Los Angeles River Metals Total Maximum Daily Load Implementation Plan

Prepared for:

California Department of Transportation

October 11, 2010

FINAL REPORT

CTSW-RT-10-182-15.1

For individuals with sensory disabilities, this document is available in alternate formats upon request. Please call or write to Stormwater Liaison, Caltrans Division of Environmental Analysis, P.O. Box 942874, MS 27, Sacramento, CA 94274 0001, (916) 653-8896 Voice, or dial 711 to use a relay service.

Contents

Tables

Figures

Appendices

Appendix Tables

Appendix Figures

Acronyms and Abbreviations

ac	Acre
BMP	Best Management Practice
cfs	Cubic feet per second
CMP	Coordinated Monitoring Plan
DWQ	Department of Water Quality
EPA	U.S. Environmental Protection Agency
ID	Identification
kg	Kilograms
L	Liters
LA	Los Angeles
MS	Maintenance Station
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NRDC	Natural Resources Defense Council
PM	Post Mile
Rte	Route
TMDL	Total Maximum Daily Load
WLA	Waste Load Allocation
WQV	Water Quality Volume

1 Background

1.1 Implementation Plan Purpose

This plan describes the actions that the California Department of Transportation (Caltrans) will take to meet the Los Angeles River Metals Total Maximum Daily Load (TMDL) requirements. The plan incorporates a multi-faceted approach that includes implementation of structural BMPs, source control actions, and special studies. Caltrans received comments from Los Angeles Regional Board staff regarding this implementation plan in a letter dated June 14, 2010, which is provided in Appendix F. Caltrans has addressed the comments provided in the letter in this implementation plan.

1.2 TMDL Summary

The Los Angeles River Metals TMDL was adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) on June 2, 2005 and adopted by the State Water Resources Control Board (State Board) on October 20, 2005. The TMDL was developed using water quality data considered by the Regional Board and the U.S. Environmental Protection Agency (EPA) in developing the 1998 and 2002 303(d) listings for metals and additional data submitted by the City of Los Angeles, the City of Burbank, and the County of Los Angeles. The primary named responsible jurisdictions for this TMDL are all National Pollutant Discharge Elimination System (NPDES)-regulated municipal stormwater discharges in the Los Angeles watershed. These include the Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit, the City of Long Beach MS4 Permit, and the Caltrans NPDES stormwater permit (Order No. 99-06-DWQ) issued by the State Board on July 15, 1999.

1.3 Watershed Description

The Los Angeles River watershed has a drainage area of approximately 534,000 acres, of which approximately 7,200 acres (1.3%) consists of Caltrans roadways and facilities. Caltrans operates and maintains 19 routes in the watershed, comprising 275.5 miles. Caltrans operates and maintains 18 maintenance stations and 15 park and ride facilities in the watershed. Figure 2-1 shows all Caltrans facilities within the Los Angeles River Watershed.

Approximately 44% of the watershed area can be classified as forest or open space. These areas are primarily within the headwaters of the Los Angeles River in the Santa Monica, Santa Susana, and San Gabriel Mountains, including the Angeles National Forest, which comprises approximately 200 square miles of the watershed. Approximately 36% of the land use can be categorized as residential, 10% as industrial, 8% as commercial, and 3% as agricultural, water and other. More urban uses are found in the lower portions of the watershed.

1.4 Caltrans Waste Load Allocations

Table 1-1 shows the waste load allocations (WLAs) established by the Los Angeles River TMDL for both dry and wet weather periods. For the dry weather allocations, due to a lack of data, it was not possible to divide the allocations between Caltrans and the MS4 permittees; therefore, the WLAs are shared allocations.

Table 1-1: Waste Load Allocations for the Los Angeles River Metals TMDL

Dry Weather WLAs for Stormwater Permittees (including Caltrans)				
Waterbody	**Critical Flow (cfs)**	**Copper (kg/day)**	**Lead (kg/day)**	**Zinc (kg/day)**
Los Angeles River Reach 6	7.20	0.53	0.33	
Los Angeles River Reach 5	0.75	0.05	0.03	
Los Angeles River Reach 4	5.13	0.32	0.12	
Los Angeles River Reach 3	4.84	0.06	0.03	
Los Angeles River Reach 2	3.86	0.13	0.07	
Los Angeles River Reach 1	2.58	0.14	0.07	
Bell Creek	0.79	0.06	0.04	
Tujunga Wash	0.03	0.001	0.0002	
Verdugo Wash	3.3	0.15	0.07	
Burbank Western Channel	3.3	0.18	0.10	
Arroyo Seco	0.25	0.01	0.01	
Rio Hondo Reach 1	0.50	0.01	0.006	0.16
Compton Creek	0.90	0.04	0.02	

Wet Weather WLAs					
Constituent	**General Industrial Permittees (kg/day)**	**General Construction Permittees (kg/day)**	**Caltrans (kg/day)**	**MS4 Permittees (kg/day)**	**Combined Stormwater Permittees (kg/day)**
Cadmium	1.6E-10*daily volume (L) – 0.11	5.9E-11*daily volume (L) – 0.04	5.3E-11*daily volume (L) – 0.03	2.8E-09*daily volume (L) – 1.82	3.1E-09*daily volume (L) – 1.95
Copper	8.8E-10*daily volume (L) – 0.5	3.2E-10*daily volume (L) – 0.2	2.9E-10*daily volume (L) – 0.2	1.5E-08*daily volume (L) – 9.5	1.7E-08*daily volume (L) – 10
Lead	3.3E-09*daily volume (L) – 0.22	1.2E-09*daily volume (L) – 0.08	1.06E-09*daily volume (L) – 0.07	5.6E-08*daily volume (L) – 3.85	6.2E-08*daily volume (L) – 4.2
Zinc	8.3E-09*daily volume (L) – 4.8	3.01E-09*daily volume (L) – 4.8	2.7E-09*daily volume (L) – 1.6	1.4E-07*daily volume (L) – 83	1.6-07*daily volume (L) – 90

1.5 Coordinated Monitoring Plan

Caltrans has joined with other stakeholders in the watershed to form the Los Angeles River Metals TMDL Technical Committee and to develop and implement a coordinated monitoring program. The County of Los Angeles and the City of Los Angeles serve as co-chairs of the Technical Committee. The final draft of the Coordinated Monitoring Plan was submitted to the Regional Board on March 21, 2008 and approval was received from the Regional Board on April 11, 2008.

The Coordinated Monitoring Plan (CMP) developed by the Technical Committee addresses three objectives:

- To collect data to assess compliance with the WLAs;
- To collect data to evaluate potential management scenarios; and
- To collect data to evaluate the uncertainties and assumptions made during the development of the TMDL.

The monitoring program consists of a three-tiered program to meet the TMDL requirements. The approach consists of long-term monitoring (Tier I), focused monitoring of tributaries at locations with repeated criteria exceedances (Tier II), and monitoring of direct source control efforts (Tier III). The monitoring program includes sample analyses to evaluate levels of cadmium, copper, lead, zinc, and hardness. Dry weather monitoring is performed monthly, and activities began in October 2008. Wet weather monitoring is performed on a wet weather event basis not to exceed two sample events per month with a minimum of 72 hours between wet weather events. Wet weather monitoring began in February 2009.

One of the three objectives of the monitoring program as stated above is to collect data to assess compliance with the TMDL waste load allocations. The TMDL allows that the ambient monitoring station locations also be used to assess the effectiveness of stakeholder implementation efforts. In addition, the laboratory analysis method being used for metals, the Inductively Coupled Plasma-Atomic Emission Spectrometric Method (“ICP-AES” or “ICP”), has the ability to detect levels below that of the TMDL compliance requirements. As specified in the Compliance Monitoring Plan, the annual monitoring reports submitted to the Regional Board will include compliance summary tables. Caltrans will continue to participate in the stakeholder group on the coordinated monitoring program.

2 Caltrans Facilities in the Los Angeles River Watershed

2.1 Description of Roadways and Facilities

Caltrans operates and maintains 19 routes, comprising 275.5 miles, 18 maintenance stations, and 15 park and ride facilities in the Los Angeles River watershed. Caltrans owns 66.4 acres of vacant or leased land within the Los Angeles River watershed. Some of the land is leased to third parties for industrial or commercial uses. A small percentage of land is leased for residential use. This land is owned by Caltrans for use in future expansion of the highways. Table 2 presents the list of highways within each Jurisdictional Group. Table 2-1 lists the highways within each jurisdictional boundary and the post miles (PM) where the highways enter and exit the watershed boundaries.

Table 2-1 Caltrans Highway by Jurisdictional Group

Highway	Jurisdiction	PM Marker Start	PM Marker Finish	Miles
1	1	5.40	7.65	2.2
91	1	9.18	10.58	1.4
105	1	6.77	11.37	4.6
110	1	13.35	19.50	6.1
405	1	5.50	7.80	2.3
710	1	1.10	8.77	7.7
2	2	33.89	38.43	4.5
2	2	24.41	32.69	8.3
2	2	32.77	33.15	0.4
5	2	8.35	20.54	12.2
10	2	14.40	28.60	14.2
60	2	0.00	10.54	10.5
72	2	7.74	8.46	0.7
91	2	10.58	14.51	3.9
101	2	0.00	2.47	2.5
105	2	11.37	15.87	4.5
110	2	22.79	31.91	9.1
134	2	11.16	13.34	2.2
210	2	19.13	36.11	17.0
605	2	23.30	25.10	1.8
710	2	8.77	27.70	18.9
2	3	13.58	23.15	9.6
5	3	20.45	35.19	14.7
134	3	4.22	11.16	6.9

Highway	Jurisdiction	PM Marker Start	PM Marker Finish	Miles
210	3	10.89	19.13	8.2
2	4 & 5	33.15	33.89	0.7
2	4 & 5	32.69	32.77	0.1
2	4 & 5	44.13	45.01	0.9
2	4 & 5	43.12	43.17	0.1
2	4 & 5	51.21	53.83	2.6
2	4 & 5	45.96	50.46	4.5
5	4 & 5	35.19	47.15	12.0
14	4 & 5	24.79	25.70	0.9
101	4 & 5	9.31	19.35	10.0
118	4 & 5	6.81	14.43	7.6
134	4 & 5	0.00	4.22	4.2
170	4 & 5	14.50	20.51	6.0
210	4 & 5	0.00	10.89	10.9
405	4 & 5	36.60	48.20	11.6
27	6	9.29	20.06	10.8
101	6	19.35	29.78	10.4
118	6	0.00	6.81	6.8
118	6	31.74	32.60	0.9

2.2 Land Use Analysis

Caltrans operates and maintains approximately 2,305 identified discharge points in the Los Angeles River Watershed. Due to the high number of Caltrans discharge points in the watershed, a list containing each discharge point (including the outfall ID number, location in easting/northing, route number, direction, and cross street) can be provided upon request.

