACT NO. 109054
RESIDENT ENGR. Thy. C. Bk.
DATE Completed: 4-14-89

DRAINAGE PLAN
SCALE: 1" = 50'

US-101 BMP LAYOUT

NO SCALE

L-52

CALCULATED DESIGNED BY | DATE | REVISED BY | DATE REVISED
CHECKED BY
PROJECT ENGINEER B. P. LEE
STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION · Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

CU 07204

BSW No. 257				
L (FT)	98			
B (FT)	11			
S (%)	1.0			
AIMP (AC)	1.2			
ALNDSCP (AC)	1.2			
n	0.25			
CCOMP	0.95	WQV (CF)	6,240	
I (IPH)	0.20	n25	0.05	
WQF (CFS)	0.46	I25 (IPH)	3.87	
WQD (FT)	0.50	Q25 (CFS)	8.87	
V (FPS)	0.23	D25 (FT)	0.94	
HRT (MIN)	5.8	V25 (FPS)	1.64	

GSRD No. 257 LINEAR RADIAL TYPE LR-3	
AREA (AC)	1.2
DEBRIS RATE (CF/AC/YR)	10.0
TOTAL DEBRIS (CF/YR)	12.0
Max DEBRIS (CF/YR)	22.5
CCOMP	1.00
I25 (IPH)	3.87
Q25 (CFS)	8.87
Max Q (CFS)	10.96
L (FT)	24.5
W (FT)	11.5
HEAD (FT)	0.42
AVAIL H (FT)	0.8

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO	TOTAL SHEETS
07	LA, Ven	101	30.9/38.2 0.0/1.8	51	176

