STORMWATER MONITORING AND BMP DEVELOPMENT STATUS REPORT: FISCAL YEAR 2015-2016 UPDATE

FINAL

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California Department of Transportation
Division of Environmental Analysis
Stormwater Program MS-27
1120 N Street
Sacramento, California 95814

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Storm Water Liaison, Caltrans Division of Environmental Analysis
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Acronyms

ASBS	Areas of Special Biological Significance
BMP	Best Management Practice
FY	Fiscal Year
NA	Not Applicable
NPDES	National Pollutant Discharge Elimination System
PCB	Polychlorinated Biphenyl
PLRM	Pollutant Load Reduction Model
PPDG	Project Planning and Design Guide
RAM	Rapid Assessment Methodology
SSC	Suspended Sediment Concentration
TBD	To Be Determined
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
WLA	Waste Load Allocation

Section 1 Introduction and Purpose

The California Department of Transportation (Caltrans) National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit Waste Discharge Requirements Order No. 2012-0011-DWQ (State Water Board 2012, Section E.2.e) requires that the Stormwater Monitoring and BMP Development Status Report be updated annually and submitted with Caltrans' Annual Report. This document provides an update on the status of stormwater treatment technology studies, source control studies (including erosion control studies), and monitoring and discharge characterization studies for July 1, 2015 through June 30, 2016, the 2015-2016 fiscal year (FY). The information is summarized according to the type of study as follows:

- Stormwater treatment technology studies (Section 2)
- Source control studies (Section 3)
- Monitoring and discharge characterization studies (Section 4)

This report update also summarizes (in Section 5) how study findings are being implemented to improve Caltrans' stormwater monitoring program. These updates are provided for studies conducted during FY 2015-2016 or studies for which the implementation category has changed since this Report was last updated (Caltrans 2015).

Section 2 Treatment Technology Studies

Table 2-1 provides an update on the status of treatment technology studies for the period July 1, 2015 to June 30, 2016. These studies are intended to evaluate the performance of potential treatment technologies in terms of concentration, volume, or load reductions. The table provides the following information for each study:

- The study name
- A description of the study
- The study findings
- The year water quality monitoring began
- The study status during FY 2015-2016
- The planned activities for the next three fiscal years

During FY 2015-2016, the treatment technology studies that were underway (i.e., in the planning, construction, monitoring, or reporting phase) or completed included:

- Tahoe Activated Alumina Filter Study
- State Route 73 Bioretention Study
- San Francisco/Oakland Bay Bridge (SFOBB) Bioretention Study
- Tahoe Sand Vaults Retrofit Pilot Study
- District 3 Linear Filtration Pilot Study
- District 7 Linear Filtration Pilot Study
- Chollas Creek BMP Retrofit Project

The studies are presented chronologically in Table 2-1 based on the year that monitoring began. For some studies, monitoring was temporarily discontinued for one or more monitoring seasons, but later resumed. The description of each study includes a summary of the type of treatment technology that is being studied and how its performance will be evaluated (i.e., whether in terms of concentration, volume, or load reductions).

During FY 2015-2016, a final report was completed for the Tahoe Activated Alumina Filter Study (Caltrans 2016a). According to the report, significant load reductions were observed for fine sediment particles, total suspended solids (TSS), turbidity, and nutrients. The life span for activated alumina media, as indicated by the study's data, is estimated to be 30 years.

For the SFOBB bioretention study, Caltrans submitted a final report (Caltrans 2014) to the San Francisco Bay Regional Water Quality Control Board in November 2014. Good removal occurred for many constituents. In addition, although removal of some pollutants depends on salinity and suspended sediment concentrations (SSC), such findings were qualified as being specific to this site due to its atypical exposure to salt water intrusion. In June 2016, the board provided

concurrence that that the bioretention basin monitoring obligations have been completed in June 2016 (SFB Regional Water Board 2016).

For the other studies, some type of activity (e.g., monitoring, reporting, or further study planning) will continue during FY 2016-2017, so there are no findings to report at this time. The findings will be included in subsequent status reports once the respective studies have been completed.