Figure 2-1 shows Caltrans Highways by Jurisdictional Group.

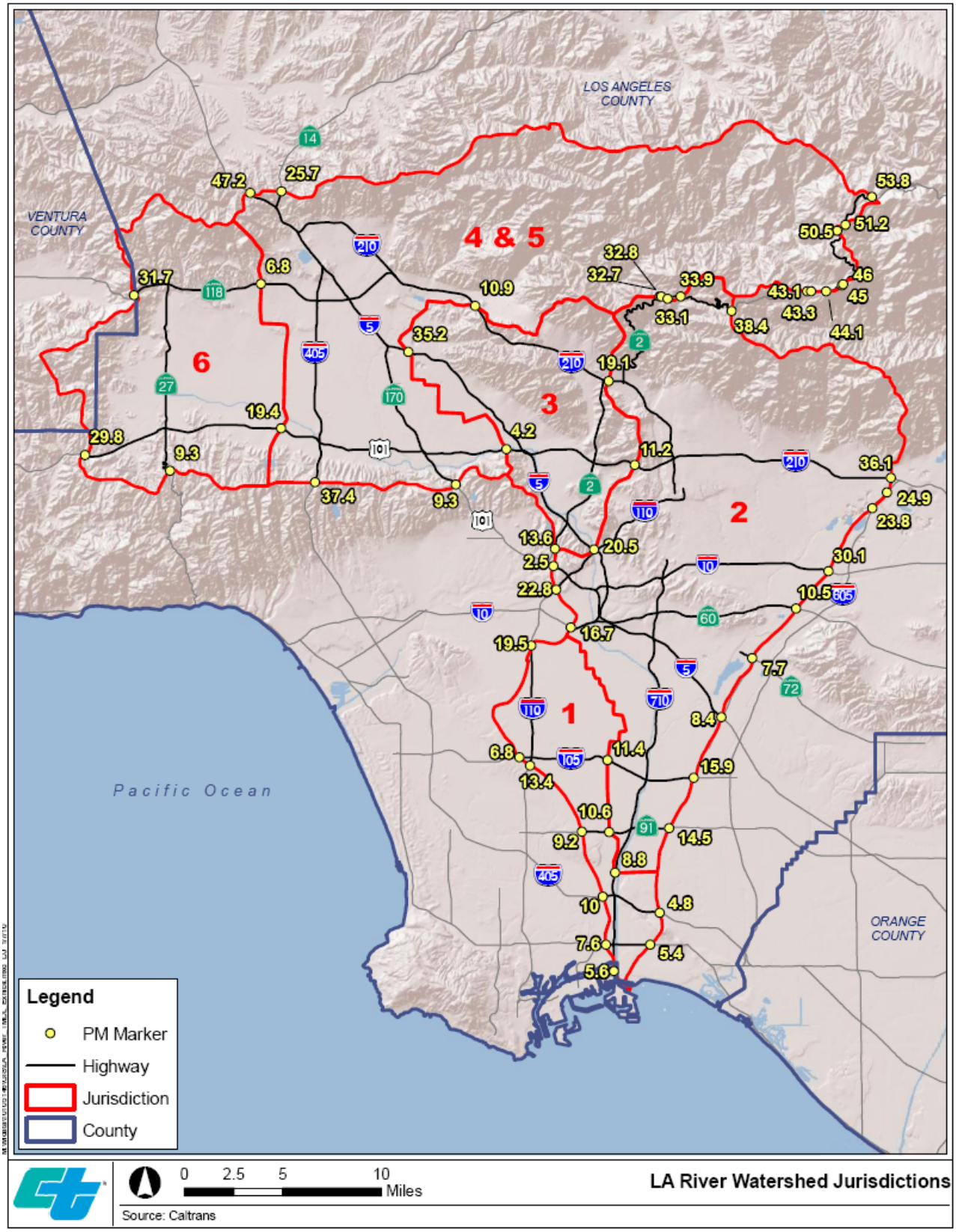

Figure 2-1: Caltrans Highways by Jurisdictional Group

2.2.1 Jurisdictional Group 1

Jurisdictional Group 1 consists of the subwatersheds of the Los Angeles River Reach 1 and Compton Creek. Caltrans has six highways that cross this watershed, consisting of approximately 24 miles as shown in Table 2-1. Caltrans is an active member in the stakeholder group within this jurisdiction. A separate implementation plan is being submitted for this jurisdictional group.

2.2.2 Jurisdictional Group 2

Jurisdictional Group 2 consists of the subwatersheds of the Los Angeles River Reach 2, Rio Hondo, Arroyo Seco, and all contributing subwatersheds. Caltrans has thirteen highways that cross this watershed, consisting of approximately 110 miles as shown in Table 2-1. Caltrans is an active member in the stakeholder group within this jurisdiction. A separate implementation plan is being submitted for this jurisdictional group.

2.2.3 Jurisdictional Group 3

Jurisdictional Group 3 consists of the subwatershed of the Los Angeles River Reach 3, Verdugo Wash, and Burbank Western Channel. Caltrans has four highways that cross this watershed, consisting of approximately thirty-nine miles as shown in Table 2-1.

2.2.4 Jurisdictional Groups 4 and 5

Jurisdictional Group 4 and 5 consists of the subwatershed of the Los Angeles River Reach 4 and 5, Tujunga Wash and all contributing subwatersheds. Caltrans has nine highways that cross this watershed, consisting of approximately 72 miles as shown in Table 2-1.

2.2.5 Jurisdictional Group 6

Jurisdictional Group 6 consists of the subwatershed of the Los Angeles River Reach 6, Bell Creek, and all contributing subwatersheds. Caltrans has three highways that cross this watershed, consisting of approximately 29 miles as shown in Table 2-1.

3 Caltrans Implementation

3.1 Corridor Studies

On January 17, 2008, Judge Edward Rafeedie, United States District Court, Central District of California, signed a Stipulation and Order in the longstanding case between the Natural Resources Defense Council (NRDC) and Caltrans. This Stipulation and Order requires Caltrans to prepare Corridor Stormwater Management Studies (Corridor Studies) on the District 7 Drainage System located in Los Angeles and Ventura Counties, and to perform the studies in a manner consistent with the Regional Board's jurisdiction.

The drainage system encompasses about 610 centerline miles of freeways and 356 centerline miles of conventional highways. Under the Stipulation and Order, Caltrans is required complete the Corridor Studies for freeways in District 7 by September 30, 2011, and for conventional highways in District 7 by September 30, 2013.

Each Corridor Study:

- Identifies all the locations possible for BMP implementation on a corridor basis.
- Explains how preliminary opportunities for placement of BMPs were identified and evaluated.
- Explains the analysis used to identify proposed BMP opportunities and sites.
- Includes a list of all BMP opportunities assessed, the identification of the BMPs selected, their preliminary locations, and water quality volumes (WQV) to be treated.

The Corridor Studies present how the placement of BMPs can meet the Stipulation and Order requirement in each identified watershed. Each Corridor Study determines the technical feasibility of implementing treatment BMPs in the corridors, compares the effectiveness of the treatment BMPs to the cost, and identifies and evaluates possible locations of treatment BMPs.

The Stipulation and Order further requires Caltrans to implement the recommendations of these Corridor Studies into appropriate new construction and major reconstruction projects as they are developed in these corridors. The implementation of the treatment and reduction measures identified in the Corridor Studies helps Caltrans to work toward compliance for the WLA for metals under the Los Angeles River TMDL.

Corridor Studies to be completed that have overlap into the Los Angeles River watershed are shown in Table 3-1.

Table 3-1: Corridor Study Highway Miles and Post Miles

Route	PM Start	PM End	Miles	Status	% WQV Treat / Target
2	15.1	23.2	8.1	Pending	NA
5	-2.3	13.8	16.1	Complete	62%
5	14.9	26.7	11.8	Complete	169%
5	26.7	45.6	18.9	Complete	112%
5	45.6	87.4	41.8	In Process	NA
5	43.9	46.4	2.5	Pending	NA
10	14.8	31.2	16.4	Complete	23%
10	0.0	0.7	0.7	Pending	NA
60	0.5	11.7	11.2	Pending	NA
91	6.3	20.7	14.4	Pending	NA
101	0.0	17.2	17.2	Pending	NA
101	0.0	1.3	1.3	Pending	NA
101	17.2	3.8	20.9	Pending	NA
105	0.5	17.8	17.3	Pending	NA
110	0.8	31.9	21.1	In Process	NA
118	0.0	14.4	14.4	Pending	NA
170	14.5	20.6	6.1	Complete	190%
210	0.0	25.1	25.1	Pending	NA
210	25.1	52.2	27.1	Pending	NA
405	0.0	13.1	13.1	Complete	226%
405	29.5	39.4	9.9	Complete	186%
405	39.4	48.6	9.2	Complete	248%
605	9.6	25.8	16.2	In Process	NA
710	6.9	15.7	8.8	Complete	127%
710	15.7	26.5	10.8	Complete	167%
710	26.5	32.7	6.2	Pending	NA
1	0.0	31.3	31.3	Pending	NA
2	24.4	52.3	32.8	Pending	NA
164	1.4	8.8	7.4	Pending	NA
27	0.0	20.1	20.1	Pending	NA

As of December 2009, four projects in the I-5 North Corridor (PM 26.7 to PM 45.6) have incorporated 33 of 38 recommended BMPs into the P&SE package at an estimated cost of $20 million. The remaining BMPs will be evaluated further in other projects. Three projects in the I-5 South Corridor (PM -2.3 to PM 13.8) are evaluating 62 BMPs at the estimated cost of $32 million. The 405 Design Build Corridor Study (29.5 to PM 39.4) from Route 10 to Route 101 is a joint Design Build project with Metropolitan Transport Authority (Metro). Caltrans has included all 21 identified BMPs, estimated to cost $19 million, in the Design Build package for detailed evaluation and incorporation into the P&SE package.

Since December 2008, more projects have been added; the exact number is not yet available.

3.2 Project Delivery/BMP Implementation

Caltrans implements BMPs for roadway improvement projects through an established process, the Stormwater Data Report (SWDR) preparation process. In general, a SWDR is prepared for every project. The Licensed Professional Engineer (or Licensed Landscape Architect) prepares the SWDR. A SWDR is prepared at the initiation of a project during the preparation of the Project Initiation Document (PID). The purpose of preparing a SWDR at the initiation of a project is to develop consensus on the scope, schedule, and estimated cost of a project. Caltrans recognizes the importance of considering stormwater treatment early in the project development process. The goal of the SWDR at this stage is to obtain consensus between the different functional units, facilitate the consideration of the BMPs, and provide sufficient information to consider BMPs.

