Long Form - Storm Water Data Report

Dist-County-Route: 07-LA-405

Post Mile (Kilometer Post) Limits: 10.8/11.4 (17.4/18.3)

Project Type: Interchange Modification

EA: 233900

RU: 07-186

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 incorporating 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 60 days prior to PS&E Submittal. List submittal date: _____

Total Disturbed Soil Area: **13.6 Ac (12.4 Ac in Caltrans right-of-way)**

Estimated Construction Start Date: **December 2008** Construction Completion Date: **August 2010**

Notification of Intent (NOI) Date to be submitted: **November 2008**

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 data upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

Ray Fares, PE
Registered Project Engineer/Landscape Architect

Hamid Toossi, PE Date
Caltrans Designated Oversight Representative

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

David Yan, *Project Manager* Date

Roger Castillo, *Designated Maintenance Representative* Date

Ron Russak, *Designated Landscape Architect Representative* Date

STAMP
[Required for PS&E only]

Shirley Y. Pak, *District/Regional SW Coordinator or Designee* Date

STORM WATER DATA INFORMATION

1. Project Description

The proposed interchange modification project is located in the City of Carson with a population of 89,730 in Los Angeles County. The proposed interchange modification project is located in the area where the Interstate (I)-405 interchange with Avalon Boulevard is located. The existing I-405 cross section has ten mixed-flow lanes (MFL) and two high-occupancy-vehicle (HOV) lanes north of Avalon Boulevard, and eight MFL and two HOV lanes south of Avalon Boulevard. The local land use is dominated by commercial and industrial businesses that include shopping centers and some low-density residential properties.

The existing Interstate 405 southbound off-ramp to Avalon Boulevard will be reconstructed to connect to the proposed Lenardo Drive. The proposed Lenardo Drive includes construction of a bridge over the Torrance Lateral Channel. The existing Interstate 405 southbound loop on-ramp will be realigned next to the new terminus of the reconstructed southbound off-ramp. A new Interstate 405 southbound on-ramp is proposed to be constructed in the southeast quadrant of the interchange. The proposed on-ramp includes widening of the existing 213th Street Bridge Undercrossing I-405. The Interstate 405 northbound off-ramp to Avalon Boulevard will be widened and realigned to allow for full movements at the ramp terminal at Avalon Boulevard. The Interstate 405 northbound on-ramp will be realigned at the ramp terminus to allow for two left-turn lanes from northbound Avalon Boulevard. Southbound Avalon Boulevard right-turn lane to the northbound on-ramp will be signalized to permit right turn on green arrow only at the same phase with the southbound through lanes.

The total disturbed area is approximately 13.6 acres (ac) [12.4 ac within Caltrans right of way]. The 13.6 acres of disturbed soil was calculated by tabulating the demolition and reconstruction footprints of the existing southbound (S/B) I-405 on- and off-ramps, widening the northbound (N/B) I-405 on- and off-ramps, construction of the new S/B I-405 entrance ramp east of Avalon Boulevard, and the extension of Lenardo Drive from the Torrance Lateral Channel to Avalon Boulevard.

The project site's existing impervious area was calculated to be 60%. The project site's impervious area after the proposed improvements to the interchange are constructed is estimated to be 70%. A portion of the proposed interchange modification project lies within the Los Angeles County municipal separate storm sewer system (MS4).

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

Receiving Water Bodies/303(d) List

The proposed Avalon Boulevard Interchange Modification Project at I-405 project does not to include any construction activities in the Dominguez or Torrance Lateral Channels.

The proposed interchange modification project is located within the Dominguez Channel Watershed and found within Caltrans Hydrologic Sub-Area (HSA) 411.01. Storm water runoff from the redeveloped area will be conveyed through a series of new and existing drainage facilities that ultimately drain into the 303(d) Listed Dominguez Channel Estuary. The existing outfall to the Dominguez Channel is approximately 150 feet away from the nearest project boundary and approximately 1000 feet away from the furthest project limit. Currently existing Treatment Best Management Practices (BMPs) do not exist within the project limits.

No Total Maximum Daily Loads (TMDL's) have been established for the 303(d) listed Dominguez Channel Estuary. However, the Dominguez Channel Estuary has the following pollutants of concern (POCs): Ammonia, Benthic Community Effects, Benzo(a)pyrene (PAHs), Benzo(a)anthracene, Chlordane (tissue), Chrysene (C1-C4), Coliform Bacteria, DDT (tissue & sediment), Dieldrin (tissue), Lead (tissue), PCBs (Polychlorinated Biphenyls), Phenanthrene, Pyrene, and Zinc (sediment). Treatment BMPs are required to treat the above mentioned POCs that are also overlap as targeted design constituents (TDCs).

Since the project site does not encompass any City of Carson or Los Angeles County domestic water supply reservoirs including domestic groundwater percolation facilities, direct discharge of runoff into high risk facilities is not possible in the event of a spill. In summary, there are no high risk areas within the project limits.

Soil stabilization and sediment control shall be provided by the contractor as defined in the Storm Water Pollution Prevention Plan and the Water Pollution Control Plan throughout construction and especially during the rainy season of October 1 to May 1. In the rainy season, the total active disturbed soil area within the project limits will be maintained to a minimum by focusing on construction activities that avoid earthwork and by implementing the approved Construction Site BMPs.

The Avalon Boulevard Interchange Modification Project at I-405 project does not require Section 401 Certification since no work will occur in the Dominguez or Torrance Lateral Channel and wetlands within the project limits do not exist.