Table 2-1. Stormwater Treatment Technology Studies

Study Name	Description	Findings	FY Monitoring Began	FY 2015-2016 Status	FY 2016-2017 Plan	FY 2017-2018 Plan	FY 2018-2019 Plan
Tahoe Activated Alumina Filter Study	Evaluate the pollutant removal effectiveness of activated alumina filters with respect to load reductions for the Tahoe TMDL.	Significant load reductions observed for sediments and nutrients. Estimated life span for activated alumina media is 30 years. [1]	FY 2003-2004[2] and FY 2005-2006[2]	Conducted monitoring and developed report	TBD[3]	TBD[3]	TBD[3]
State Route 73 Bioretention Study	Evaluate the pollutant removal effectiveness of one bioretention basin on State Route 73 with respect to concentration.	TBD[4]	FY 2006-2007[5]	Conducted monitoring	Conduct monitoring	Develop report; conduct TMDL monitoring[5]	No action planned (study complete)[6]
San Francisco/Oakland Bay Bridge Bioretention Study	Evaluate the pollutant removal effectiveness of 2 bioretention basins at San Francisco/ Oakland Bay Bridge. Provide additional information on hydrology, maintenance, effects of salinity, vegetation, and mosquito/or vector control.	Good removal of many constituents. Removal of some pollutants depends on salinity and SSC concentrations. Findings are specific to this site due to atypical salt water intrusion.[7]	FY 2009-2010[8]	Received Regional Water Board approval of project completion[7]	No action planned (study complete)	No action planned (study complete)	No action planned (study complete)
Tahoe Sand Vaults Retrofit Pilot Study	Determine load reductions of new filter media configuration in Austin-type vaults (horizontal flow through the media as opposed to the traditional vertical flow configuration of media filters). Compare results with those predicted by Tahoe PLRM model for potential TMDL compliance.	TBD[4]	FY 2012-2013	Conducted monitoring	Conduct monitoring	Conduct monitoring and develop report	TBD[3]
District 3 Linear Filtration Pilot Study	Evaluate performance of various linear filtration designs in terms of concentration, volume, and load reduction.	TBD[4]	FY 2014-2015	Conducted monitoring	Conduct monitoring	Conduct monitoring and develop report	No action planned (study complete)
District 7 Linear Filtration Pilot Study	Evaluate performance of various linear filtration designs in terms of concentration, volume, and load reduction.	TBD[4]	FY 2015-2016	Conducted monitoring	Conduct monitoring	Conduct monitoring	Develop report
Chollas Creek BMP Retrofit Project	Evaluate performance of modular infiltration trenches and bio-infiltration swales in terms of reducing pollutant concentrations associated with the Chollas Creek TMDL WLAs.	TBD[4]	FY 2015-2016	Conducted monitoring	Conduct monitoring	TBD[3]	TBD[3]

[1] *Caltrans 2016a.*

[2] *Water quality monitoring of Highway 50 and State Route 267 filters began FY 2003-2004 and 2005-2006, respectively. Additional water quality monitoring conducted FY 2004-2005 through FY 2008-2009; FY 2011-2012; and FY 2015-2016.*

[3] *Future activities will be determined after evaluating previous years' monitoring results.*

[4] *Study is ongoing. Findings will be summarized once final study report is completed.*

[5] *Water quality monitoring for State Route 73 began FY 2006-2007. Monitoring discontinued FY 2008-2009. Monitoring restarted FY 2013-2014.*

[6] *BMP performance monitoring (influent and effluent) will be reported in FY 2017-2018. Monitoring of the BMP effluent station will continue for TMDL compliance and updated in Table 4-1, Monitoring and Discharge Characterization Studies.*

[7] *Final report submitted to San Francisco Bay Regional Water Board in Nov 2014, who concurred in June 2016 that monitoring obligations are complete. Findings not applicable to other bioretention basins; this site's unique location makes it prone to salt water intrusion. (Caltrans 2014; SFB Regional Water Board 2016).*

[8] *Water quality monitoring for San Francisco/Oakland Bay Bridge began FY 2009-2010. No water quality monitoring was conducted FY 2010-2011, but monitoring resumed FY 2011-2012. Mercury and PCB TMDL monitoring began FY 2012-2013.*