B P Lee
REGISTERED CIVIL ENGINEER

2-1-88
PLANS APPROVAL DATE

B.P. LEE No 33233 Exp 6/30/90 CIVIL

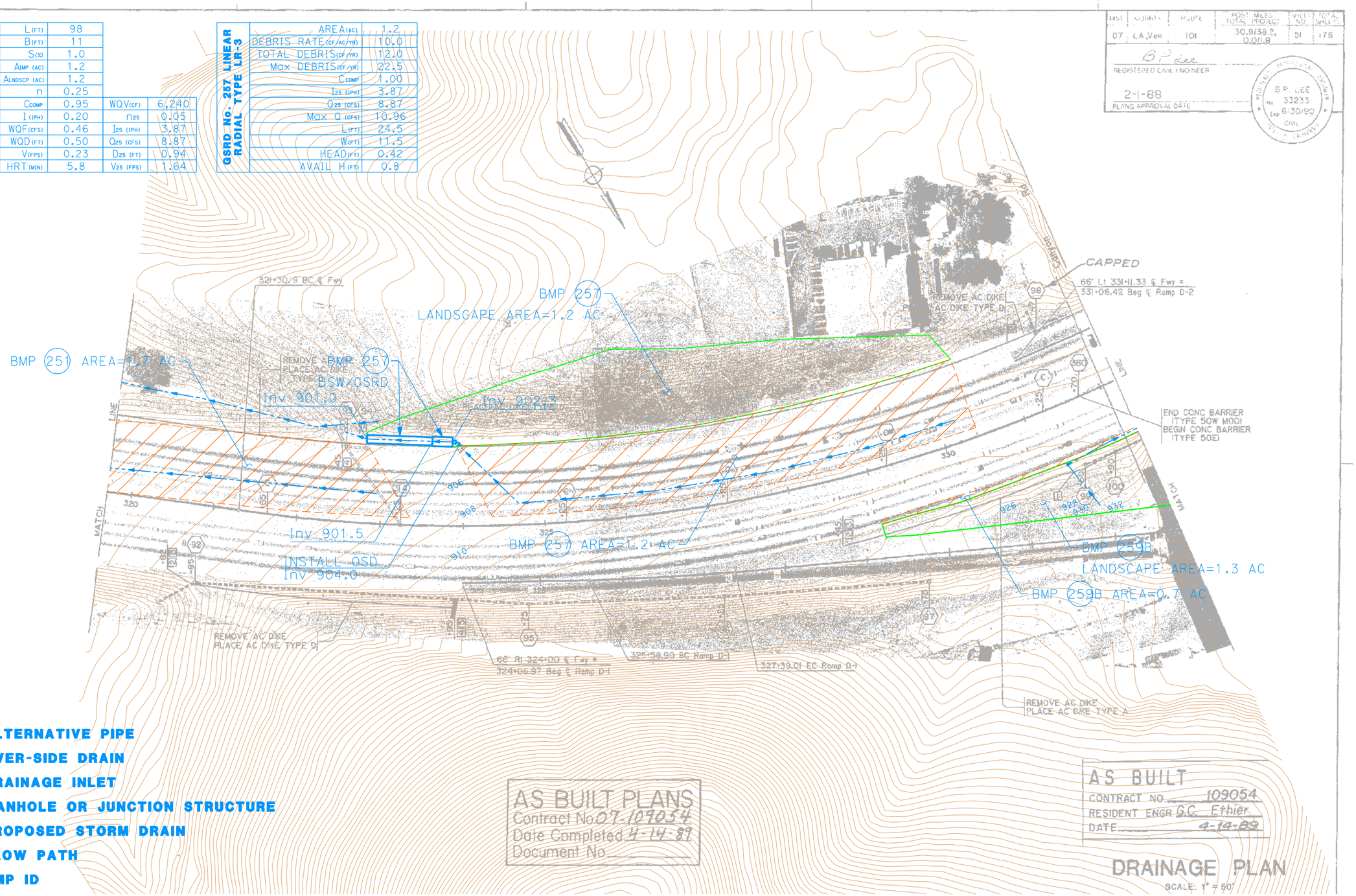
DATE | REVISED BY | DATE REVISED

CALCULATED DESIGNED BY

CHECKED BY

PROJECT ENGINEER
B. P. LEE

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION



AS BUILT PLANS
Contract No 07-109054
Date Completed 4-14-89
Document No.

AS BUILT
CONTRACT NO. 109054
RESIDENT ENGR G.C. Ethier
DATE 4-14-89

DRAINAGE PLAN
SCALE: 1" = 50'

LEGEND

AP	ALTERNATIVE PIPE
OSD	OVER-SIDE DRAIN
	DRAINAGE INLET
	MANHOLE OR JUNCTION STRUCTURE
	PROPOSED STORM DRAIN
	FLOW PATH
1	BMP ID
	POST 1994 ROAD WIDENING
	IMPERVIOUS DRAINAGE AREA
	LANDSCAPE BMP AREA
	PIPE TO BE REMOVED

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

CU 07204

US-101 BMP LAYOUT

NO SCALE

L-53

BST No. 259A			
L (FT)	460		
W (FT)	22		
S (%)	20		
AIMP (AC)	1.0		
ALNDSCP (AC)	0.5		
n	0.25	WQV (CF)	4,008
CCOMP	0.97	n25	0.05
I (IPH)	0.20	I25 (IPH)	3.87
WQF (CFS)	0.29	Q25 (CFS)	5.70
WQD (FT)	0.01	D25 (FT)	0.02
V (FPS)	0.09	V25 (FPS)	0.82

BSW No. 259B			
L (FT)	80		
B (FT)	10		
S (%)	1.0		
AIMP (AC)	0.7		
ALNDSCP (AC)	1.3		
n	0.25		
CCOMP	0.93	WQV (CF)	4,936
I (IPH)	0.20	n25	0.05
WQF (CFS)	0.36	I25 (IPH)	3.87
WQD (FT)	0.40	Q25 (CFS)	7.03
V (FPS)	0.25	D25 (FT)	0.77
HRI (MIN)	5.3	V25 (FPS)	1.79

GSRD No. 259B LINEAR RADIAL TYPE LR-3	
AREA (AC)	2.0
DEBRIS RATE (CF/AC/YR)	10.0
TOTAL DEBRIS (CF/YR)	20.0
MAX DEBRIS (CF/YR)	22.5
CCOMP	0.93
I25 (IPH)	3.87
Q25 (CFS)	7.03
MAX Q (CFS)	10.96
L (FT)	24.5
W (FT)	11.5
HEAD (FT)	0.4
AVAIL H (FT)	0.8

MF No. 260 PARTIAL SEDIMENTATION VAULTED AUSTIN SAND FILTER S-5000-3	
L (FT)	57
W (FT)	27
D (FT)	3
WQV (CF)	4,204
P24 (IN)	0.75
CCOMP	0.97
HEAD (FT)	3.1
AVAIL H (FT)	3.1