Local land use includes residential and neighborhood commercial establishments. Additional right-of-way acquisition is not possible without acquiring existing residences or land designated for channel use. Thus, the project has no additional right-of-way costs for the proposed BMPs.

The projects minimizes impact to receiving waters by limiting excavation and fill activities, incorporates retaining walls to reduce and eliminate slopes, reduces disturbances to existing vegetation, integrates permanent slope stabilization BMPs, adds more landscaping to the final design, designs slopes as flat as possible, concentrates flows in stabilized drains and channels, and proposes Treatment BMPs.

RWQCB Special Requirements/Concerns (SW-2, Question 5)

The Los Angeles Regional Water Quality Control Board (RWQCB) does not have any Total Maximum Daily Loads applicable to this Caltrans' project for protecting the Dominguez and Torrance Lateral Channels' water quality. However, Caltrans will provide the necessary temporary and permanent protection of the Dominguez Channel Watershed from identified POCs.

Project Design Considerations:

Climate

The general climate is subtropical with seasonal precipitation ranges from 8 to 18 inches. The rainy season occurs between October 1st and May 1st; precipitation during summer months is infrequent and rainless periods of several months are common. January and July are respectively the coldest and warmest months of the year. Rainfall intensity curves for frequencies of 10, 25, and 50 years with duration of 5 to 30 minutes were used to calculate the project's Q_{25}. The average annual rainfall in the project area is approximately 14.98 inches, most of which occurs during the winter period, specifically between November and April.

Soil

The site is underlain by Holocene alluvium. The Holocene alluvium is underlain by alluvial deposits of the Lakewood formation. The Holocene alluvium is generally composed of sand, silt and clay which could be relatively loose or soft. The Lakewood formation generally consists of sand and silty sand with layers of clayey silt and silty clay. Artificial fill associated with the I-405, surrounding streets, and the Dominguez and Torrance Lateral channels are probably widespread throughout the project area. Refuse overlain by variable thickness of cover fill is present at the vegetation, wild, glass, plastic, metal, paper, concrete, and other debris. The cover fill consists of sandy silt, clayey silt, and silty clay. The sands typically have a low expansion potential, however the silts and local clays could have medium to high expansion potential. The expansion potential of the onsite fills is currently unknown. In summary, per the Unified Soil Classification System (USCS), the project's soil is classified as sandy clay loam with a Natural Resources Conservation Service (NCRS) Hydrologic Soil Group (HSG) of "C."

Inconsecutive aerial photographs of the project study area from 1928 to 1965 provided by Environmental Data Resources (EDR) show the area south of the I-405 and Avalon Boulevard to be vacant, undeveloped and possibly agricultural land. From 1976 to the present, aerial photographs show the area south of the project study area to be developed land, approximately as it appears today. In the late 1950s, the I-405 was constructed through this area. Assuming agricultural use of the site, it is likely that pesticides and herbicides were used in the area prior to the construction of I-405.

Soil stabilization and erosion control will be constructed on 2:1 slopes with concrete slope paving. Additional slopes to ramps were eliminated by installing mechanically stabilized earth walls. The projected total disturbed soil area required for the completion of the project is approximately 13.6 ac (12.4ac within Caltrans right of way).

An additional expense of $1 to $2 Million is expected to properly dispose of soil contaminated with unacceptable concentrations of aerially deposited lead (ADL) which has yet to be discovered. ADL has been consistently found in unpaved Caltrans right-of-way adjacent to existing freeways and usually located within the first two feet below the surface. Using this ADL history, the project may find unacceptable concentrations of ADL in 2.8 ac of unpaved Caltrans right-of-way. This report assumes unacceptable concentrations of ADL will not be discovered within the project limits. Updated ADL contaminated soil volumes will be provided once the information becomes available. This project will not reuse soil containing ADL.

Topography

The undeveloped and obviously elevated section of land located southwest of the I-405 Freeway and Avalon Boulevard is classified as generally flat with 2:1 (H:V) slopes near the channels while the remaining project site is highly urbanized and flat with 2% street grades. Slope stabilization areas of concerns are located near the channels where the ground slopes down to the channel at 2:1. The project land is also divided in the east to west direction by a crushed aggregate base lined channel with sloping walls lined with rip-rap and by a smaller north to south channel lined with the same materials. Also, the I-405 runs elevated in the east to west direction with structural and earth ramps to touch down on the lower flat area. An electronic topographical file confirming the project's flat terrain was prepared by Psomas and Associates, Inc, a topographic survey and mapping company.

Ground Water

According to information provided MACTEC's Log of Borings for 15 boring conducted in January 2007, depth of groundwater in the vicinity of the project study area varies from approximately 11 ft to 31.3 ft below ground surface (bgs). However, water level measurements in a well on the north side of I-405 by the California Geological Survey from 1954 to 1992, ranged from a depths of 34.5 to 55.9 ft. The conservative depths of 11 ft to 31.3 ft will be utilized when designing the proposed BMPs.

The project soil's erodibility has yet to be determined. The mentioned soils information will be provided once a comprehensive geotechnical report with borings and a hydrological report are completed during the initial phase of the PS&E.

3. Regional Water Quality Control Board Agreements

The RWQCB agreements conform to statewide NPDES permit nos. CAS000002. This project conforms to NPDES Permit No. CAS000003 within Caltrans right-of-way. Notice of Intent (NOI) is required for submittal 30 days prior to start of construction.