Section 3 Source Control Studies

Table 3-1 provides an update on the status of source control and erosion control studies for the period July 1, 2015 to June 30, 2016. Source Control studies are intended to investigate potential activities or materials that can prevent pollutants from entering Caltrans runoff. The table provides the following information for each study:

- The study name
- A description of the study
- The study findings
- The year water quality monitoring began
- The study status during FY 2015-2016
- The planned activities for the next three fiscal years

One source control study was underway during FY 2015-2016:

- Road-Rapid Assessment Methodology (Road-RAM) Verification and Traction Sand Monitoring

Water quality monitoring for the Road-RAM Verification and Traction Sand Monitoring study began in FY 2015-2016. The study is intended to verify the accuracy and validity of the Lahontan Regional Water Quality Control Board-mandated Road-RAM field observation and data management tool. During FY 2015-2016, Caltrans merged the Tahoe Abrasives Study with the Road-RAM study. The Road-RAM study therefore includes monitoring stormwater runoff from areas where new abrasives are applied for snow and ice control. (Previous bench-scale studies identified these abrasives as having the potential to reduce fine sediment particles and nutrients in highway runoff resulting from abrasive applications.) Caltrans also decided to officially discontinue consideration of the High Efficiency Sweeper Study during FY 2015-2016 and focus on the Road-RAM study efforts. The Road-RAM findings will be included in future status reports once the study has been completed.

Table 3-1. Source Control Studies

Study Name	Description	Findings	FY Monitoring Began	FY 2015-2016 Status	FY 2016-2017 Plan	FY 2017-2018 Plan	FY 2018-2019 Plan
Road-RAM Verification and Traction Sand Monitoring	Verify the accuracy and validity of the Lahontan Regional Water Board-mandated Road-RAM field observation and data management tool.	TBD[1]	FY 2015-2016	Conducted monitoring	Conduct monitoring	Develop report	TBD[2]
Tahoe Abrasives Study – Performance of New Abrasives	Evaluate stormwater quality resulting from application of newly identified abrasives in interest of reducing fine sediment particles and nutrients.	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]
High Efficiency Sweeper Study	Evaluate stormwater quality (fine sediment particles and nutrients) and cost implications of using high efficiency sweeper technology compared to the more conventional, mechanical sweepers that are typically used by Caltrans.	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]

[1]*Study is ongoing. Findings will be summarized once final study report is completed.*

[2]*Future activities will be determined after evaluating previous years' monitoring results/evaluations.*

[3]*Studies were replaced by Road-RAM Verification and Traction Sand Monitoring.*

Section 4 Monitoring and Discharge Characterization Studies

Table 4-1 provides an update on the status of monitoring an discharge characterization studies for the period July 1, 2015 to June 30, 2016. It also includes BMP effectiveness studies that evaluate actual Total Maximum Daily Load (TMDL) and Areas of Special Biological Significance (ASBS) compliance based on BMP effluent data. The following information is provided or each study:

- The study name
- A description of the study
- The study findings
- The year water quality monitoring began
- The study status during FY 2015-2016
- The planned activities for the next three fiscal years

Monitoring and discharge characterization studies conducted during FY 2015-2016 consisted of:

- ASBS Special Protections Monitoring – South, Central, and North Regions
- TMDL Monitoring – Chollas Creek
- TMDL Monitoring – Rainbow Creek
- TMDL Monitoring – Coachella Valley Storm Water Channel
- TMDL Monitoring – Los Angeles River
- TMDL Monitoring – Malibu Creek and Lagoon
- TMDL Monitoring – Sacramento/San Joaquin River Delta
- TMDL Monitoring – San Diego Creek
- TMDL Monitoring – San Francisco Bay
- TMDL Monitoring – Walnut Creek

The studies are categorized by ASBS or TMDL monitoring and are then listed chronologically according to the year monitoring began. Caltrans' FY 2015-2016 Monitoring Results Report (Caltrans 2016b) summarizes the data collected during the past FY for all monitored locations.