BST No. 261			
L (FT)	420		
W (FT)	16		
S (%)	7.0		
AIMP (AC)	1.0		
ALNDSCP (AC)	0.3		
n	0.25	WQV (CF)	3,335
CCOMP	0.98	n25	0.05
I (IPH)	0.20	I25 (IPH)	3.87
WQF (CFS)	0.25	Q25 (CFS)	4.74
WQD (FT)	0.01	D25 (FT)	0.02
V (FPS)	0.07	V25 (FPS)	0.57

BST No. 262			
L (FT)	340		
W (FT)	16		
S (%)	7.0		
AIMP (AC)	0.3		
ALNDSCP (AC)	0.2		
n	0.25	WQV (CF)	1,285
CCOMP	0.96	n25	0.05
I (IPH)	0.20	I25 (IPH)	3.87
WQF (CFS)	0.09	Q25 (CFS)	1.83
WQD (FT)	0.01	D25 (FT)	0.01
V (FPS)	0.05	V25 (FPS)	0.43

LEGEND

- AP — ALTERNATIVE PIPE
- OSD — OVER-SIDE DRAIN
- DRAINAGE INLET
- MANHOLE OR JUNCTION STRUCTURE
- PROPOSED STORM DRAIN
- FLOW PATH
- 1 — BMP ID
- POST 1994 ROAD WIDENING
- IMPERVIOUS DRAINAGE AREA
- LANDSCAPE BMP AREA
- PIPE TO BE REMOVED

AS BUILT PLANS
Contract No. 07-109054
Date Completed 4-14-89
Document No.

AS BUILT
CONTRACT NO. 109054
RESIDENT ENGR G.C. Fowler
DATE 4-14-89

DRAINAGE PLAN
SCALE: 1" = 50'

US-101 BMP LAYOUT

NO SCALE

L-54

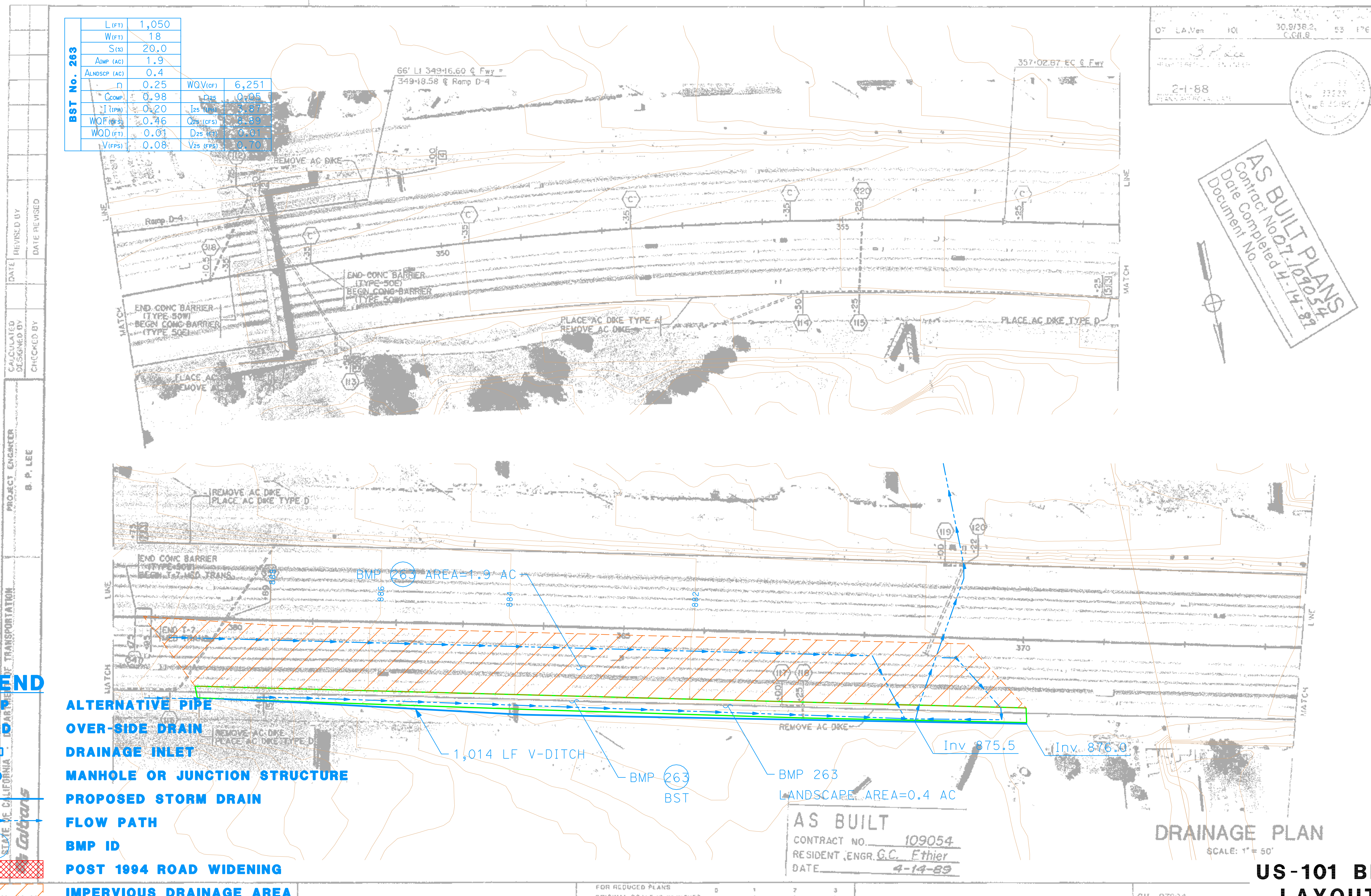
REGISTERED CIVIL ENGINEER 2-1-88
PLANS APPROVAL DATE