The next phase of a SWDR is to develop a Project Approval/Environmental Document (PA/ED). The purpose of the PA/ED is to summarize the studies of the scope, cost, and overall environmental impact of alternatives so that an informed decision is made about whether to proceed with the project and to select appropriate design pollution prevention, treatment, and construction site BMPs. The water quality goal of the PA/ED phase is to use updated and more detailed engineering and environmental data to continue the BMP selection process that was initiated during the PID process. The design team also reviews the BMPs previously identified to determine whether they are still appropriate and whether they represent the best application of the BMPs approved for statewide use.

The third phase of a SWDR is the PS&E. The purpose of the PS&E is for eventual contract advertising and bidding on a project. At this phase, the SWDR is updated based on the detailed engineering data, and the most appropriate technically feasible treatment BMPs are selected to treat the pollutant(s) of concern (POC).

Listed in the following sections are Caltrans-approved Design, Treatment, Construction, and Maintenance BMPs. Listed in Appendix D are the BMPs that are proposed during the SWDR preparation. Many of these BMPs have been built and more will be built as projects go into construction. There are 486 BMPs currently proposed through the SWDR process, including 41 biofiltration strips, 64 biofiltration swales, 11 detention basins, 24 infiltration basins, 1 infiltration trench, 241 gross solids removal devices (GSRDs), 98 media filters, 1 multi-chambered treatment train (MCTT), and five other devices. Each BMP is in a different phase of the design and construction process.

3.2.1 Design Pollution Prevention BMPs

Design Pollution Prevention BMPs are permanent measures to reduce pollution discharges (e.g., reduce erosion, manage non-stormwater discharges, etc.) after construction is completed. The Design Pollution Prevention BMPs that are to be incorporated, as appropriate, into the design of new facilities and reconstruction or expansion of existing facilities are listed in Table 3-2.

Table 3-2: Design Pollution Prevention BMPs

Consideration of Downstream Effects Related to Potentially Increased Flow

Table 3-2: Design Pollution Prevention BMPs

Peak Flow Attenuation Basins
Preservation of Existing Vegetation
Concentrated Flow Conveyance Systems Ditches, Berms, Dikes and Swales Overside Drains Flared Culvert End Sections Outlet Protection/Velocity Dissipation Devices
Slope/Surface Protection Systems Vegetated Surfaces Hard Surfaces

For all Caltrans projects, Caltrans will maximize vegetation-covered soil areas of a project.

3.2.2 Treatment BMPs

Treatment BMPs are permanent measures to improve stormwater quality after construction is completed. The Treatment BMPs approved by Caltrans are listed in Table 3-3.

Table 3-3: Approved Treatment BMPs

• Biofiltration Systems (Strips/Swales)	• Gross Solids Removal Devices (GSRDs)
• Infiltration Devices	• Media Filters
• Detention Devices	• Multi-Chambered Treatment Trains (MCTTs)
• Dry Weather Flow Diversions	• Wet Basins

Biofiltration strips and swales are vegetated surfaces that remove pollutants by filtration through grass, sedimentation, sorption to soil or grass, and infiltration through the soil. Strips and swales are mainly effective at removing debris and solid particles, although some constituents are removed by sorption to the soil. Biofiltration swales are vegetated channels that receive directed flow and convey stormwater. Biofiltration strips, also known as vegetated buffer strips, are vegetated sections of land over which stormwater flows as overland sheet flow. Biofiltration strips and swales are to be implemented at all sites to the extent that implementation is consistent with existing Caltrans policies.

Infiltration devices are basins or trenches that store runoff and allow it to infiltrate into the ground. Infiltration prevents pollutants in the captured runoff from reaching surface waters. In areas of high sediment loads, pretreatment may be required. Infiltration devices are permanent treatment BMPs, and should be considered wherever site conditions allow, and shall be sited and designed according to Caltrans criteria.

Detention devices are basins or tanks that temporarily detain runoff under quiescent conditions to allow particles to settle out. A detention device is a permanent treatment BMP designed to reduce the sediment and particulate loading in runoff from the water quality design storm.

Dry weather flow diversions are devices that direct flow through a pipe or channel to nearby municipal sanitary sewer systems for treatment at a local wastewater treatment plant during dry weather or during periods of dry weather. Dry weather flow Diversions may be feasible if dry weather flow from Caltrans activities is persistent, and the sanitary sewer authority is willing to accept the flow. They should only be considered if dry weather flow from Caltrans activities is

persistent or the result of an ongoing Caltrans activity. Additionally, dry weather flow diversions should only be considered if connection to a nearby sanitary sewer would not involve excessive measures to implement.

Gross solids removal devices (GSRDs) are devices that remove litter from stormwater runoff using various screening technologies. GSRDs should be considered for areas where receiving waters are on the 303(d) list for trash or other associated pollutants, as well as areas for which TMDLs have been adopted that require trash removal.

Media filters are devices that remove sediment, particulate-associated pollutants, and sometimes dissolved pollutants from stormwater runoff by filtration. The normal configuration of such a device consists of two chambers, an initial sedimentation basin or vault followed by a filtering basin or vault that incorporates a filtering media.

Multi-chambered treatment trains (MCTTs) are devices that utilize three chambers to remove sediment, particulate-associated pollutants, and sometimes dissolved pollutants from stormwater runoff using media filter materials. MCTTs use three different treatment mechanisms in three separate chambers. These include a grit chamber with a sump, a sedimentation chamber with tube settlers and sorbent pads, and a filtering chamber provided with a filtering media.

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

Wet basins should be considered when the site is located in a location where the visual aesthetics of the permanent pool is considered a benefit (such as a roadside rest area or vista point). Potential sites must have a high water table, or another source of water must be present to provide base flow sufficient to maintain the plant community year-round.

Presented in Figure B-1, Figure B-2, and Figure B-3 in Appendix B are the expected effluent concentrations for copper, lead, and zinc for each of the approved treatment BMPs. These charts were created based on the monitoring data collected in the Caltrans BMP Retrofit Pilot Program (CTSW-RT-01-050). The circle represents the median effluent concentrations, while the lines represent the 90th percentile confidence interval for the mean effluent concentrations. The red horizontal line indicates the WLA based on the equations using the typical hardness from Caltrans discharge.

3.2.3 Construction Site BMPs

Construction Site BMPs (also called temporary control practices) are deployed during construction activities to reduce pollutants in stormwater discharges. Caltrans' construction site BMPs are divided into seven categories as shown in Table 3-4.

Table 3-4: Approved Construction Site BMP Categories

- Temporary Soil Stabilization
- Temporary Sediment Control
- Wind Erosion Control
- Tracking Control
- Non-Stormwater Management
- Waste Management and Materials
- Pollution Control

3.2.4 Maintenance BMPs

Maintenance BMPs are water quality controls used to reduce pollutant discharges during highway maintenance and activities conducted at maintenance facilities. One example of

maintenance BMPs is Caltrans' practice of stenciling messages at storm drain inlets located at highway facilities such as park and ride lots, rest areas, and vista points to assist in educating the public about stormwater runoff pollution. Additionally, all new inlets located within cities, towns, and communities with populations of 10,000 or more, or within designated MS4 areas, are stenciled when constructed.

3.3 Source Control

3.3.1 Brake Pad Partnership

Caltrans is funding a statewide effort to reduce loads of copper from vehicle brake pads. Caltrans is working in cooperation with municipal stormwater permittees, brake pad manufacturers, environmental groups, other government agencies, and community members to reduce copper loads from brake pads. Studies have shown that brake pads in motor vehicles may contribute a significant percentage of the copper loads from highly urbanized watersheds. Reducing copper from brake pads prevents copper at one of its sources. This is a preventive and much more effective action than treating runoff to reduce copper once discharged.

On September 25, 2010, the governor signed SB 346 (Kehoe) which phases out copper and other metals in brake linings. The new law requires that brake friction material contain no more than 5% copper by weight by 2021, with reduction to no more than 0.5% by 2025. Effective 2014, the law also places restrictive limits (0.1% or less) on cadmium, hexavalent chromium, lead, mercury and asbestos. Current brake pads contain up to 20% copper. This legislation will lead to substantial reduction of copper, as well as cadmium and lead, from reaching the Los Angeles River.

3.3.2 Roadside Landscape Measures

Caltrans has numerous projects to install plants to stabilize the soil surface and control erosion to stop sediment and attached pollutants (including metals) at the source, and prevent pollution of receiving waters. Studies have shown that root and soil development can stabilize shallow slope failures. Successful revegetation will include remediation of soils and irrigation. Erodible areas where plants cannot be maintained will be covered with a paving material. The projects are focused on the prevention of erosion and increasing the ability of stormwater to infiltrate, containing some pollutants on site.

Several projects are being undertaken within the Los Angeles River watershed. The locations of the projects are shown in Table 3-5. Dry and drought conditions have contributed to the loss of vegetation in the area. Annual weeds proliferate in these areas, when rain returns and hinder the deeper-rooted plants from successfully holding the soil. Caltrans will continue to look for similar opportunities throughout the watershed.

Table 3-5: Landscape Project Locations

Route	Beg PM	End PM	Project Location	Areas Improved (ac)
210	R0.8	R4.9	In LA County NB from Maclay Ave to Yarnell St	56 ac
210	R0.8	R4.9	In LA County SB from Maclay Ave to Yarnell St	51 ac

Table 3-5: Landscape Project Locations

Route	Beg PM	End PM	Project Location	Areas Improved (ac)
110	23.5	23.9	SB Rte 110 @ the Rte 101 IC	10 ac
110	23.5	23.9	NB Rte 110 @ the Rte 101 IC	10 ac
118	11.5	13.7	EB Rte 118 from I-5 IC to Rte 210 IC	43 ac
118	11.5	13.7	WB Rte 118 from I-5 IC to Rte 210 IC	40 ac
170	R17.7	R20.3	NB Rte 170 from Van Owen St UC to NB off-ramp to Sheldon St	46 ac
170	R17.7	R20.3	SB Rte 170 from Van Owen St UC to NB off-ramp to Sheldon St	42 ac
5	26.4	27.0	NB I-5 from Zoo Dr to Rte 134 and WB Rte 134	34 ac
5	26.4	27.0	SB I-5 from Zoo Dr to Rte 134 and WB Rte 134	34 ac
5	25.2	26.5	From Elk Ave/Colorado Extension to Zoo Drive	34 ac

3.3.3 Annual Element

The Annual Element is a Soil Stabilization Protocol prepared annually in response to the July 25, 1996 Court Order and Stipulation. The Maintenance Division tracks areas of potential erosion, particularly near bridge embankments, and repairs/stabilizes these areas to prevent erosions. Each year the Maintenance Field Supervisor collects field data to identify erosion problem areas. The District Erosion Control Team reviews the collected filed data and prioritizes projects based on critical needs. These prioritized projects are then evaluated for an appropriate solution. Techniques for stabilization include rock riprap, willow planting, ice plant planting, pavement, mulching and regarding. The Annual Element program first reported in 1999. Since 1999, seventy-seven projects have been completed effectively stabilizing areas of erosion.