In 2015, the Colorado River Basin Regional Water Quality Control Board sent a letter to Caltrans acknowledging receipt of a report on Phase I implementation for the Coachella Valley Storm Water Channel (CRB Regional Water Board 2015). The report claimed that no samples were collected during the previous years of monitoring due to few rainfall events and the resulting lack of runoff within the channel. The report therefore concluded that it is unlikely runoff from Caltrans facilities, as represented by the stations, is contributing to bacterial loads. Caltrans is currently awaiting direction from the regional board regarding implementation for Phase II compliance.

Table 4-1. Monitoring and Discharge Characterization Studies

Study Name	Description	Findings	FY Monitoring Began	FY 2015-2016 Status	FY 2016-2017 Plan	FY 2017-2018 Plan	FY 2018-2019 Plan
ASBS Monitoring – South, Central, and North Regions	Conduct monitoring to comply with requirements for discharging stormwater into ASBS[1].	TBD[2]	FY 2012-2013[3] and FY2013-2014[3]	Conducted monitoring	Conduct monitoring[4]	TBD[4]	TBD[4]
TMDL Monitoring – Chollas Creek	Conduct TMDL monitoring[5] for: • Chollas Creek, Diazinon • Chollas Creek, Dissolved Metals	TBD[2]	FY 2011-2012	Conducted monitoring	Conduct monitoring[4]	TBD[6]	TBD[6]
TMDL Monitoring – Rainbow Creek	Conduct TMDL monitoring[5] for: • Rainbow Creek, Total Nitrogen and Total Phosphorus	TBD[2]	FY 2011-2012	Conducted monitoring	Conduct monitoring[4]	TBD[6]	TBD[6]
TMDL Monitoring – Coachella Valley Storm Water Channel	Conduct TMDL monitoring[5] for: • Coachella Valley Stormwater Channel, Bacterial Indicator	It is unlikely runoff from Caltrans facilities, as represented by the stations, is contributing to bacterial loads[8]	FY 2013-2014[7]	Attempted monitoring[8]	Await Regional Water Board direction[8]	TBD[6]	TBD[6]
TMDL Monitoring – Los Angeles River	Conduct TMDL monitoring[5] for: • LA River, Metals • LA River Watershed, Bacteria	TBD[2]	FY 2013-2014[7]	Conducted monitoring	Conduct monitoring[4]	TBD[6]	TBD[6]
TMDL Monitoring – Malibu Creek	Conduct TMDL monitoring[5] for: • Malibu Creek and Lagoon, Bacteria • Malibu Creek and Lagoon, Sedimentation and Nutrients	TBD[2]	FY 2013-2014[7]	Conducted monitoring	Conduct monitoring[4]	TBD[6]	TBD[6]
TMDL Monitoring – Sacramento/San Joaquin River Delta	Conduct TMDL monitoring[5] for: • Sacramento/San Joaquin Delta Estuary, Methyl Mercury	TBD[2]	FY 2013-2014[7]	Conducted monitoring	Conduct monitoring	TBD[6]	TBD[6]
TMDL Monitoring – San Diego Creek	Conduct TMDL monitoring[5] for: • San Diego Creek and Newport Bay including Rhine Channel, Metals (Copper, Lead, and Zinc) • San Diego Creek and Newport Bay, Cadmium • San Diego Creek Watershed, Organochlorine Compounds (DDT, Chlordane, PCBs, and toxaphene)	TBD[2]	FY 2013-2014[7]	Conducted monitoring	Conduct monitoring	TBD[6]	TBD[6]
TMDL Monitoring – San Francisco Bay	Conduct TMDL monitoring[5] for: • San Francisco Bay, Mercury • San Francisco Bay, PCBs	TBD[2]	FY 2013-2014[7]	Conducted monitoring	Conduct monitoring	TBD[6]	TBD[6]
TMDL Monitoring – Walnut Creek	Conduct TMDL monitoring[5] for: • San Francisco Bay and Urban Creeks, Diazinon and Pesticides	TBD[2]	FY 2013-2014[7]	Conducted monitoring	Conduct monitoring	TBD[6]	TBD[6]