PROJECT ENGINEER B. P. LEE
CALCULATED/DESIGNED BY
CHECKED BY
REVISED BY
DATE REVISED
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

CU 07204

BST No. 263				
	L (FT)	1,050		
	W (FT)	18		
	S (%)	20.0		
	A_{IMP} (AC)	1.9		
	A_{LNDSCP} (AC)	0.4		
	n	0.25	WQV (CF)	6,251
	C_{COMP}	0.98	n_{25}	0.05
	I (IPH)	0.20	I_{25} (IPH)	3.87
	WQF (CFS)	0.46	Q_{25} (CFS)	8.89
	WQD (FT)	0.01	D_{25} (FT)	0.01
	V (FPS)	0.08	V_{25} (FPS)	0.70



LEGEND

AP	ALTERNATIVE PIPE
OSD	OVER-SIDE DRAIN
▭	DRAINAGE INLET
○	MANHOLE OR JUNCTION STRUCTURE
———	PROPOSED STORM DRAIN
—·→—	FLOW PATH
○	BMP ID
(red crosshatch)	POST 1994 ROAD WIDENING
(orange hatch)	IMPERVIOUS DRAINAGE AREA
(green outline)	LANDSCAPE BMP AREA
//////	PIPE TO BE REMOVED

US-101 BMP LAYOUT

NO SCALE

NOTE:

FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA,
SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	101	17.2-38.1	04	18

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

LEGEND:

- XXX — BMP SITE LOCATION AND IDENTIFICATION
- EXISTING ON-SITE DRAINAGE FACILITY
- EXISTING OFF-SITE DRAINAGE FACILITY
- PROPOSED ON-SITE DRAINAGE FACILITY
- ON-SITE FLOW DIRECTION
- OFF-SITE FLOW DIRECTION

LAYOUT

SCALE: 1" = 500'

L-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	CONSULTANT FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	CHECKED BY
Caltrans	YOUR NAME HERE	YOUR NAME HERE	YOUR NAME HERE

REVISED BY	DATE REVISED

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SNGUYEN 7/9/2009 11:45:53 AM

LAST REVISION 00-00-00
DATE PLOTTED => 7/9/2009
TIME PLOTTED => 11:45:53 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