4. Describe 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 proposed Avalon Boulevard Interchange Modification Project at I-405 project will slightly increase the velocity increase and volume of downstream flow, continue to discharge to a lined channel, decrease sediment loading, and cause other hydraulic changes to the existing storm drain system that is not likely to affect the downstream Dominguez Channel stability. Scour protection at the existing outlets are not required since

existing runoff enters a crushed aggregate/riprap lined channel with low velocities. Increasing the tributary area by widening ramps, adding a bridge and extending Lenardo Drive paves segments of undeveloped areas and increased the amount of runoff directed into the existing local storm drain system. In order to collect and direct this additional runoff drainage ditches along the proposed retaining walls, concrete curbs and gutters at street level, drainage inlets, and an underground network of reinforced concrete pipes that eventually drain to the Dominguez and Torrance Lateral Channels through existing outfalls will be constructed. Note the existing outfalls are located outside of the project limits. Flared end pipe sections will be incorporated at the ends of the drainage pipes that connect to the proposed treatment BMPs.

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

The existing slopes on the Caltrans right-of-way make up the sides of the entrance and exit ramps are currently covered with sparse vegetation. The existing total slope area to be reconstructed is approximately 4.9 ac. The proposed design reduces slope lengths and constructs retaining walls to eliminate slopes in several areas. Since this portion of I-405 is classified as "landscaped," all existing landscape that is disturbed due to modified or new slopes will be replaced. Thus, the entire landscaped slope area of approximately 4.9 ac will be re-planted following Caltrans replacement planting policy and procedure.

Benching, rounding or terraces to reduce concentration flows will be considered at the slopes and detailed in the Plans, Specifications and Estimate (PS&E) design phase with aid from the project's final hydraulic report. These construction costs are estimated at approximately $200,000 and are currently included as grading, drainage and slope paving items. During construction, all exposed slopes will be protected and stabilized from wind and water erosion with the appropriate Construction Site BMPs. Finally, the Avalon Boulevard Interchange Modification Project at I-405's earthwork will be staged in conjunction with temporary construction BMPs to minimize site soil disturbances during the rainy season.

Overtopping will be eradicated by stabilizing the affected slopes with temporary construction BMPs constructing during the dry months and diligent maintenance during the rainy season. At this time, all proposed slopes will be fully compacted and sloped at 4Horizontal:1Vertical, 3:1 or 2:1 in the worst case scenario. Early re-planting of slopes and/or slope paving will be considered and specified in the final PS&E plans.

Proposed hard surfaces include widened roadways, ramps, bridges, and sidewalk.

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

The project does not have any existing cross drains or intends to construct any new cross drains within the project limits.

The combined existing and proposed Avalon Boulevard Interchange Modification Project at I-405 drainage system will collect concentrated flows from the elevated structure and new road segments through new and existing surface drains located throughout the project site. Runoff from slopes will be conveyed through a series of concrete lined ditches. The proposed I-405 drainage facilities will distribute the collected runoff to the proposed permanent BMP area for water quality treatment. Upon treatment, the storm water will be routed into the existing storm drain system and ultimately drain into the Dominguez and Torrance Lateral Channels. The drainage system will be designed with Caltrans approved materials to maintain the highest water quality.

Drainage facilities will be designed with backflow devices to prevent the storm drain system from backing-up, contaminating treated water and eliminating potential washouts.

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

The existing Avalon Boulevard Interchange Modification Project at I-405 project site consists of paved and vegetated areas. 2.0 ac of clearing and grubbing is estimated. Clearing and grubbing limits will be clearly identified in the final project plans and later in the field denoted with orange polypropylene fences per the Environmental Impact Report (EIR). Preservation of existing vegetation will be limited to several trees and some ground cover within the temporary construction limits. Environmentally Sensitive Areas (ESA) have not been identified for this project outside of the Dominguez and Torrance Lateral Channels.

Total estimated cost for Design Pollution Prevention BMPs is $ 2.3 million.

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

Treatment BMP Strategy, Checklist T-1

The project site has been divided into four individual drainage areas where runoff will be collected and treated at each low spot (the four drainage areas are located at northwest, northeast, southwest and southeast quadrants of the I-405 Interchange at Avalon Boulevard). Storm water runoff will drain by gravity to four treatment devices that will treat the following TDCs: total and dissolved lead, nitrogen, total and dissolved zinc, and sediment. The largest Treatment BMP, an infiltration device, is proposed in the area bounded by I-405 to the north, Avalon Boulevard to the east, Lenardo Drive to the south and the Torrance Lateral Channel to the west. The other three areas will include biofiltration swales between the respective ramps and the I-405 mainline. The project design team considered all nine Caltrans approved treatment BMPs before selecting the proposed Treatment BMPs in order to maximize treatment of the water quality volume (WQV)/water quality flow (WQF). Using the TDC method outlined in the PPDG, the proposed Treatment BMPs of an infiltration basin will treat approximately 70% of WQV and three distinct biofiltration swales treat approximately 2% of the WQF.

The projects 2007 geologic reports identified the local groundwater table to vary from 11ft to 31.3 ft below the existing surface.

As noted in Section 2, since TMDLs have not been established for the Dominguez Channel Estuary and within Caltrans Hydrologic Sub-Area (HSA) 411.01, the proposed Treatment BMPs were selected on their ability to remove the project's identified TDCs (total and dissolved lead, total and dissolved zinc, and sediment).

In all instances, the treatment BMPs are proposed in existing right-of-way. The approximate location of the proposed treatment devices are north of Lenardo Drive, south of I-405, west of Avalon Boulevard and east of the Torrance Lateral Channel.