3.3.4 Enhanced Street Sweeping

Caltrans conducts roadway sweeping and roadside cleanup operations to provide safe freeway conditions and to maintain a neat and clean appearance appropriate for the type and use of the road. Sweeping is currently conducted as needed throughout the watershed. Material collected is disposed of appropriately. Caltrans is considering implementing an enhanced sweeping program pending available funding.

Trash/litter and debris removal activities include sweeping of shoulders, paved medians, etc., and trash/litter removal along the roadsides. In fiscal year 2006-2007, $3.35 million was spent sweeping 42,750 lane miles along freeways in Los Angeles and Ventura Counties. This information has been provided as an example maintenance activity for comparative purposes only. Caltrans has not calculated the amount of metals removed due to street sweeping activities; however, some studies have shown bimonthly sweeping programs can achieve reductions of up to 80 percent in annual total suspended solids and associated pollutants (i.e., metals) (Sutherland and Jelen, 1996).

3.4 Special Studies

Caltrans has joined with other watershed stakeholders to evaluate water quality objectives and ensure that the targets are appropriate for site-specific conditions. Several studies are ongoing to

make sure that the targets are appropriate while the water bodies are fully protected. The City of Los Angeles Watershed Protection District is leading these efforts. The task force groups plan to submit the results of these studies to be used with the planned re-opener for the TMDL slated for January 2011 by the Regional Board.

The task force group is evaluating copper criteria to determine if these can be higher and still be as protective as the California Toxics Rule (CTR) objectives and the TMDL. The task force group is proposing the development of a water effects ratio (WER). Current estimates are that the targets could be increased by three to six times. The study was submitted to the Regional Board in June 2008 and the task force is currently waiting for comments from the Regional Board. The task force plans to complete the WER by December 2010.

The task force group is also conducting a study to evaluate the zinc impairment in Rio Hondo, the only water body listed for this pollutant. Monitoring conducted between January 2005 and December 2007 did not show any exceedances of the objectives for zinc. Thirty-two dissolved and 33 total data points were collected and analyzed. The task force group is pursuing de-listing of the water body for this pollutant.

The task force group is pursuing the recalculation of the criteria for lead following the EPA recommended procedures. The procedure includes the addition of new data to the national dataset and the calculation of new criteria.

The stakeholders are also proposing an analysis of the loads that are deposited in the Los Angeles River watershed through atmospheric deposition. The TMDL currently assumes negligible metals loads are originating from open space, which accounts for over 40% of the watershed. The Southern California Coastal Watershed Research Project (SCCWRP) developed a plan for the evaluation with a target completion date of August 2011.

3.5 Ongoing Projects for TMDL Compliance

Caltrans implementation plan for compliance with the Metals TMDL in the Los Angeles River watershed includes the installation of BMPs, treatment control measures to improve the quality of stormwater discharged from Caltrans facilities. These BMPs or structural controls are augmented by maintenance activities in Caltrans facilities, other non-structural measures, and municipal coordination that all improve the quality of stormwater discharged from Caltrans facilities.

3.5.1 Constructed BMPs

Caltrans has completed construction of 115 structural BMPs in the Los Angeles River watershed estimated to treat over 166 acres. These include 101 gross solids removal devices (GSRDs), an extended detention basin, three biofiltration swales, a sand filter, and an infiltration device. Appendix D shows the existing BMPs that are in operation.

3.5.2 BMPs In-Construction

Caltrans has begun construction on 72 structural BMPs in the Los Angeles River watershed. These include five Austin Sand Filters, an infiltration basin, and 65 GSRDs. These devices are estimated to treat over 164 acres upon completion. Appendix D includes a table with the BMPs that are currently under construction.

3.5.3 Planned BMPs

Caltrans has 481 structural BMPs that are currently in the planning phase. Appendix D includes BMPs that are planned as part of the SWDR process. The structural BMPs include 41

biofiltration strips, 64 biofiltration swales, 11 detention basins, 24 infiltration basins, one infiltration trench, 241 GSRDs, and 98 media (sand) filters,. The implementation of these BMPs will result in the removal of 58 kg of copper, 57 kg of lead, and 225 kg of zinc. This was estimated by using the average tributary drainage area of 1 acre to the BMP, and an annual rainfall of 14.78 inches to determine the WQV to be treated annually. Then the removal efficiencies from the Caltrans BMP Retrofit Study (CTSW-RT-01-050) were applied.

Additionally, Caltrans will be implementing BMPs via the SWDR process on all freeways in accordance with the finding of the Corridor Studies. Fourteen Corridor Studies have been complete in the Los Angeles River watershed to date, with an additional seven Corridor Studies planned for completion by 2013. A Corridor Study is included in Appendix C (available upon request) as an example of the evaluation currently being conducted throughout the watershed. These 14 reports identify 287 treatment BMPs that are recommended within the watershed. The construction of these 287 treatment BMPs would treat over 1,946,000 cubic feet of WQV, removing 93 kg of copper, 88 kg of lead and 355 kg of zinc. As discussed earlier in section 3.3, all routes within the Los Angeles River watershed are being evaluated for treatment BMP implementation opportunities. The BMPs recommended for implementation as part of the Corridor Studies will be implemented as a feasible part of construction for the current corridor reconstruction projects. Appendix E contains a list of currently planned projects within the watershed and their completion dates.

3.6 Dry Weather Runoff Estimation

Caltrans facilities typically do not have dry weather discharges, as flows are usually associated with broken irrigation lines. Caltrans will continue to perform prompt maintenance on all reported dry-weather discharges to correct any problems.

Caltrans is currently meeting the dry weather WLA and will continue to perform maintenance as needed to correct and eliminate any non-stormwater discharges.

In an effort to comply with TMDLs for dry weather flow, Caltrans conducted field investigations of Caltrans facilities within the Los Angeles River Watershed in August 2007. The purpose of the investigation was to document the dry weather runoff, if any, each facility contributed to receiving waters within these watersheds from Caltrans property, and activities (e.g., landscape irrigation). The study area consisted of 281.2 miles within the Los Angeles River watershed and 17 maintenance stations.

Sixty-one instances of dry weather flow were observed in the Los Angeles River watershed. Most observations were found on Route 164, followed by Route 1 and Route 27. These routes are conventional highways with adjacent commercial and residential properties, and were received run-on from the adjacent property and are outside Caltrans control. Caltrans is coordinating with the municipalities to report these occurrences of run-on in an effort to eliminate the sources.

There is a substantial difference in the source type and density observed when comparing dry weather flow on conventional highways versus freeways. More dry weather flow was observed on conventional highways, even though the length of conventional highways is much less than that of freeways. The number of dry weather flow observations per mile inspected is shown in Figure 3-1, demonstrating the higher density of conventional highway dry weather runoff. The sources of dry weather flow observations in conventional highways and freeways are illustrated in Figure 3-2 and Figure 3-3, respectively.

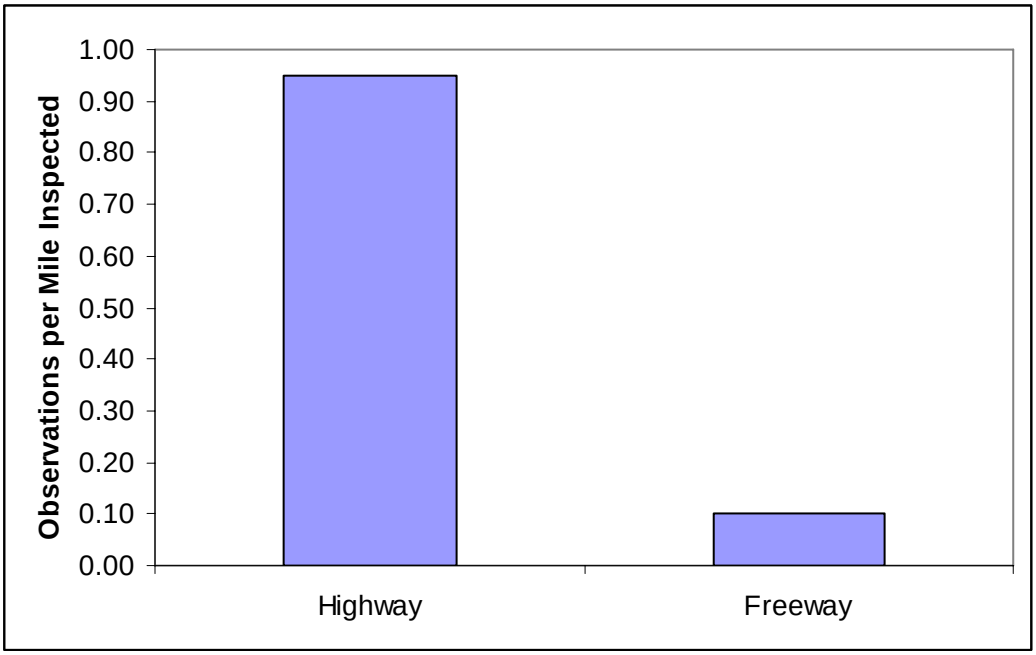

Figure 3-1: Number of Dry Weather Flow Observations per Mile Inspected

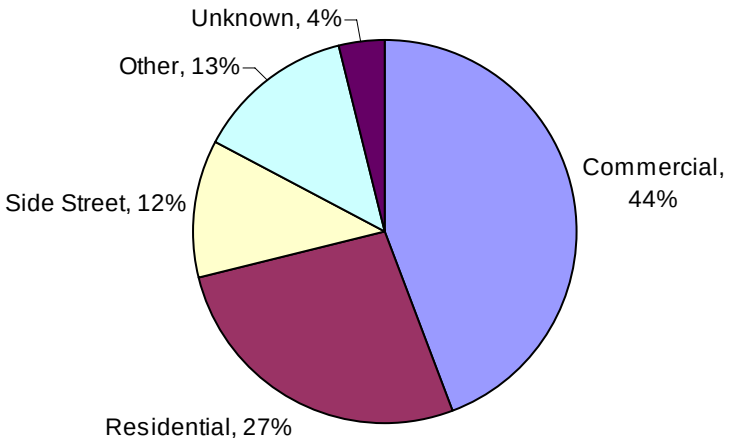

Figure 3-2: Distribution of Highway Dry Weather Flow Observations by Source

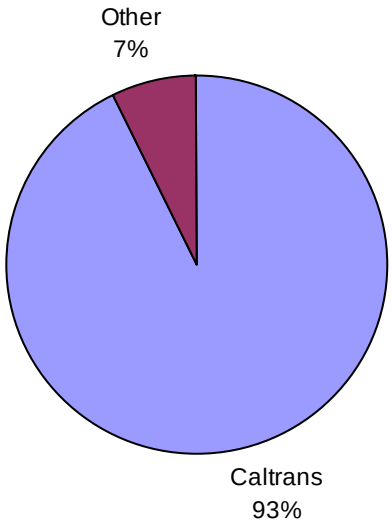

Figure 3-3: Distribution of Freeway Dry Weather Flow Observations by Source

Instances where Caltrans was identified as a source of dry weather flow only occurred on freeways or at maintenance stations adjacent to freeways. No dry weather flow was attributed to Caltrans on conventional highways. The majority (88%) of dry weather flows that were attributed to Caltrans was due to broken irrigation lines. It is Caltrans' standard practice to repair these broken lines quickly. Since Caltrans has minimal sporadic or no dry weather flows from freeways, conventional highways and maintenance stations, there are no discharges to receiving water bodies during dry weather and therefore no discharge of pollutants (e.g., copper, lead, and zinc).