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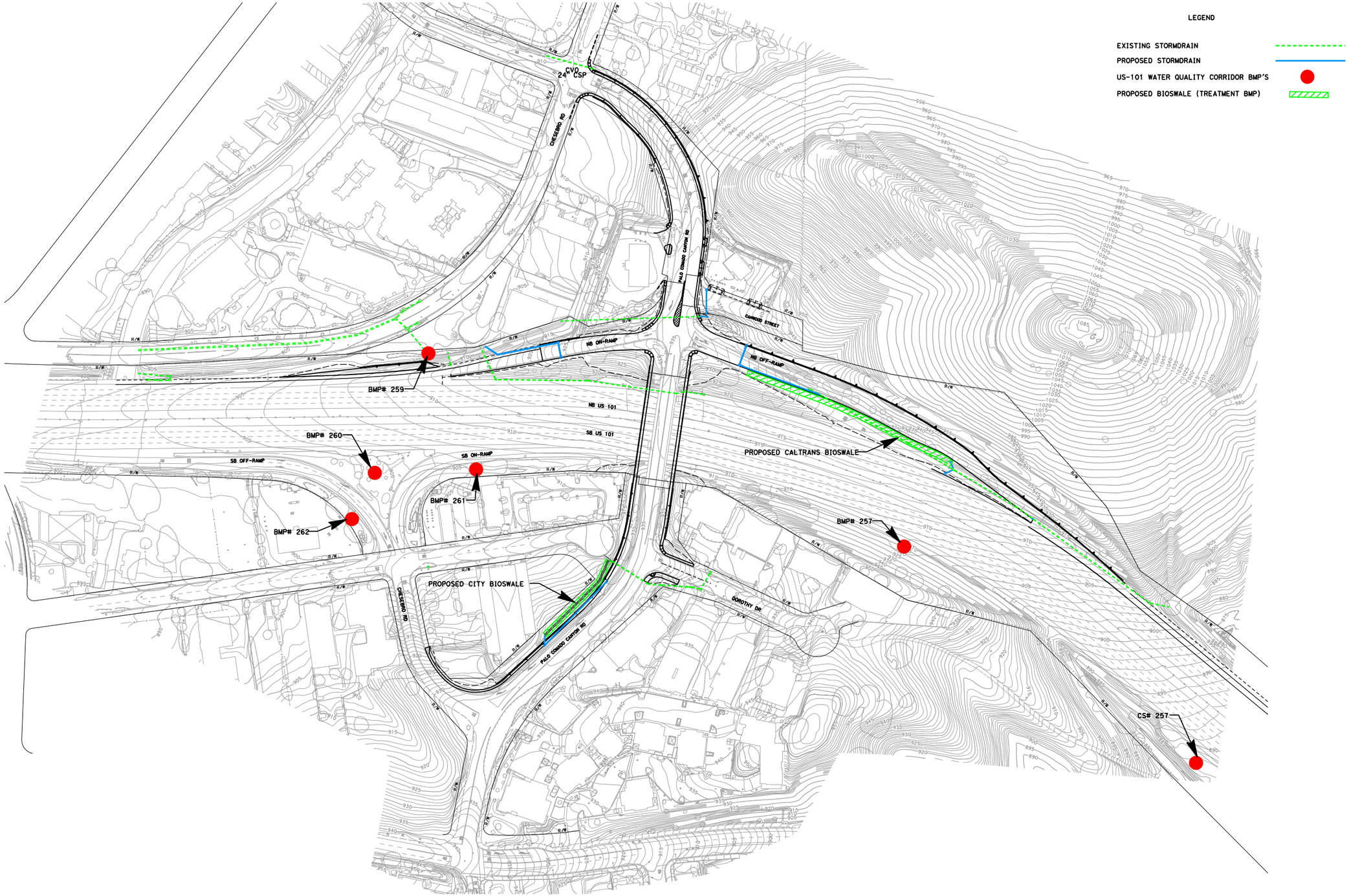