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

After runoff from the proposed Avalon Boulevard Interchange Modification Project at I-405 project that has a tributary area of 836,000 square feet is collected, 2% of the WQF can be treated by three biofiltration swales located in three distinct areas. As the runoff drains down the (1) northbound I-405 on-ramp, (2) the northbound I-405 off-ramp and the (3) new southbound I-405 on-ramp, 2% of the WQF will be directed to individual biofiltration swales for treatment. Each biofiltration swale will operate with a flow of one foot per second and a water depth of six inches. After the runoff is treated by these three BMP devices, it will be directed into the existing storm drain system and ultimately released into the Dominguez Channel.

The space necessary to accommodate the required biofiltration swales is currently owned by Caltrans. The proposed treatment area is located in between S/B I-405, the widened S/B on-ramp and west of Avalon Boulevard. The construction costs for installing the proposed biofiltration swales was determined per Caltrans Storm Water Quality Handbooks Project Planning and Design Guide (PPDG), Appendix F.

Funding has been allocated to allow for implementation of the three BMPs.

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

Dry weather diversion BMPs are not incorporated into the project because flows are not anticipated to be persistent.

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

After runoff from the proposed Avalon Boulevard Interchange Modification Project at I-405 project with a tributary area of 836,000 square feet and a WQV of 44,600 cubic feet is collected, 70% of the WQV be treated by one infiltration device located south of the I-405, northbound I-405, east of Avalon Boulevard and west of the Torrance Lateral Channel.

As stated earlier, USCS has classified the local soil as a sandy clay loam with a NCRS Hydrologic Soil Group of "C." Per the design criteria in Appendix B of the May 2007 PPDG, the infiltration device's invert is proposed 20 to 50 above the local water table. The estimated infiltration rate of 0.15 inches per hour is adequate, but will be confirmed along with the soil's permeability rate during the PS&E phase. After the collected runoff is treated by this BMP, it will be released into the existing storm drain system and ultimately into the Dominguez Channel.

The proposed right-of-way necessary to accommodate the required infiltration device is currently owned by Caltrans. The construction costs for installing the proposed infiltration device was determined per Caltrans PPDG Appendix F.

Funding has been allocated to allow for implementation of the infiltration BMP estimated at $146,000.

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

Since the groundwater table is lower than 10 feet, the site has geotechnical integrity, and the project's WQV of 44,600 cubic feet is much greater than the required volume of 4,356 cubic feet, detention devices were considered as a potential treatment BMP. In one case, the detention device can only treat four of the identified TDCs (i.e. dissolved lead, nitrogen, sediments and total zinc), while infiltration devices can treat all five. In the other locations where biofiltration swales are proposed, both infiltration and detention devices do not fit.

Sufficient hydraulic head exists to move water from the impervious surfaces into a detention basin, but the low invert that maximizes the detention device's volume requires a pump transfer the treated runoff into the local storm drain system. Since pumps are not acceptable to Caltrans, detention devices are not recommended.

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

GSRDs are not recommended but will be placed on this project because the Dominguez Channel Watershed does not have a trash TMDL, nor the receiving water on the 303d list for litter/trash.

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

Traction sand trap devices are not recommended because traction sand is not applied at least twice a year within the project limits. Therefore these devices will not be placed on the project.

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

Per the project's land constraints, neither the Austin Sand Filter nor the Delaware Filter's chambers can be sized and constructed within the project site limits to treat more than 30% of the WQV. The project site does provide the required hydraulic head to operate media filters BMPs however; the concrete lined invert of each filter basin must be designed at a low elevation to maximize the chamber volumes and thus requires pumps to transfer the treated runoff to the local storm drain system. Since pumps are not acceptable to Caltrans, media filters are not recommended.

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

MCTTs are not recommended as a Treatment BMP because in this specific case a "critical source area" (i.e. vehicle service facilities, parking areas, paved storage areas and fueling stations) as defined by the May 2007

PPDG is not being served. Therefore these devices are not feasible and are not recommended to be placed on this project.

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

Wet basins are not feasible because a natural permanent water source does not exist. Therefore these devices will not be placed on this project.
The total estimated cost for the proposed Treatment BMPs is $647,000.

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

The Construction Site BMP strategy for this project shall consist of the following for soil stabilization and sediment control. Perimeter Controls – Run-off Control will be placed at the toe of all excavation and embankment slopes. Slope Protection and Slope Interruption Devices shall be implemented on applicable slopes during the construction period. Wherever possible, early implementation of permanent erosion control seeding or landscape planting shall be performed.

During construction the contractor will be required to implement several temporary site BMPs to limit soil erosion and maintain the highest water quality runoff. At all construction site entrances, the contractor will provide construction stabilized entrances/exits. Regular watering of the non-paved sites along with street sweeping and vacuuming will be required on paved surfaces. All slopes will be protected with fiber rolls, silt fences, temporary slope drains and early slope paving or landscaping as defined in the approved Storm Water Pollution Prevention Plan (SWPPP). The contractor will be required to manage all stock piles against wind and water erosion and contain concrete wastes with concrete washouts. All catch basins and drainage inlets will include gravel bag berms or storm drain inlet protection. Finally, for all construction equipment, fuels, and toxic chemicals spill prevention and spill control measures will be implemented before construction begins. Dewatering is not expected.

Temporary construction site BMPs will be deployed by the contractor based on a Caltrans approved SWPPP. Temporary concrete washouts, stabilized construction entrance/exits, silt fences, sand bag barriers, gravel bag berms, and fiber rolls have been identified as potential contract bid line items. Additional items will be identified as the PS&E design advances.

Table F-3 Percentage of Extra Cost to Project Due to Construction Site BMPs from the May 2007 PPDG was utilized to determine the costs of Construction Site BMPs. Two percent of the total construction layout cost was used to determine the cost of the construction site BMPs. Although no water pollution control plan sheets were developed, initial quantities are generally estimated based on the type and length of the project. All remaining water pollution control items will be included in the Construction Site Management lump sum bid item.