3.7 Stakeholder Group Coordination

In addition to its own efforts to comply with the TMDL, Caltrans is a stakeholder in Jurisdictional Groups 1 and 2 and actively participates in their efforts to meet TMDL compliance. These efforts are outlined in the Implementation Plans submitted separately by each Jurisdictional Group.

4 Summary

Caltrans owns 275.5 miles of roadway within the Los Angeles River watershed, 134 miles of which is within Jurisdictional groups 1 and 2. Caltrans facilities typically do not have dry weather discharges; flows are usually associated with broken irrigation lines. Caltrans will continue to perform prompt maintenance on all reported dry-weather discharges to correct any problems and work with other stakeholders to eliminate the sources of dry weather flow run-on.

Caltrans' goals for compliance with wet WLA are 25 percent within six years, 50 percent within 18 years, and 100 percent within 22 years. Caltrans will use structural BMPs to assist in meeting the metals concentration WLA. The recent passage of SB 346 will reduce the amount of metals released in the right-of-way. An increase frequency of street sweeping will also reduce the discharge of metals in the watershed.

Caltrans is committed to achieving the metals concentration goals identified within the TMDL, and believes the potential program outlined above will result in achievement of WLA by 2028.

Appendix A: Roadways and Facilities within the Los Angeles River Watershed

Table A-1: Highway Miles and Post Miles

Route	PM Start	PM End	Miles
1	3.8	8.1	4.3
2	13.1	37	23.9
2	41.2	48.5	7.3
2	49.2	51.6	2.4
5	8.3	46.6	38.3
10	14.4	28.6	14.2
14	0	0.5	0.5
27	9.1	20	10.9
60	0	11.1	11.1
72	8	8.4	0.4
91	8.4	13.9	5.5
101	0	3.9	3.9
101	10	30.6	20.6
105	6.6	15	8.4
110	13.4	19.9	6.5
110	22.5	31.8	9.3
118	0	14.1	14.1
164	0	9.5	9.5
170	0.5	6.6	6.1
210	0	36	36
405	5.5	7.8	2.3
405	36.6	48.2	11.6
605	23.3	25.1	1.8
710	1.1	27.7	26.6

Table A-2: Maintenance Facilities

Maintenance Station	Route	PM	Address	City
Altadena MS (165)	2	1.8	2122 N Windsor	Altadena
Chilao MS (191)	2	48.5	Star Rte	La Canada
Central Bandini and Special Crews Regional MS (184)	5	10.3	7300 East Bandini Blvd	Commerce
Silver Lake MS (207)	5	22.5	2187 Riverside Dr	Los Angeles
Burbank Electrical MS (197)	5	28.8	524 South Flower St	Burbank
Buena Vista MS (163)	5	31.2	2600 North San Fernando Rd	Burbank

Table A-2: Maintenance Facilities

Maintenance Station	Route	PM	Address	City
East Los Angeles MS (213)	7	24.6	4425 East 3rd St	Angeles
Alameda MS (202)	10	17	1740 East 15th St	Los Angeles
North Hollywood MS (219)	101	11.2	11210 Moorpark St	Hollywood
Tarzana MS (215)	101	21.2	5660 Reseda Blvd	Tarzana
Rosemead MS (154)	164	6.7	9153 East Lower Azusa Rd	Rosemead
Foothill MS (198)	210	34.9	850 East Huntington Dr	Monrovia
Mission Hills-Antelope Valley Sign Crew MS (622)	405	0	15603 Chatsworth St	Mission Hills
Pacific Place MS (178)	405	7.2	3725 Pacific Place	Long Beach
Long Beach MS (226)	405	8.1	22101 Santa Fe Ave	Long Beach
San Fernando MS (161)	405	48.6	11930 Blucher St	Granada Hills
Humphrey St MS (180)	710	24.6	102 South Humphrey St	Los Angeles

Table A-3: Park and Ride Facilities

Park and Ride	Route	PM	Address
Verdugo	2	23.10	Verdugo Blvd @ Hilldale Dr
Newhall East Lot	14	27.1	San Fernando Rd (1260) E of Rte 14
Century/Harbor	105	7.70	Rte 105 @ Rte 110-117th St & Figueroa St
Avalon	105	8.90	Rte 105 @ Avalon
Long Beach Blvd	105	11.60	Rte 105 @ Long Beach Blvd
Willowbrook	105	10.00	Rte 105 @ Wilmington (Blue Line)
Manchester	110	15.80	Rte 110 @ Manchester Ave
Slauson	110	18.0	Rte 110 @ Slauson Ave
Chatsworth	118	10.1	15550 Chatsworth St
Porter Ranch	118	11.4	Rte 118 @ Porter Ranch
Glendale	134	8.8	Rte 134 and Rte 2
Oxnard St	170	16.60	Rte 170 @ 1200 Oxnard St
Lowell	210	16.10	Rte 210 @ 3930 Lowell Ave
Paxton	210	6.00	12501 Foothill Blvd @ I-120 & Paxton St
Sierra Madre Blvd	210	29.40	Sierra Madre Blvd @ Rte 210