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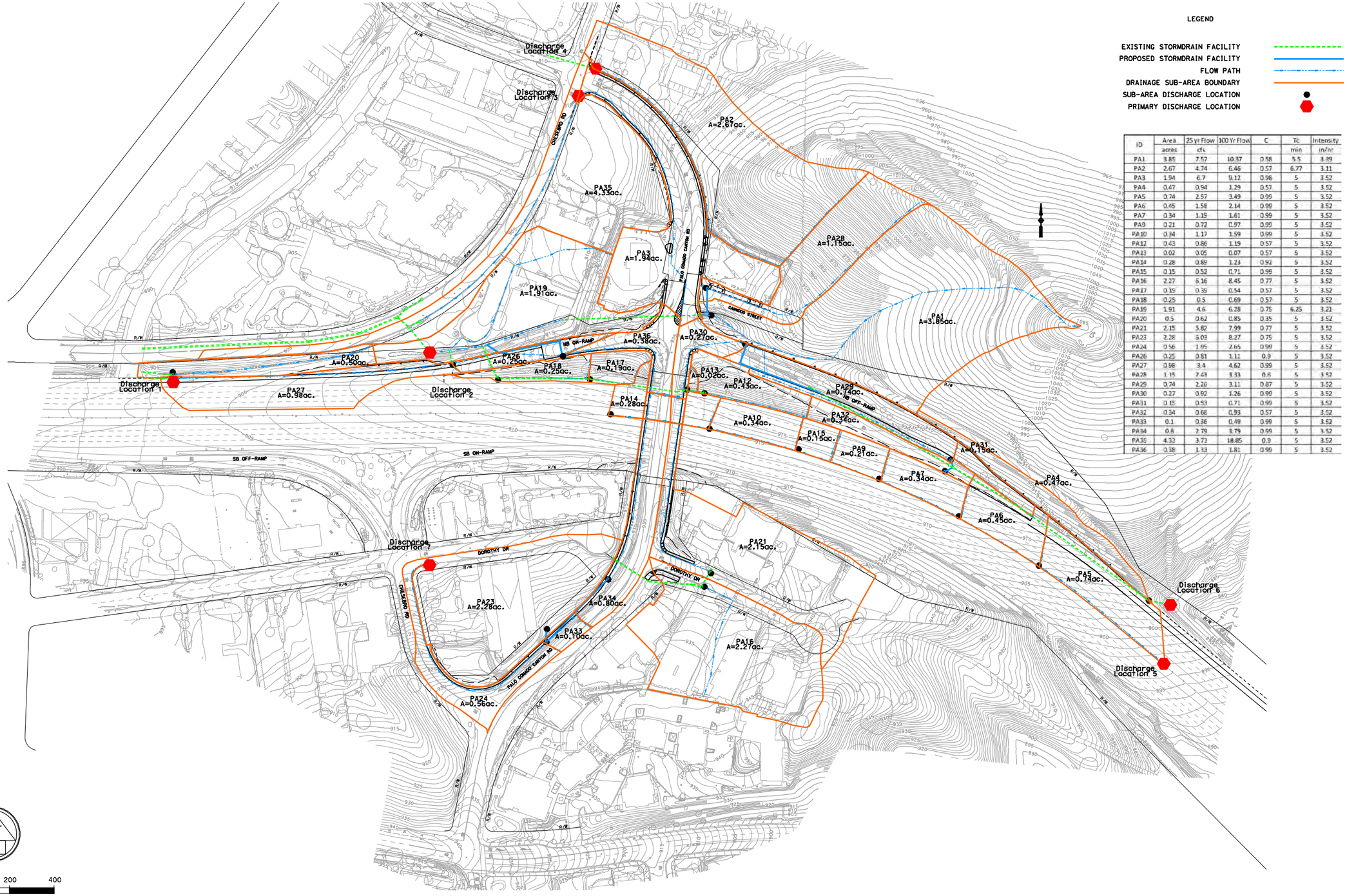
Kimley-Horn and Associates, Inc.
401B STREET - Suite 600 - San Diego, Ca. - 92101
Tel: (619) 234-9411 Fax: (619) 234-9433

PROJECT LIMITS AND TREATMENT BMP's

Palo Comado Canyon Road/US101 Interchange Project



ID	Area	25 yr Flow	100 Yr Flow	C	Tc	Intensity
	acres	cfs			min	in/hr
PA1	3.85	7.57	10.37	0.58	5.5	3.89
PA2	2.67	4.74	6.46	0.57	6.77	3.11
PA3	1.94	6.7	9.12	0.98	5	3.52
PA4	0.47	0.94	1.29	0.57	5	3.52
PA5	0.74	2.57	3.49	0.99	5	3.52
PA6	0.45	1.58	2.14	0.99	5	3.52
PA7	0.34	1.19	1.61	0.99	5	3.52
PA8	0.21	0.72	0.97	0.99	5	3.52
PA10	0.34	1.17	1.59	0.99	5	3.52
PA12	0.43	0.86	1.19	0.57	5	3.52
PA13	0.02	0.05	0.07	0.57	5	3.52
PA14	0.28	0.89	1.23	0.92	5	3.52
PA15	0.15	0.52	0.71	0.99	5	3.52
PA16	2.27	5.16	8.45	0.77	5	3.52
PA17	0.19	0.39	0.54	0.57	5	3.52
PA18	0.25	0.5	0.69	0.57	5	3.52
PA19	1.91	4.6	6.28	0.75	6.25	3.21
PA20	0.5	0.62	0.85	0.35	5	3.52
PA21	2.15	5.82	7.99	0.77	5	3.52
PA23	2.28	5.03	8.27	0.75	5	3.52
PA24	0.56	1.95	2.65	0.99	5	3.52
PA26	0.25	0.81	1.11	0.9	5	3.52
PA27	0.98	3.4	4.62	0.99	5	3.52
PA28	1.15	2.43	3.33	0.6	5	3.52
PA29	0.74	2.26	3.11	0.87	5	3.52
PA30	0.27	0.92	1.26	0.99	5	3.52
PA31	0.15	0.53	0.71	0.99	5	3.52
PA32	0.34	0.68	0.93	0.57	5	3.52
PA33	0.1	0.36	0.49	0.99	5	3.52
PA34	0.8	2.79	3.79	0.99	5	3.52
PA35	4.33	3.73	18.85	0.9	5	3.52
PA36	0.38	1.33	1.81	0.99	5	3.52