[1] *Monitoring is being conducted under the General Exception to Prohibiting Storm Water Discharges in the California Ocean Plan and in compliance with ASBS requirements of Caltrans' NPDES Permit (State Water Board 2012).*

[2] *Study is ongoing.*

[3] *South Region monitoring began in FY 2012-2013. Central Region and North Region monitoring began in FY 2013-2014.*

[4] *Monitoring will continue during FY 2016-2017. Caltrans is currently negotiating with the State Water Board regarding future monitoring. Future activities will be determined pending compliance determination in accordance with Caltrans' NDPES permit (State Water Board 2012).*

[5] *Monitoring is being conducted in compliance with TMDL requirements (Attachment IV) and Tier 1 monitoring requirements of Caltrans' NPDES Permit (State Water Board 2012).*

[6] *Future activities will be determined pending compliance determination in accordance with Caltrans' NPDES permit (State Water Board 2012).*

[7] *Monitoring for TMDL compliance with Caltrans' NPDES Permit Attachment IV (State Water Board 2012) began FY 2013-2014.*

[8] *Monitoring attempted but no samples were collected due to rarity of rainfall and lack of runoff. Therefore, Caltrans submitted a report to Colorado River Basin Regional Water Quality Control Board (CRB Regional Water Board) regarding Phase I of TMDL compliance claiming it is unlikely Caltrans facilities represented by the monitoring stations are contributing to bacterial loads. Caltrans awaiting CRB Regional Water Board direction regarding Phase II compliance. (CRB Regional Water Board 2015).*

Section 5 Implementation of Research Findings into Stormwater Program

This section provides a summary of the current implementation status for the efforts listed in Table 2-1, Table 3-1, and Table 4-1, followed by studies that have been completed in previous years. Table 5-1 provides a key to the implementation categories that are assigned to Caltrans' stormwater studies. Table 5-2, Table 5-3, and Table 5-4 present the most recent implementation category for each treatment technology, source control, and discharge characterization study, respectively. Implementation updates are only provided for studies conducted during FY 2015-2016 or previous studies for which the implementation category has changed since the Status Report Update was last submitted.

Table 5-1. Implementation Category Key

Implementation Category	Explanation
A	Study findings resulted in changes to maintenance program.
B	Study findings resulted in changes to PPDG or other supplemental design guidance.
C	Study is complete and results did not justify changes to program based on the information generated.
D	Study is ongoing.
E	Study findings resulted in approval of BMP for statewide use (i.e., inclusion in Caltrans' BMP tool box).
F	Study findings resulted in changes to construction practices/management.
G	Study is long-term and the management implications have yet to be determined.
H	Study findings provided information for regulatory compliance or BMP planning.
I	Study's field/laboratory effort is complete, but incorporation into program is still under assessment.
J	Study findings led to full-scale field studies or follow-up study.
K	Study was postponed for further consideration.
L	Study was replaced with other study.

Table 5-2. Update of Implementing Findings of Treatment Technology Studies

Study Title	Implementation Category
Tahoe Activated Alumina Filter Study	D
State Route 73 Bioretention Study	D
San Francisco/Oakland Bay Bridge Bioretention Study	H
Tahoe Sand Vaults Retrofit Pilot Study Test	D
District 3 Linear Filtration Pilot Study	D
District 7 Linear Filtration Pilot Study	D
Chollas Creek BMP Retrofit Project	D

Table 5-3. Update of Implementing Findings of Source Control Studies

Study Title	Implementation Category
Tahoe Abrasives Study – Performance of New Abrasives	D
Road – RAM Verification and Traction Sand Monitoring	D
High Efficiency Sweeper Study	L

Table 5-4. Update of Implementing Findings of Discharge Characterization Studies

Study Title	Implementation Category
ASBS Special Protections Monitoring – South, Central, and North Regions	D
TMDL Monitoring – Coachella Valley Storm Water Channel	D
TMDL Monitoring – Chollas Creek	D
TMDL Monitoring – Los Angeles River	D
TMDL Monitoring – Malibu Creek	D
TMDL Monitoring – Rainbow Creek	D
TMDL Monitoring – Sacramento/San Joaquin River Delta	D
TMDL Monitoring – San Diego Creek	D
TMDL Monitoring – San Francisco Bay	D
TMDL Monitoring – Walnut Creek	D