Appendix B: BMP Performance Charts

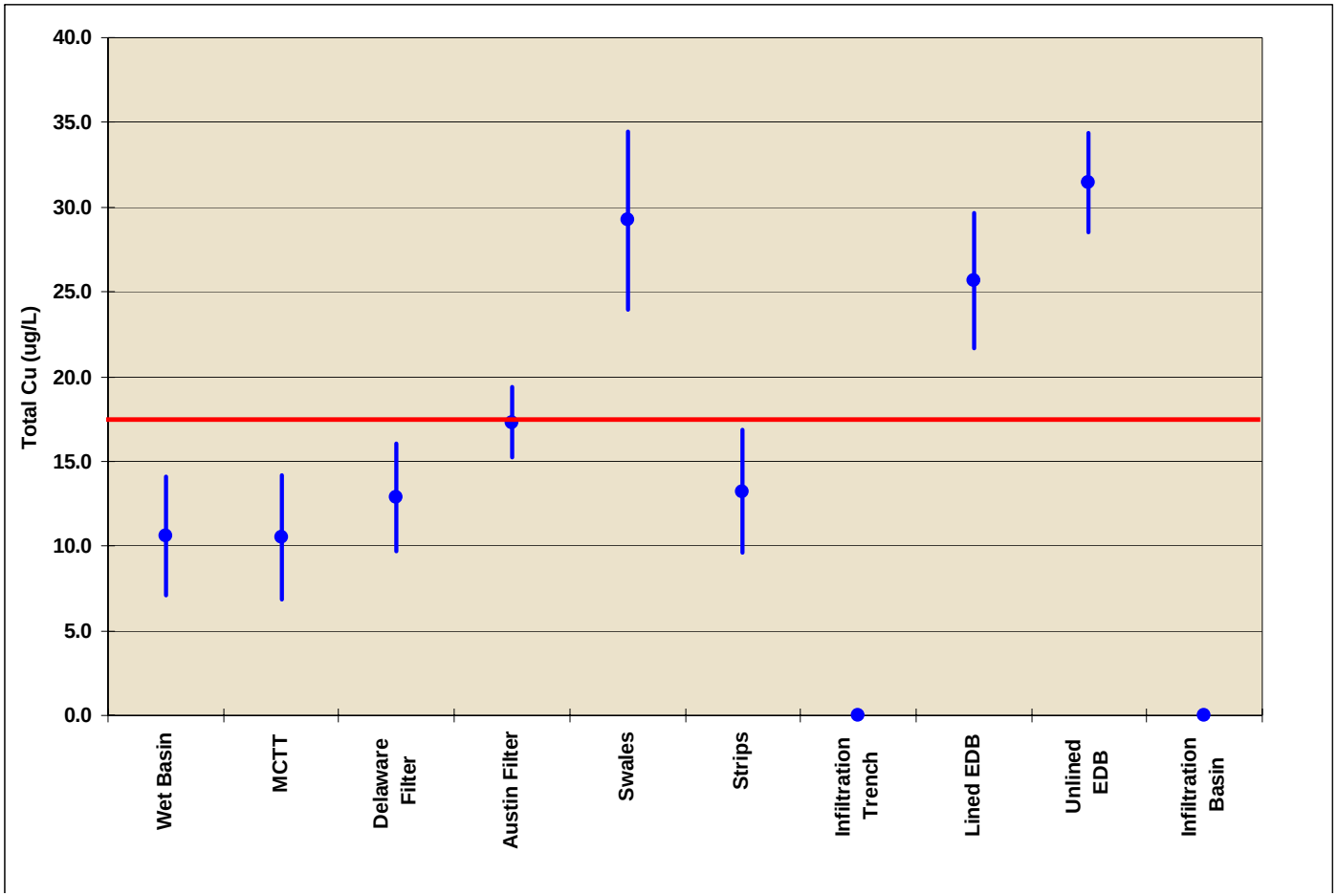

Figure B-1: Treatment BMPs Expected Effluent Concentrations for Copper

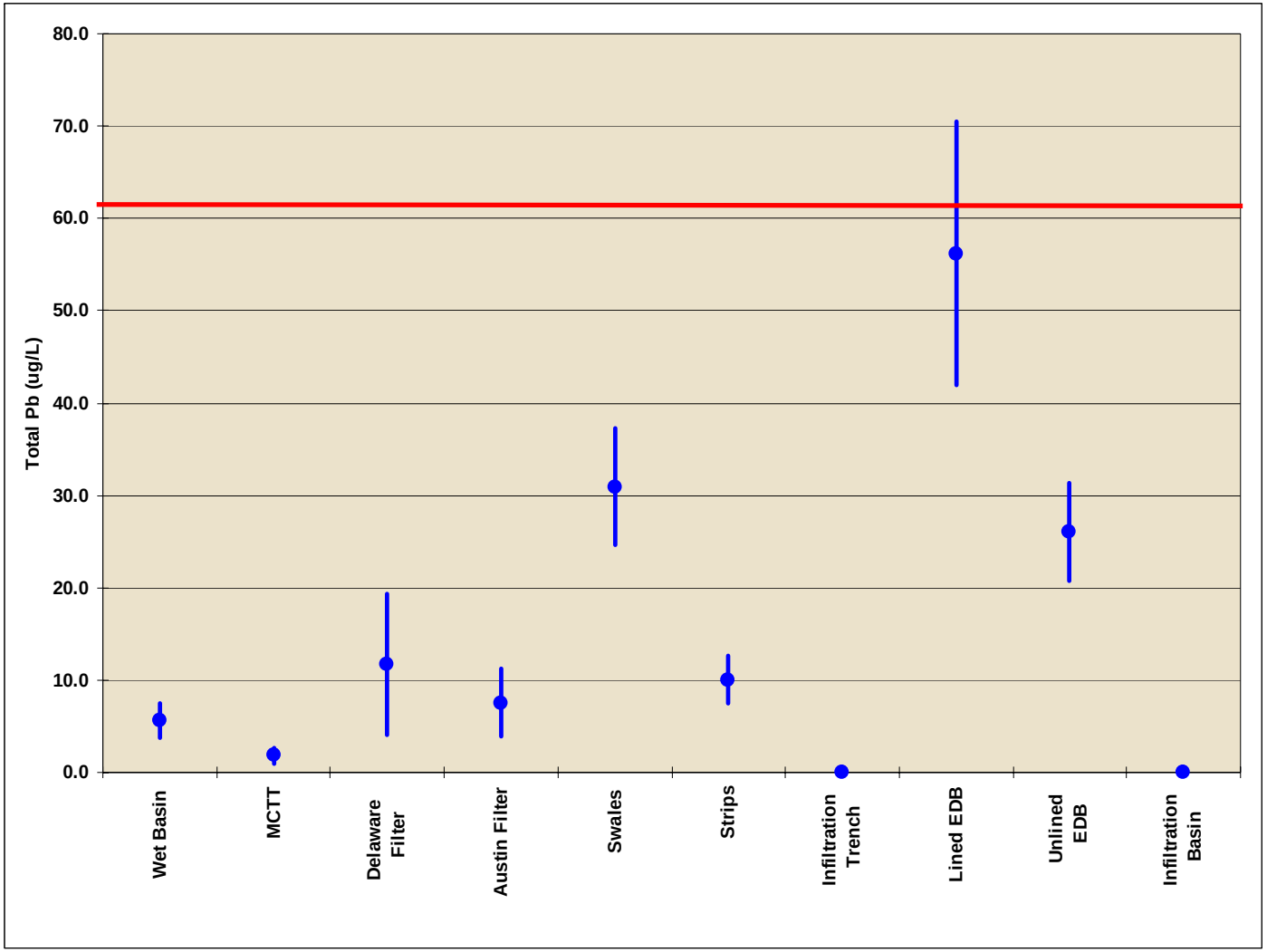

Figure B-2: Treatment BMPs Expected Effluent Concentrations for Lead

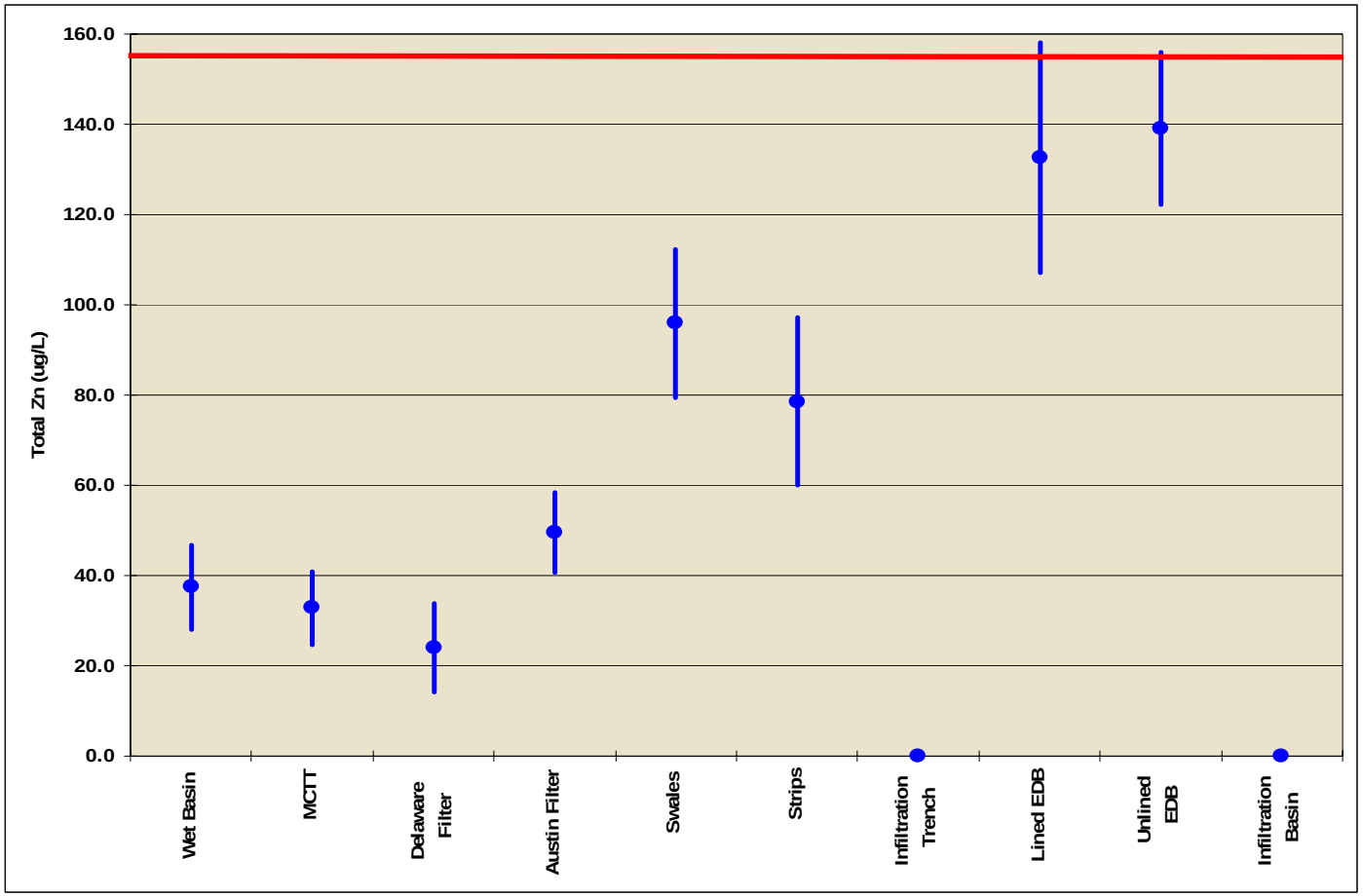

Figure B-3: Treatment BMPs Expected Effluent Concentrations for Zinc

Appendix C: Example Corridor Study

Available upon request.

Appendix D: Structural BMPs

Table D-1

Table D-1: Existing BMPs

BMP Type	Route	PM	Direction	Drainage Area (ac)
Extended Detention Basin	710 @ 105		SB	N/A
	170	PM 19.76A	SB	N/A
	170	PM 19.78	SB	N/A
	170	PM 19.81	SB	N/A
Bio Swale	101	19.31	NB/SB	N/A
Bio Swale	101	19.02	NB/SB	N/A
Bio Swale	101	19.02	NB/SB	N/A
Austin Vault Sand Filter	101	19.32	NB/SB	N/A
Austin Vault Sand Filter	101	19.03	NB/SB	N/A
GSRD	2	Gleneden St & Ripple Pl PM 15.40	EB	0.83
GSRD	2	Casitas Ave & Carrillo Dr PM 15.79	WB	0.57
GSRD	2	Eagle Rock Blvd Verdugo Rd PM 16.78	EB	1.92
GSRD	2	Ave 40 Roderick Rd PM 17.02	WB	1.60
GSRD	2	York Blvd WB off-ramp PM 17.05	WB	4.10
GSRD	2	Ave 40/Delevan Dr PM 17.07	WB	2.74
GSRD	2	Round Top Dr PM 17.80	EB	6.00
GSRD	2	Colorado Blvd EB Off-ramp PM 18.47	EB	2.11
GSRD	2	Colorado Blvd PM 18.56	WB	0.75
GSRD	2	Colorado Blvd PM 18.57	EB	1.45
GSRD	2	Oak Vista Drive/Holly Dr PM 19.07	EB	1.00
GSRD	2	Glendale Drive/Harvey Dr PM 19.21	WB	7.23
GSRD	2	Verdugo Luma Dr PM 20.48	WB	3.13
GSRD	2	Fern Ln. & Delisle St PM 21.46	WB	8.70
GSRD	5	Garber	SB	0.90
GSRD	5	PM 27.62	SB	
GSRD	5	Irving Ave PM 28.07	SB	1.60
GSRD	5	Allen Ave PM 28.15	NB	2.13
GSRD	10	Rosemead Ave	WB	3.70
GSRD	60	Downey & Sunol PM 2.7	SB	5.24
GSRD	60	South Vancouver Ave PM 4.0	SB	0.60
GSRD	60	Atlantic Blvd PM 4.4	SB	3.04

Table D-1: Existing BMPs

BMP Type	Route	PM	Direction	Drainage Area (ac)
GSRD	60	Gerhart Ave PM 4.8	SB	0.94
GSRD	60	Gerhart Ave PM 4.8	NB	0.94
GSRD	60	Findlay Ave PM 5.2	NB	0.33
GSRD	60	Findlay Ave PM 5.2	NB	1.06
GSRD	60	Via Norte Ave PM 5.3	NB	0.73
GSRD	60	Garfiled Ave PM 5.7	NB	0.52
GSRD	60	Garfiled Ave PM 5.7	SB	0.52
GSRD	60	Juneway Rd PM 5.8	NB	0.68
GSRD	60	Juneway Rd PM 5.8	SB	0.68
GSRD	60	Juneway Rd PM 5.8	NB	0.68
GSRD	60	Juneway Rd PM 5.8	SB	0.68
GSRD	60	Wilcox Ave PM 5.8	NB	0.63
GSRD	60	Wilcox Ave PM 5.8	SB	0.63
GSRD	60	Wilcox Ave PM 5.9	NB	0.68
GSRD	60	Wilcox Ave PM 5.9	SB	0.62
GSRD	60	PM 6.6	NB	1.00
GSRD	101	Gaviota	EB	2.10
GSRD	170	North Hollywood Park South of Chandler PM 15.55	NB	1.18
GSRD	170	Lemp Ave/cul-de-sac PM 15.59	SB	1.01
GSRD	170	Westpark Drive/cul-de-sac PM 15.73	NB	1.60
GSRD	170	Colfax Ave PM 15.82	NB	0.76
GSRD	170	Burbank Blvd & Colfax PM 15.95	NB	1.60
GSRD	170	Simpson Ave (cul-de-sac) PM 15.98	SB	1.08
GSRD	170	On-ramp @ Burbank Blvd PM 16.05	NB	0.79
GSRD	170	On-ramp @ Burbank Blvd PM 16.14	NB	0.66
GSRD	170	Channel, Par. Bucknell PM 16.14	NB	1.45
GSRD	170	Channel, Par. Bucknell PM 16.43	NB	2.04
GSRD	170	North of Laurel Canyon Blvd PM 16.86	NB	1.79
GSRD	170	North of Laurel Canyon Blvd PM 16.98	NB	1.43
GSRD	170	Victory Blvd NB Off-ramp PM 17.08	NB	1.96
GSRD	170	South of Victory Blvd PM 17.19	NB	2.49
GSRD	170	Victory Blvd PM 17.21	NB	0.31
GSRD	170	100’ North of Victory Blvd PM 17.28	NB	1.29
GSRD	170	Bt. Kitridge St & Hamlin PM 17.42	NB	1.27
GSRD	170	Valley Plaza Park PM 17.56	NB	0.94
GSRD	170	Archwood & Kitridge St PM 17.57	SB	0.77
GSRD	170	Archwood & Welby Way PM 17.66	NB	1.08