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Exhibit B-Proposed Conditions Hydrology Map

Palo Comado Canyon Road/US101 Interchange Project

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

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.

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.).	☒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.	☐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: Nicholas A. Roberts Date: 04/13/2012 District-Co-Route: 07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

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.

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: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Consideration of Design Pollution Prevention BMPs

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: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Downstream Effects Related to Potentially Increased Flow

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.	☐Complete

Design Pollution Prevention BMPs

Checklist DPP-1, Part 3

Prepared by: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Slope / Surface Protection Systems

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?	☐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. 0.57 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: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Concentrated Flow Conveyance Systems

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: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Preservation of Existing Vegetation

1.	Review Preservation of Property, Standard Specifications 16.1.01 and 16-1.02 (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: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Consideration of Treatment BMPs

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? ☐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 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 site conditions, estimate what percentage of the WQV[1] can be infiltrated. When calculating the WQV, use a 12-hour drawdown for Type A and B soils, a 24-hour drawdown for Type C soils, and a 48-hour drawdown for Type D soils.

   Infiltration devices are not recommended per the Corridor Study and therefore the Bioswales were not evaluated for infiltration considerations. ☒Complete

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

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

[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? Use the 'drain time' associated with the amended soil (the 12-hour WQV for Type A and B soils, the 24-hour WQV for Type C soils[2]). ☐Yes ☒No

If Yes, consider including soil amendments; increasing the infiltration ranking allows more flexibility in the selection of BMPs (strips and swales will show performance comparable to other BMPs). Record the new infiltration estimate below:

_X_ < 20% (skip to 6)
___ 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. ☐Yes ☒No

6. Biofiltration in Rural Areas

Is the project in a rural area (outside of urban areas that is covered under an NDPES Municipal Stormwater Permit[3]). 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 or earthen filters) been prohibited? Consult your District/Regional Storm Water Coordinator and/or environmental documents. ☒Yes ☐No

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

[2] Type D soils are not expected where amendments are incorporated

[3] 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) Assess infiltration of an infiltration BMP that is used in conjunction with biofiltration. Include infiltration losses from biofiltration, if biofiltration is feasible. ☐Complete

(use 24 hr WQV)
___ < 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 with combinations with remaining approved earthen BMPs using water quality volumes based on the drain time of those BMPs. This assessment will be used in subsequent BMP selection matrices.

Earthen Detention Basin (use 48 hr WQV)	Earthen Austin SF (use 48 hr WQV)
___ < 20%	___ < 20%
___ 20% - 50%	___ 20% - 50%
___ > 50%	___> 50%

☐Complete

Continue to Question 8

8. Identifying BMPs based on the Target Design Constituents

(a) Does the project discharge to a water body that has been placed on the 303-d list or has had 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)?

☐ sediments
☐ phosphorus
☐ nitrogen
☐ copper (dissolved or total)
☐ lead (dissolved or total)
☐ zinc (dissolved or total)
☐ general metals (dissolved or total)[1]

(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] General metals include cadmium, nickel, chromium, and other trace metals. Note that selenium and arsenic are not metals. Mercury is a metal, but is considered later during BMP selection, under Question 12 below.

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 water body that has been placed on the 303-d list or has had a TMDL adopted 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
    _X__ 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 WQV (or WQF, depending upon the Treatment BMP selected) will be treated by the preferred Treatment BMP(s): __100___% ☒Complete

    (a) Have Treatment BMPs been considered for use in parallel or series to increase this percentage? ☒Yes ☐No

15. Estimate what percentage of the net WQV (for all new impervious surfaces within the project) that will be treated by the preferred treatment BMP(s): __>100_____% ☒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. ☒Complete

Treatment BMPs

Checklist T-1, Part 2

Prepared by: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Biofiltration Swales / Biofiltration Strips