All comments received by District 7 Construction representative, James Burt, have been addressed to his satisfaction within the proposed Construction Site BMP strategy for this project.

Construction Site BMP costs are estimated at $480,000.

7. Maintenance BMPs (Drain Inlet Stenciling)

Drain Inlet Stenciling will be required within the city limits of Carson. In such cases, the contractor will use the City of Carson standard stenciling types unless otherwise informed by the proper City agent.

REQUIRED ATTACHMENTS

⇒ **Vicinity Map**
⇒ **Evaluation Documentation Form (EDF)**

SUPPLEMENTAL ATTACHMENTS

⇒ 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 1,2,4,5,8,9&10 (Treatment BMPs)

DATE: July 1, 2008

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPS EA: 233900

NO.	CRITERIA	YES	NO	SUPPLEMENTAL INFORMATION FOR EVALUATION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	☒		Go to 2
2.	Is this an emergency project?	☐	☒	If **Yes**, go to 11. If **No**, continue to 3.
3.	Have TMDLs OR OTHER Pollution Control Requirements been established for surface waters within the project limits?	☐	☒	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 10 or 4 (as determined by the NPDES Coordinator). _____ *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project within an urban MS4?	☒	☐	If **Yes**, continue to 5. *(Los Angeles County)* If **No**, go to 11.
5.	Is the project directly or indirectly discharging to surface waters?	☒	☐	If **Yes**, continue to 6. If **No**, go to 11.
6.	Is this 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 11.
8.	Is the Disturbed Soil Area (DSA) created by the project greater than or equal to 3.0 acres or does the project result in a net increase of one acre or more of new impervious surface?	☒	☐	If **Yes**, continue to 10. If **No**, go to 9. *13.6 acres (Total DSA quantity*
9.	Is the project part of a Common Plan of Development?	☐	☐	If **Yes**, continue to 10. If **No**, go to 11.
10.	Project is required to consider approved Treatment BMPs.	☒	See Sections 2.4 and either Section 5.5 or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
11.	Project is not required to consider Treatment BMPs. _____*(Dist./Reg. 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

DATE: July 1, 2008

Project Evaluation Process for the Consideration of Construction Site BMPs EA: 233900

NO.	CRITERIA	YES	NO	SUPPLEMENTAL INFORMATION
1.	Will construction of the project result in areas of disturbed soil as defined by the Project Planning and Design Guide (PPDG)?	☒	☐	If **Yes**, Construction Site BMPs for Soil Stabilization (SS) will be required. Complete CS-1, Part 1. Continue to 2. If **No**, Continue to 3.
2.	Is there a potential for disturbed soil areas within the project to discharge to storm drain inlets, drainage ditches, areas outside the right of way, etc?	☒	☐	If **Yes**, Construction Site BMPs for Sediment Control (SC) will be required. Complete CS-1, Part 2. Continue to 3.
3.	Is there a potential for sediment or construction related materials and wastes to be tracked offsite and deposited on private or public paved roads by construction vehicles and equipment?	☒	☐	If **Yes**, Construction Site BMPs for Tracking Control (TC) will be required. Complete CS-1, Part 3. Continue to 4.
4.	Is there a potential for wind to transport soil and dust offsite during the period of construction?	☒	☐	If **Yes**, Construction Site BMPs for Wind Erosion Control (WE) will be required. Complete CS-1, Part 4. Continue to 5.
5.	Is dewatering anticipated or will construction activities occur within or adjacent to a live channel or stream?	☒	☐	If **Yes**, Construction Site BMPs for Non-Storm Water Management (NS) will be required. Complete CS-1, Part 5. Continue to 6.
6.	Will construction include saw-cutting, grinding, drilling, concrete or mortar mixing, hydro-demolition, blasting, sandblasting, painting, paving, or other activities that produce residues?	☒	☐	If **Yes**, Construction Site BMPs for Non-Storm Water Management (NS) will be required. Complete CS-1, Part 5. Continue to 7.
7.	Are stockpiles of soil, construction related materials, and/or wastes anticipated?	☒	☐	If **Yes**, Construction Site BMPs for Waste Management and Materials Pollution Control (WM) will be required. Complete CS-1, Part 6. Continue to 8.
8.	Is there a potential for construction related materials and wastes to have direct contact with precipitation; storm water run-on, or stormwater runoff; be dispersed by wind; be dumped and/or spilled into storm drain systems?	☒	☐	If **Yes**, Construction Site BMPs for Waste Management and Materials Pollution Control (WM) will be required. Complete CS-1, Part 6. Continue to 9.
9.	End of checklist.	☒	Document for Project Files by completing this form, and attaching it to the SWDR.	