Table D-1: Existing BMPs

BMP Type	Route	PM	Direction	Drainage Area (ac)
GSRD	170	Archwood & Welby St PM 17.66	SB	1.20
GSRD	170	Arleta Ave North of Roscoe PM 19.88	NB	2.18
GSRD	170	Arleta Ave North of Roscoe PM 19.92	NB	1.71
GSRD	170	Burbank Boulevard	NB	2.50
GSRD	170	Riverside Dr & Camarillo St	NB	2.97
GSRD	170	Magnolia Avenue	NB	3.74
GSRD	170	Oxnard St & End NB on-ramp	NB	1.82
GSRD	170	Oxnard St	NB	2.27
GSRD	210	Casitas PM 22.73	EB	0.89
GSRD	210	Casitas PM 22.79	EB	0.49
GSRD	210	Casitas PM 22.81	WB	0.38
GSRD	210	Casitas PM 22.84	EB	0.24
GSRD	210	Casitas PM 22.88	WB	0.51
GSRD	210	Casitas PM 22.89	EB	0.32
GSRD	210	Casitas PM 22.92	EB	0.34
GSRD	210	Casitas PM 22.93	EB	0.44
GSRD	210	Casitas PM 23.01	EB	0.79
GSRD	210	West Hammend St PM 23.46	EB	0.92
GSRD	210	Claremont St PM 23.73	EB	1.89
GSRD	210	PM 23.77/23.78	WB	
GSRD	210	Glendada	EB	6.20
GSRD	210	Claremont PM 23.77	EB	0.18
GSRD	210	Hamnd PM 23.78	EB	0.84
GSRD	210	South of Hammond St PM 23.84	WB	1.01
GSRD	210	South of Hammond St PM 23.88	WB	0.34
GSRD	210	Orcas Avenue	WB	3.40
GSRD	210	Christy Avenue	EB	2.30
GSRD	210	Orcas Avenue	WB	1.09
GSRD	210	Filmore St	WB	2.52
GSRD	405	Leadwell St	SB	3.00
GSRD	710	Noble St PM 22.5	EB	3.14
GSRD	710	Noble St PM 22.6	EB	1.35
GSRD	710	Sydney Dr PM 23.0	WB	0.31
GSRD	710	Duncan Ave PM 23.0	EB	0.43
GSRD	710	Sydney Dr PM 23.0	WB	0.28
GSRD	710	Duncan Ave PM 23.1	EB	0.46
GSRD	710	Sydney Dr PM 23.1	WB	0.26

Table D-1: Existing BMPs

BMP Type	Route	PM	Direction	Drainage Area (ac)
GSRD	710	Sydney Dr PM 23.1	WB	0.46
GSRD	710	Triggs St PM 23.1	EB	0.50
GSRD	710	Burger Ave PM 23.6	EB	3.50
GSRD	710	Verona St PM 23.6	EB	0.34
GSRD	710	Whittier Ave PM 23.8	WB	1.49
Austin Vault Sand Filter	Paxton Park and Ride			1.36
MCTT	Lakewood Park and Ride			1.88
MCTT	Silverlake Maintenance Station			4.58
StormFilter®	North Hollywood Maintenance Station			
Infiltration	Altadena Maintenance Station			1.73

Table D-2 includes BMPs that are currently under construction.

Table D-2: BMPs In-Construction

BMP Type	Route	PM	Direction	Drainage Area (ac)
Austin Vault Sand Filter	5	PM 9.88	SB	2.37
Austin Vault Sand Filter	60	PM 4.26	EB	1.5
Austin Vault Sand Filter	170	PM 16.23	NB	2.79
Austin Vault Sand Filter	170	PM 19.76B	SB	2.15
Austin Vault Sand Filter	710	PM 16.80	NB	3.2
Infiltration Basin	710	PM 21.54	NB	3.81
AVSF	710	PM 22.54	NB	1.35
GSRD	5	Ruberta Ave PM 27.62	NB	2.52
GSRD	5	PM 16.35	SB	1.37
GSRD	91	Alameda St PM 10.25	S	2.45
GSRD	91	Susan Rd PM 10.84	S	4.10
GSRD	91	Muriel Ave PM 11.22	N	5.28
GSRD	91	Lime Ave/67th St PM 12.26	S	0.95
GSRD	91	Olive Ave/67th St PM 12.27	S	3.10
GSRD	91	Myrtle Ave/67th St PM 12.35	S	1.67
GSRD	91	Cerritos Ave/Eleanor St PM 12.54	N	1.34
GSRD	91	Cerritos Ave/Eleanor St PM 12.56	N	1.34
GSRD	91	Orange Ave/67th St PM 12.61	S	1.18
GSRD	91	Orange Ave/Eleanor St PM 12.62	N	1.18
GSRD	91	Walnut Ave/67th St PM 12.85	S	2.76
GSRD	91	Gaviota Ave/67th St PM 12.92	S	1.80
GSRD	91	67th Way PM 13.46	N	1.25
GSRD	91	Obispo Ave/67th PM 13.88	S	2.92
GSRD	101	PM 12.72	SB	1.02
GSRD	101	PM 14.26	SB	2.03
GSRD	101	PM 14.53	SB	2.4
GSRD	101	PM 14.78	SB	1.74
GSRD	101	PM 16.72	NB	1.86
GSRD	101	PM 18.40	NB	1.78
GSRD	101	PM 22.67	NB	0.45
GSRD	101	PM 26.01	NB	1.68
GSRD	101	PM 26.05	NB	0.26
GSRD	101	PM 26.49	NB	0.83
GSRD	105	Avalon Blvd PM 8.25	S	7.14
GSRD	105	Avalon Blvd PM 8.31	S	0.00
GSRD	105	Stanford Ave PM 8.43	S	6.35

Table D-2: BMPs In-Construction

BMP Type	Route	PM	Direction	Drainage Area (ac)
GSRD	105	Stanford Ave PM 8.46	S	2.31
GSRD	105	Wadsworth Ave PM 8.67	S	4.94
GSRD	105	116th Place PM 8.74	S	0.73
GSRD	105	116th Place PM 8.75	S	1.74
GSRD	105	Belhaven St PM 8.84	S	1.74
GSRD	105	Alvaro St/Compton Creek PM 8.94	S	1.60
GSRD	105	Slater St PM 9.04	S	2.22
GSRD	105	Slater St PM 9.08	S	1.90
GSRD	105	Slater St PM 9.09	S	0.25
GSRD	105	Success Ave PM 9.20	S	8.31
GSRD	105	Compton Ave PM 9.34	S	0.83
GSRD	105	Wilmington Ave PM 9.54	S	9.10
GSRD	105	117th St PM 9.70	S	3.56
GSRD	105	Wilmington Ave PM 9.71	S	1.00
GSRD	105	Croesus Ave PM 10.08	S	19.85
GSRD	105	Birch St PM 11.76	S	2.47
GSRD	105	Fernwood Ave PM 11.81	S	1.82
GSRD	105	Spruce St 11.88	S	0.25
GSRD	105	Fernwood Ave PM 11.98	S	1.07
GSRD	105	Spruce St PM 11.98	S	0.25
GSRD	105	Fernwood Ave PM 12.08	S	1.65
GSRD	105	Bullis Rd PM 12.08	S	1.82
GSRD	105	Fernwood Ave PM 12.25	S	0.51
GSRD	105	Louise St PM 12.28	S	0.48
GSRD	105	Louise St PM 12.36	S	1.03
GSRD	105	Fernwood Ave PM 12.41	S	1.43
GSRD	105	Muriel Dr PM 12.44	S	1.72
GSRD	105	Fernwood Ave PM 12.53	S	1.08
GSRD	105	Harris Ave PM 12.54	S	1.27
GSRD	105	Fernwood Ave PM 12.62	S	1.24
GSRD	105	4th Ave PM 12.63	S	0.74
GSRD	105	Elm St PM 12.72	S	1.70
GSRD	105	2nd Ave PM 12.76	S	1.60
GSRD	105	Wright Road/Josephine St PM 13.15	S	0.10
GSRD	110	3rd St PM 23.11	E	0.63
GSRD	110	Temple St PM 23.61	W	1.34

Table D-3 SWDR BMPS

EA	District	County	Route	PM Start	PM End	Water Bodies Affected	Biofiltration Strip	Biofiltration Swale	Detention	Infiltration Basin	Infiltration Trench	GSRD	Media Filter	MCTT	Wet Basin	Other Devices	Particulate Cu Load Removed (kg)	Particulate Pb Load Removed (kg)	Particulate Zn Load Removed (kg)	Dissolved Cu Load Removed (kg)	Dissolved Pb Load Removed (kg)	Dissolved Zn Load Removed (kg)
246401	7	LA	5	13.6	18.5	LA River Reach 2	1										0.11	0.11	0.32	0.02	0.01	0.13
1786A1	7	LA	5	27.4	28.1	LA River Reach 3			1				1				0.64	0.63	1.91	0.04	0.05	0.65
121811	7	LA	5	31.56	36.04	Burbank Western Channel		4				3					0.41	0.40	1.29	0.07	0.03	0.56
1218U1	7	LA	5	31.6	36	Burbank Western Channel		4				3					0.41	0.40	1.29	0.07	0.03	0.56
1219U1	7	LA	5	36	39.4	Tujunga Wash Channel	1	3		2		1	5				2.56	2.58	7.76	0.24	0.21	3.19
235501	7	LA	5	39.4	42.8	East Canyon Channel		6		1		4	2				1.52	1.51	4.66	0.18	0.12	1.97
26650K	7	LA	5	41.1	45.9	East Canyon Channel		7									0.72	0.70	2.26	0.12	0.06	0.98
121901	7	LA	5	58	63.4	Tujunga Wash	1	3		2		1	5				2.56	2.58	7.76	0.24	0.21	3.19
25840K	7	LA	5	Var	Var	LA River		7	2			44	11				5.03	4.99	15.18	0.30	0.37	5.70
	7	LA	10	17		LA River										1	0.00	0.00	0.00	0.00	0.00	0.00
166811	7	LA	10	18.3	31.3	Various	1	2									0.31	0.31	0.97	0.05	0.03	0.41
	7	LA	10	27.35								1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	2.7		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	4		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	4.4		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	4.8		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	4.9		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.2		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.21		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.3		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.7		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.71		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.8		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.81		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.82		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.83		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.84		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.85		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.9		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00
	7	LA	60	5.91		LA River Reach 2						1					0.00	0.00	0.00	0.00	0.00	0.00