Section 6 References

California Department of Transportation (Caltrans). 2014. *Caltrans, District 4, San Francisco Oakland Bay Bridge (SFOBB) Bioretention Pilot Project Final Report.* October 2014. CTSW-RT-14-288.05.3

California Department of Transportation (Caltrans). 2015. *Stormwater Monitoring and BMP Development Status Report Fiscal Year 2014-2015*. September 2015. CTSW-RT-15-312.01.01

California Department of Transportation (Caltrans). 2016a. Report Addendum. Lake Tahoe Austin Media Filter Pilot Study. 2015-16 Monitoring Season. June 2016. CTSW-TM-16-326.4.1.

California Department of Transportation (Caltrans). 2016b. *California Department of Transportation Monitoring Results Report Fiscal Year 2015-16.* September 2016. CTSW-RT-16-312.01.02

California State Water Resources Control Board (State Water Board). 2012. *Order No. 2012-0011-DWQ As Amended by* Order WQ 2014-0006-EXEC, Order WQ 2014-0077-DWQ, and Order WQ 2015-0036-EXEC: NPDES NO. CAS000003 *National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit Waste Discharge Requirements (WDRs) for State of California Department of Transportation.*

Colorado River Basin Regional Water Quality Control Board (CRB Regional Water Board). 2015. *Caltrans 2 Years Monitoring in Conformance with Phase I Implementation for the Indicator Bacteria Total Maximum Daily Load (TMDL) for Coachella Valley Stormwater Channel (CVSC).* Letter to Caltrans District 8. January 6 2015.

San Francisco Bay Regional Water Quality Control Board (SFB Regional Water Board). 2016. *Completion of Stormwater Monitoring for SFOBB Bioretention Basins.* Email from Derek Beauduy, SFB Regional Water Board, Water Resource Engineer. June 21 2016.

Attachment 1

January 6, 2015 Colorado River Basin Regional Water Board Letter

January 6, 2015 via email only (patrick.hally@dot.ca.gov)

Patrick Hally, P.E.
California Department of Transportation (Caltrans) District 8
464 W. Fourth Street, 6th Floor
San Bernardino, CA 92401

Dear Mr. Hally:

SUBJECT: CALTRANS 2 YEARS MONITORING IN CONFORMANCE WITH PHASE I IMPLEMENTATION FOR THE INDICATOR BACTERIA TOTAL MAXIMUUM DAILY LOAD (TMDL) FOR COACHELLA VALLEY STORMWATER CHANNEL (CVSC)

Staff of the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board) received the above reference report on November 30, 2015. The report summarizes two years of *E.coli* monitoring, from October 2013 to September 2015, in the CVSC by the Caltrans under Phase I of the TMDL Implementation.

The report indicates that no water samples were collected because there was not enough runoff due to the rare rainfall events that occurred at the monitoring sites. The report concludes that even if bacteria is generated in highway right-of-way, it is highly unlikely that Caltrans facilities represented by the monitoring sites have been responsible for contribution of bacteria to the CVSC due to not enough runoff to reach to the CVSC, and recommends that Caltrans being removed from the TMDL due to lack of connectivity.

Regional Water Board staff is aware that current drought conditions might suggest an absence of runoff at the monitoring sites. However, the report does not support or discount Caltrans' contribution to the E.coli impairments to the CVSC, because no data was collected to determine the contribution. The sources of *E.coli* have not been identified yet, and therefore, it is too early to determine exclusion of any groups/individuals from the responsible party list.

Should you have any questions, please contact Dr. Jeong-Hee Lim by calling at 760-776-8940 or via email to jeong-hee.lim@waterboards.ca.gov.

Sincerely,

Nadim Shukry-Zeywar, TMDL/NPS Unit Chief
Colorado River Basin Water Board

JHL/

File: CW-805091: Coachella Valley Stormwater Channel Bacteria TMDL