PE to initialize after concurrence with Construction (PS&E only) *Date*

Checklist SW-1, Site Data Sources

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405

PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900

RWQCB: Los Angeles (Region 4)

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	
• Henry Ford Avenue Topographic File - Ltr-690.dgn	September 22, 2004
• Ocean Boulevard Topographic File - Ltr-690.dgn	August 30, 2004
• Psomas and Associates, Inc. Topographic Survey and Mapping of SR-47/Sr-103 alignment -38384_sf.dgn	July 30, 2002
•	
Hydraulic	
• Geological map of California – Long Beach, dated 1962 (6th printing)	1991
Soils	
• Report of Phase I Environmental Site Assessment	January 16, 2008
• Report of Geologic-Seismic Evaluation	April 16, 2007
•	
Climatic	
• Los Angeles Almanac, 1877-2006 Average Total Precipitation http://www.losangelesalmanac.com/topics/Weather/we02.htm	December 2008
• L.A. County Department of Public Works Los Angeles, Water Resources: Rainfall Indices - www.ladpw.com/wrd/report/0001/precip/indices.cfm	December 2004
• L.A. County Department of Public Works Los Angeles, Hydrology Manual – Runoff values and calculations http://ladpw.org/wrd/publication/engineering/online/Contents/hydman.pdf	December 1991
•	
Water Quality	
• Caltrans Section 303(d) List - www.swrcb.ca.gov, (Region 4), Domínguez Channel (Estuary)	December 2008
Other Data Categories	
• Draft Project Report/Project Study Report – Plans, Typicals, and Profiles.	January 2008
• Draft Initial Study/ Environmental Assessment	July 2007
• http://www.dot.ca.gov/hq/oppd/stormwtr/Final-PPDG_Master_Document-6-04-07.pdf	May 2007
• L.A. County Department of Public Works, Los Angeles River Watershed www.ladpw.com/wmd/watershed/la/	July 2003
• Supplemental Project Study Report	November 2002

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

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 or hazardous 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: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

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: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

Consideration of Design Pollution Prevention BMPs

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

(a) Will project increase velocity or volume of downstream flow?	☒Yes	☐No	☐NA
(b) Will the project discharge to unlined channels?	☐Yes	☒No	☐NA
(c) Will project increase potential sediment load of downstream flow?	☐Yes	☒No	☐NA
(d) 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.

2. Slope/Surface Protection Systems

(a) 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.

3. Concentrated Flow Conveyance Systems

(a) Will the project create or modify ditches, dikes, berms, or swales?	☒Yes	☐No	☐NA
(b) Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA
(c) Will it be necessary to direct or intercept surface runoff?	☒Yes	☐No	☐NA
(d) 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.

4. Preservation of Existing Vegetation

a) 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: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405

PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900

RWQCB: Los Angeles (Region 4)

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 to reduce peak discharges.	☒Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 3

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

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 slopes > 1:4 vertical:horizontal (V:H))? ☒Yes ☐No

   If Yes, District Landscape Architecture must prepare or approve an erosion control plan.

6. Are slopes > 1:2 (V:H)? ☐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 1:2 (V:H).

7. Estimate the change to the impervious areas that will result from this project. 1.4 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: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

Concentrated Flow Conveyance Systems

Ditches, Berms, Dikes and Swales

1. Consider Ditches, Berms, Dikes, and Swales as per Chapters 813, 836, and 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 1:4 V:H. ☒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: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405

PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900

RWQCB: Los Angeles (Region 4)

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: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405

PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900

RWQCB: Los Angeles (Region 4)

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-watersheds 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.

1. 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

   (c) Is the 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 <u>all</u> of these questions consider Dry Weather Flow Diversion, complete and attach Part 3 of this checklist

2. 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: Biofiltration Systems, Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins also can capture litter – consult with District/Regional NPDES if these devices should be considered to meet litter/trash TMDL.

3. Is project located in an area (e.g., mountain regions) where traction sand is applied more than twice a year?
   If Yes, consider ***Traction Sand Traps***, complete and attach **Part 7** of this checklist. ☐Yes ☒No

4. (a) Are there local influent limits for infiltration or Basin Plan restrictions or other local agency prohibitions that would restrict the use of the infiltration devices? ☐Yes ☒No

(b) Would infiltration pose a threat to local groundwater quality as determined by the District/Regional Storm Water Coordinator? ☐Yes ☒No

If the answer to either part of Question 4 is Yes, then Infiltration Devices are infeasible and the consideration of Infiltration Devices should not be made when completing Questions 5 through 17.

5. (a) Does the project discharge to any 303(d) listed water body? ☒Yes ☐No
If No, go to Question 17, General Purpose Pollutant Removal

(b) If Yes, is the identified pollutant(s) considered a Targeted Design Constituent (TDC) (check all that apply):

___phosphorus, ✓ nitrogen, ___total copper, ___dissolved copper,
✓ total lead ✓ dissolved lead, ✓ total zinc, ✓ dissolved zinc,
✓ sediments, ___general metals [unspecified metals].

`

(c) If only one TDC is checked above, continue to Question 6. ☒Complete

(d) If more than one TDC is checked, contact your District/Regional NPDES Coordinator to determine priority before continuing with this checklist. ☒Complete

6. Consult with the District/Regional Storm Water Coordinator to determine whether Treatment BMP selection will be affected by any existing or future TMDL requirements. ☒Complete

The following questions show the approved Treatment BMPs in order of preference based on load reduction (performance) for the listed constituent and lifetime costs for the device, excluding right-of-way. Note that a line separates Treatment BMPs into groups of approximately equal effectiveness and within each grouping; any of the Treatment BMPs may be selected for placement if meeting site conditions. In the space provided next to the BMP, use Yes or a check mark to indicate a positive response.

If none of the listed Treatment BMPs for a specific constituent of concern (TDC) can be sited, go to Step #17 (General Purpose Pollutant Removal) to determine whether another Treatment BMP can be incorporated into the project.