Appendix E: Schedule of Upcoming Corridor Improvement Projects

Table E-1: Project Descriptions and Schedules

Project Location				Project Description	Completion Date
Co.	Route	Begin PM	End PM		
LA	1	0	0	Trash TMDL-GSRD	Sep-11
LA	1	1	1	LA County in LA River metals TMDL, Sand Filters & Infiltration Devices	Nov-11
LA	2	0	0	Construct litter removal devices	Jan-09
LA	2	R25.5	R29.1	Bridge rail upgrade	Jan-10
LA	2	24.4	82.3	Cold plane and rubberized AC	Sep-09
LA	5	0	11.6	Upgrade median barrier	Apr-12
LA	5	6.4	13.4	Freeway Widening (Phase II)	Nov-22
LA	5	6.8	18.4	Construct Litter Removal Device Phase 4 of 10	Jan-10
LA	5	13.1	13.5	Install Outer Sep Concrete Barrier	Dec-08
LA	5	14.7	15.1	Auxiliary Lane Addition	Apr-13
LA	5	15.6	16.3	Add Lane Ramp Closure	May-11
LA	5	16.5	36.4	Storm Water mitigation (Trash TMDL)	Jan-09
LA	5	16.9	28.7	Rehabilitate roadway	Nov-10
LA	5	17.82	17.82	Construct eastside tunnel under FWY 101	Jul-10
LA	5	44.2R	46.0R	Construct direct HOV connectors, DW	May-13
LA	5	45.6R	88.6R	Install CCTV and communication system, DW	Aug-10
LA	5	55.7R	56.8R	Improve interchange and overcrossing	Apr-09
LA	5	65.4R	65.9R	Slope Reconstruction	Jan-09
LA	10	14.2	18.1	Improve Connector, Distributors, Bridge Restoration	Aug-09
LA	10	18.3	31.3	Rehabilitate Roadway and Ramps	Apr-11
LA	10	18.4	21	Highway Planting Restoration	Dec-14
LA	10	18.59		Bridge Widening	Nov-11
LA	10	18.7	28.7	On-off ramps pavement rehabilitation	Mar-10
LA	10	18.7	31.3	Rehabilitate roadway/ramps	Mar-11
LA	10	18.7	21.6	Rehab HOV/Bus Lane (1B Bond Funded)	Sep-09
LA	10	0S	1.0S	Repair Slope Erosion and Improve	Aug-08
LA	10	12.4R	14.4R	High Visibility Channelizing System	Aug-08
LA	60	0	30.5	Install MBGR and concrete railing	Feb-10
LA	60	0.6	R6.6	Bridge Preservation	Jun-09
LA	60	2.6		MTA Project Eastside LRT	Jul-10
LA	60	8	19.3	Bridge Preservation	Jun-09
LA	90	0.9	0.9	Extend Route 90, Highway Realignment	Aug-13
LA	90	1.2	1.0R	Widen Existing Freeway	Jul-08
LA	91	6.7	14.1	Longlife pavement rehab	Nov-08
LA	91	11.8	16.6	Highway Planting Restoration	May-16
LA	91	R11.6	R20.64	Bridge Preservation	Jul-08

Project Location				Project Description	Completion Date
Co.	Route	Begin PM	End PM		
LA	91	R6.4	R11.81 R11.82	Bridge Preservation	Jan-12
LA	101	0.4	0.4	Construct Amtrak and commuter rail viaduct	Jul-10
LA	101	0.4	1.7	Highway Planting Restoration	Feb-15
LA	101	0.7	1	Bridge replacement	Aug-11
LA	101	1.7	8.2	Construct off pavement access, install access gates, improve access trail and slope hardscaping	Jul-08
LA	110	0.8	21.4	Upgrade End Treatment & Crash Cushion	Nov-10
LA	110	21.1	22.8	Construct auxiliary lane/ modify lamps	Jan-10
LA	110	21.2	22.8	Construct Auxiliary Lane; Modify Ramps	May-11
LA	110	21.4	23.5	Wet Improvement	Jan-09
LA	110	21.9	22.5	Modify auxiliary lane and Reconstruct Ramp	Jan-10
LA	110	22	23.2	Surface Improve to Median/Island	Sep-09
LA	110	22.4	23.1	Aesthetic Improvement	Sep-09
LA	110	25.9	30.3	Landscape Beautification and Historic	Dec-09
LA	110	25.9	31.9	Upgrade Median Barrier	Dec-10
LA	110	25.9	31.9	Upgrade Median Barrier	Dec-10
LA	110	26.6	23.6	Ramp Modifications, Improve access from First St. UC/Route 101 NB	Jan-19
LA	134	0	13.4	Install MBGR	Oct-11
LA	134	11.5	13.1	Hwy Planting Restoration	Nov-09
LA	210	0.69	25.14	Modify and Upgrade Ramp Metering	Jul-08
LA	210	18.8	24.9R	Install comm/tos #4 field hardware	Apr-11
LA	210	24.6	43.2	Sound walls	Dec-10
LA	210	25.14	52	Ramp Metering with MVPs & Retaining Wall, DW	Jul-08
LA	210	29.5	30.7	Construct Soundwall	Jan-10
LA	210	31.5	31.5	Seismic retrofit, DW	Jul-10
LA	210	31.8	34.2	Construct Soundwall with Masonry Block	Nov-10
LA	210	33.4	44.5R	Install comm/tos #4 field hardware	Dec-08
LA	210	35.5	35.9	Construction of Soundwall (WB Only)	Nov-09
LA	210	0.0R	44.0R	Upgrade MBGR end treatment	May-09
LA	210	25.1R	52.2R	Remove and Replace Diseased Trees	Jul-08
LA	210	R0	26.3	CAPM on I-210 from junction I-5/I-210 to Los Robles Ave. OC	Dec-14
LA	405	0	12.6	Slab Replacement and Grinding	Nov-09
LA	405	0	48.6	Upgrade Metal Beam Guardrail End T.	Mar-10
LA	405	0.1	0.3	Construction of Soundwall	May-11
LA	405	6.4	43.1	Soundwall	Feb-13
LA	710	3.7	5	Bridge replacement	Aug-11
LA	710	5.6	24.2	Upgrade Median Barrier	Aug-14
LA	710	6.1	6.8	Highway planting restoration	Mar-11
LA	710	6.8	9.1	Landscape, drainage, and sound walls rehab	Feb-09
LA	710	6.9	9.1	Beautification and modernization	Sep-09
LA	710	9.4	18.4	Landscape	Apr-13
LA	710	9.7	18.4	Rehabilitate Roadway	Sep-10

Project Location				Project Description	Completion Date
Co.	Route	Begin PM	End PM		
LA	710	13.6	26.5	Long life pavement & widen bridges	Dec-15
LA	710	16.1	18.4	Roadway Rehab/Upgrade Med Barrier	Jul-11
LA	710	17.3	26.3	Upgrade median barrier	Dec-08
LA	710	18.1	20.8	Long Life Pavement Rehabilitation	Apr-14
LA	710	21.9	22	Modify interchange & ramps	Aug-10
LA	710	22.5	22.7	Sound wall	Apr-12
LA	710	26.5	27.4	Roadside Restoration	Sep-12
LA	10, 710	21.0; 26.4	21.9; 26.6	Highway Planting and Restoration	Jan-13

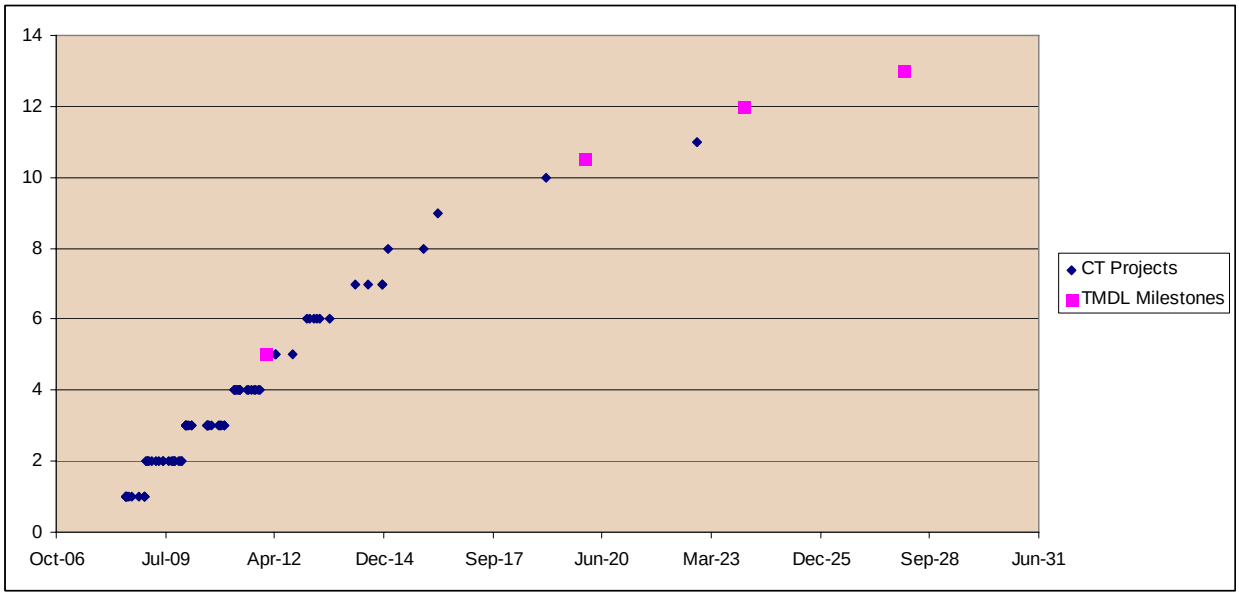

Figure E-1: Upcoming Caltrans Projects