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 will 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 ≤ 300 ft? *	☒Yes	☐No
5.	Has the minimum width (in the direction of 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.	Is the biofiltration strip sized as long as possible in the direction of flow? **	☒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: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Infiltration Devices

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?	☒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? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]) *	☐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

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

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

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.	Is the volume of the Infiltration Trench equal to at least the 2.85x the WQV, while maintaining a drawdown time of ≤ 96 hours? It is recommended to use a drawdown time between 40 and 48 hours. (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet], unless the District/Regional NPDES Storm Water Coordinator will allow a volume between 2,830 ft^3 and 4,356 ft^3 to be considered.) *	☐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

Treatment BMPs

Checklist T-1, Part 5

Prepared by: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Detention Devices

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]) ☐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 with 40-hrs the preferred design drawdown time? *	☐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 6

Prepared by: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Gross Solids Removal Devices (GSRDs)

Feasibility

1. Is the receiving water body downstream of the tributary area to the proposed GSRD on a 303(d) list or has a TMDL for litter been established? ☒Yes ☐No

2. Are the devices sized for flows generated by the peak drainage facility design event or can peak flow be diverted? ☒Yes ☐No

3. Are the devices sized to contain gross solids (litter and vegetation) for a period of one year? ☒Yes ☐No

4. Is there sufficient access for maintenance and large equipment (vacuum truck)? ☒Yes ☐No

   If "No" to any question above, then Gross Solids Removal Devices are not feasible. Note that Biofiltration Systems, Infiltration Devices, Detention Devices, Dry Weather Flow Diversion, MCTT, Media Filters, and Wet Basins may be considered for litter capture, but consult with District/Regional NPDES if proposed to meet a TMDL for litter.

5. Does adequate area exist within the right-of-way to place Gross Solids Removal Devices? ☒Yes ☐No
   If "Yes", continue to Design Elements section. 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 Gross Solids Removal Devices and how much right-of-way would be needed? _____ 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

Design Elements – Linear Radial Device

* **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.	Does sufficient hydraulic head exist to place the Linear Radial GSRD? *	☒Yes	☐No
2.	Was the litter accumulation rate of 10 ft^3/ac/yr (or a different rate recommended by Maintenance) used to size the device? *	☒Yes	☐No
3.	Were the standard detail sheets used for the layout of the devices? ** If No, consult with Headquarters Office of Storm Water Management and District/Regional NPDES.	☒Yes	☐No
4.	Is the maximum depth of the storage within 10 ft of the ground surface, or another depth as required by District Maintenance? *	☒Yes	☐No

Design Elements – Inclined Screen

* **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.	Does sufficient hydraulic head exist to place the Inclined Screen GSRD? *	☐Yes	☒No
2.	Was the litter accumulation rate of 10 ft^3/ac/yr (or a different rate recommended by Maintenance) used to size the device? *	☒Yes	☐No
3.	Were the standard details sheets used for the layout of the devices? ** If No, consult with Headquarters Office of Storm Water Management and District NPDES.	☒Yes	☐No
4.	Is the maximum depth of the storage within 10 ft of the ground surface, or another depth as required by District Maintenance? *	☒Yes	☐No

Treatment BMPs

Checklist T-1, Part 8

Prepared by: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Media Filters

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 40 to 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)? If Yes, continue to Design Elements sections. If No, continue to Question 5. ☐Yes ☐No

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
   If Yes, continue to the Design Elements section. If No, continue to Question 6. ☐Yes ☐No

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

Treatment BMPs

Checklist T-1, Part 9

Prepared by: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

MCTT (Multi-chambered Treatment Train)

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)? If Yes, continue to Design Elements sections. If No, continue to Question 6.	☐Yes	☐No
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 If Yes, continue to Design Elements section. If No, continue to Question 7.	☐Yes	☐No
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: Nicholas A. Roberts Date:04/13/2012 District-Co-Route:07-LA-101

PM : 33.0/34.4 Project ID (or EA): 257200 RWQCB: Los Angeles RWQCB

Wet Basin

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
    If Yes, continue to Design Elements section.

    If No, continue to Question 12.

☐Yes ☐No

12. Have the appropriate state and federal regulatory agencies been contacted to discuss location and potential to attract and harbor sensitive or endangered species?

    If No, contact the Regional/District NPDES Coordinator

☐Yes ☐No

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 water body that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, low dissolved oxygen, or odors?

    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.

☐Yes ☐No

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
10.	Is the maximum depth < 10 ft?"	☐Yes	☐No