***For the SWDRs developed for the PID and PA/ED phases of a project:* Consider all approved Treatment BMPs listed that can be reasonably incorporated into the project for each TDC.**

***For the SWDR developed for the PS&E phase:* Indicate (Yes or check mark) only those BMPs that will be incorporated into the project.**

7. Is phosphorus the TDC? [Use this constituent if "eutrophic" or "nutrients" is the TDC for the water body.] If Yes, consider: ☐Yes ☒No

_____Infiltration Devices
_____Austin Sand Filters

8. Is nitrogen the TDC? If Yes, consider: ☒Yes ☐No

- ✓ Infiltration Devices
- ✓ Austin Sand Filters
- ✓ Delaware Filter
- ✓ Detention Device
- ✓ MCTT

9. Is copper (total) the TDC? If Yes for total Copper, consider: ☐Yes ☒No

- Infiltration Devices
- Wet Basins
- Biofiltration Strips
- Detention Device
- Biofiltration Swales
- Austin Sand Filter
- Delaware Filter
- MCTT

10. Is copper (dissolved) the TDC? If Yes for dissolved Copper, consider: ☐Yes ☒No

- Infiltration Devices
- Biofiltration Strips
- Wet Basin
- Biofiltration Swale

11. Is lead (total) the TDC? If Yes for total Lead, consider: ☒Yes ☐No

- ✓ Infiltration Devices
- ✓ Wet Basin
- ✓ Biofiltration Strips
- ✓ Austin Sand Filter
- ✓ **Delaware Filter**
- ✓ Detention Device
- ✓ Biofiltration Swales
- ✓ MCTT

12. Is lead (dissolved) the TDC? If Yes for dissolved Lead, consider: ☒Yes ☐No

- ✓ Infiltration Devices
- ✓ Biofiltration Strips
- ✓ Wet Basin
- ✓ Detention Device
- ✓ Biofiltration Swales
- ✓ Austin Sand Filter

13. Is zinc (total) the TDC? If Yes for total Zinc, consider: ☒Yes ☐No

- ✓ Infiltration Devices
- ✓ Delaware Filter
- ✓ Wet Basin
- ✓ Biofiltration Strips
- ✓ Biofiltration Swales
- ✓ Austin Sand Filter
- ✓ MCTT
- ✓ Detention Devices

14. Is zinc (dissolved) the TDC? If Yes for dissolved Zinc, consider: ☒Yes ☐No

- ✓ Infiltration Devices
- ✓ Delaware Filter
- ✓ Biofiltration Strip
- ✓ Biofiltration Swale
- ✓ Austin Sand Filter
- ✓ MCTT

15. Is sediment (total suspended solids [TSS]) the TDC? If Yes for TSS, consider: ☒Yes ☐No

- ✓ Infiltration Devices
- ✓ Austin Sand Filter
- ✓ Delaware Filter
- ✓ Wet Basin
- ✓ Detention Device
- ✓ Biofiltration Strip
- ✓ MCTT
- Biofiltration Swale

16. Are "General Metals" or (unspecified) "Metals" the TDC? If Yes for General Metals, consider: ☐Yes ☒No

- Infiltration Devices
- Biofiltration Strips
- Wet Basin
- Biofiltration Swale
- Austin Sand Filter
- Delaware Filter
- MCTT

17. General Purpose Pollutant Removal.: When it is determined that there are no TDCs, consider the Treatment BMPs in the order listed below. ☐Yes ☒No

- Infiltration Devices
- Biofiltration Strips
- Wet Basin
- Biofiltration Swale
- Austin Sand Filter
- Detention Device
- Delaware Filter
- MCTT

18. Biofiltration

(a) Are site conditions and climate favorable to allow suitable vegetation to be established? ☒Yes ☐No

(b) Have Biofiltration strips and swales been considered to the extent practicable? Note: Biofiltration BMPs should be considered for all projects, even if other Treatment BMPs are placed. ☒Yes ☐No

If No to (a) or (b), document justification in Section 5 of the SWDR.

19. After completing the above, complete and attach the checklists shown below for every Treatment BMP under consideration ☒Complete

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

20. (a) Estimate what percentage of WQV/WQF will be treated by the preferred Treatment BMP(s): 70% of WQV and 2% of WQF. ☒Complete

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

21. Prepare cost estimate, including right-of-way, for selected Treatment BMPs and include as supplemental information for SWDR approval. ☒Complete

Treatment BMPs

Checklist T-1, Part 2

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405

PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900

RWQCB: Los Angeles (Region 4)

Biofiltration Swales / Biofiltration Strips

Feasibility

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

2. Are flow velocities < 4 fps (i.e. low enough to prevent scour of the vegetated bioswale 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 hazardous soils or contaminated 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 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 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 bioswale 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 bioswale 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 biostrip ≤ 300 ft? *	☒Yes	☐No
5.	Has the minimum width (in the direction of flow) of the invert of the bioswale received the concurrence of Maintenance? *	☐Yes	☒No
6.	Can bioswales 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 biostrip 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 3

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

Dry Weather Flow Diversion

Feasibility

1. Is dry-weather flow diversion acceptable to a Publicly Owned Treatment Works (POTW)? ☐Yes ☒No
2. Would a connection require ordinary (i.e., not extraordinary) plumbing, features or construction methods to implement? ☒Yes ☐No

   If No to either question above, Dry Weather Flow Diversion is not feasible.

3. Does adequate area exist within the right-of-way to place Dry Weather Flow Diversion devices? ☐Yes ☐No
   If Yes, continue to Design Elements sections. If No, continue to Question 4.
4. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Dry Weather Flow Diversion devices and how much right-of way would be needed? _____ (acres) ☐Yes ☐No
   If Yes, continue to the Design Elements section.

   If No, continue to Question 5.
5. 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. Does the existing sanitary sewer pipeline have adequate capacity to accept project dry weather flows, or can an upgrade be implemented to handle the anticipated dry weather flows within the project's budget and objectives? * ☐Yes ☐No
2. Can the connection be designed to allow for Maintenance vehicle access? * ☐Yes ☐No
3. Can gate, weir, or valve be designed to stop diversion during storm events? * ☐Yes ☐No
4. Can the inlet be designed to reduce chances of clogging the diversion pipe or channel? * ☐Yes ☐No
5. Can a back flow prevention device be designed to prevent sanitary sewage from entering storm drain? * ☐Yes ☐No

Treatment BMPs
Checklist T-1, Part 4

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405

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RWQCB: Los Angeles (Region 4)

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 as determined by the District/Regional NPDES Storm Water Coordinator?	☐ 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.	☐ Yes	☒ No
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	☐ Yes	☒ No
	If Yes, continue to Design Elements section.		
	If No, continue to Question 9.		
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 Water Quality freeboard above the WQV elevation (reference Appendix B.1.3.1)? *	☒Yes	☐No
6.	Can the Infiltration Basin be designed with interior side slopes no steeper than 1:4(V:H) (may be 1:3 [V:H] 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/Emergency 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 ≤ 72 hours? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet], unless the District/Regional NPDES 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, and is the depth < the width? *	☒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 Biofiltration)? *	☒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: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

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 and 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)?

   If Yes, continue to the Design Elements section. 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 Detention Device(s) 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

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 WQV? *	☒Yes	☐No
4.	Is an overflow outlet provided? *	☒Yes	☐No
5.	Is the drawdown time of the Detention Device within 24 to 72 hours? *	☒Yes	☐No
6.	Is the Detention Device 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 1:4 (V:H) or flatter for interior slopes? ** (Note: Side slopes up to 1:3 (V:H) 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: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

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 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

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 7

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

Traction Sand Traps

Feasibility

1. Can a Detention Device be sized to capture the estimated traction sand and the WQV from the tributary area?
   If Yes, then a separate Traction Sand Trap may not be necessary. Coordinate with the District/Regional Storm Water Coordinator and also complete Checklist T-1, Part 5. ☒Yes ☐No

2. Is the Traction Sand Trap proposed for a site where sand or other traction enhancing substances are applied to the roadway at least twice per year? ☐Yes ☒No

3. Is adequate space provided for Maintenance staff and equipment access for annual cleanout? ☒Yes ☐No

4. Has the local RWQCB agreed that the proposed Traction Sand Trap would not be classified as a regulated underground injection well? ☐Yes ☒No

   If the answer to any one of Questions 2, 3 or 4 is No, then a Traction Sand Trap is not feasible.

5. Does adequate area exist within the right-of-way to place Traction Sand Traps? ☐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 Traction Sand Traps and how much right-of way would be needed? _____ 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

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.	Was the local Caltrans Maintenance Station contracted to provide the amount of traction sand used annually at the location? * (Detention Device or CMP type) List application rate reported. _____ yd^3	☐Yes	☐No
2.	Does the Traction Sand Trap have enough volume to store settled sand over the winter using the formula presented in Appendix B, Section B.5? * (Detention Device or CMP type)	☐Yes	☐No
3.	Is the invert of the Traction Sand Trap a minimum of 3 ft above seasonally high groundwater? * (CMP type)	☐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? * (CMP type)	☐Yes	☐No
5.	Has the District/Regional NPDES Storm Water Coordinator been contacted to ensure that the traction sand trap is not classified as a regulated underground injection well? * (CMP type)	☐Yes	☐No
6.	Can peak flow be diverted around the device? ** (CMP type)	☐Yes	☐No
7.	Within the tributary area, have the unstabilized areas (that would contribute sediment in addition to traction sand) been minimized as much as possible?**(Detention Device or CMP type)	☐Yes	☐No
8.	Is 6 inches separation provided between the top of the captured traction sand and the outlet from the device, in order to minimize re-suspension of the solids? ** (CMP type)	☐Yes	☐No

Treatment BMPs
Checklist T-1, Part 8

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

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 40 to 48 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 NPDES 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?	☐ 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	

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 biofiltration)? **	☐ 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 1:3 (V:H) or flatter? *	☒Yes	☐No
9.	Is maximum depth ≤ 13 ft below ground surface? *	☒Yes	☐No
10.	Can the Austin Sand Filter be placed in an offline configuration? **	☒Yes	☐No

Design Elements – Delaware Filter

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

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

1.	Can the first chamber be sized for the WQV? *	☐Yes	☒No
2.	Is the drawdown time of the 2nd chamber between 40 and 48 hours? *	☒Yes	☐No
3.	Is access for Maintenance vehicles provided to the Delaware Filter? *	☒Yes	☐No
4.	Is a bypass/overflow provided for storms > WQV? **	☒Yes	☐No
5.	Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration)? **	☐Yes	☒No
6.	Can the Delaware Filter be placed in an offline configuration? **	☒Yes	☐No
7.	Is maximum depth ≤ 13 ft below ground surface? *	☒Yes	☐No

Treatment BMPs
Checklist T-1, Part 9

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.4/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

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 ≥ 4,356 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? If No to any question above, then an MCTT is not feasible.	☐ Yes	☐ No
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	

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? *	☐ 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 biofiltration)? **	☐ Yes	☐ No

Treatment BMPs
Checklist T-1, Part 10

Prepared by: Ignacio Roman PE Date: July 1, 2008 District-Co-Route: 07-LA-405
PM (KP): 10.8/11.4 (16.7/18.3) EA: 233900
RWQCB: Los Angeles (Region 4)

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 72 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 Water Quality 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 10.		

11. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres

☐Yes ☐No

12. If Yes, continue to Design Elements section.

    If No, continue to Question 8.

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

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 72 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 biofiltration, 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