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June 27, 2014

Mr. Samuel Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 West Fourth Street, Suite 200
Los Angeles, CA 90013

Dear Mr. Unger:

SUBMITTAL OF COORDINATED INTEGRATED MONITORING PROGRAM FOR JURISDICTIONAL GROUPS 2 AND 3 OF THE SANTA MONICA BAY WATERSHED

Please find attached the Coordinated Integrated Monitoring Program (CIMP) for Jurisdictional Groups 2 and 3 of the Santa Monica Bay watershed. The City of Los Angeles, as lead agency for Jurisdictional Groups 2 and 3, has prepared this CIMP on behalf of itself, the County of Los Angeles, Los Angeles County Flood Control District, and the Cities of Santa Monica and El Segundo. All agencies have reviewed the draft CIMP prior to submission to the Regional Water Board, and we appreciate the collaboration by all agencies in the preparation of the document.

The CIMP for Jurisdictions 2 and 3satisfies the requirements provided by Attachment E, the Monitoring and Reporting Program (MRP), of the new MS4 Permit (Order No. R4-2012-0175) The CIMP provides a discussion of the monitoring locations, constituents, and monitoring frequencies, details of analytical and monitoring procedures, and an approach for implementation of the CIMP. Concurrently with this CIMP, we are submitting Geographic Information System (GIS) database to satisfy the requirements of Part VII.A of the MRP.

We appreciate the discussions with and the input received from Regional Water Board staff during the development of this CIMP. The agencies of Jurisdictional Groups 2 and 3 look forward to the comments on the CIMP by your staff and finalizing this document.

Should you have any questions about this submittal, please contact me at Shahram.Kharaghani@lacity.org or phone (213) 485-0587, or your staff may contact Ms. Donna Chen at Donna.Chen@lacity.org or phone (213) 485-3928.

Sincerely,

Robert Vega for

SHAHRAM KHARAGHANI, Ph.D., P.E., BCEE
Program Manager

SK: HC
WPDCR9131

Attachment

cc: Renee Purdy, California Regional Water Quality Board, Los Angeles Region
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Hubertus Cox, City of Los Angeles, Bureau of Sanitation
Gary Hildebrand, County of Los Angeles, Department of Public Works
Rick Valte, City of Santa Monica
Stephanie Katsouleas, City of El Segundo

June 2014

SANTA MONICA BAY JURISDICTIONAL GROUP 2 AND 3
ENHANCED WATERSHED MANAGEMENT PLAN GROUP

Coordinated Integrated Monitoring Program (CIMP)

Prepared by

City of Los Angeles, Los Angeles County Flood Control District, City of Santa Monica and City of El Segundo

The MWH Team

MWH Geosyntec consultants CWE M2 Resource Consulting, Inc.

Table of Contents

List of Figures

List of Tables

List of Attachments

LIST OF ACRONYMS

Acronym	Definition
40 CFR	Code of Federal Regulations
Basin Plan	Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties
BMPs	Best Management Practices
Caltrans	California Department of Transportation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIMP	Coordinated Integrated Monitoring Program
County	Los Angeles County
CSMP	Coordinated Shoreline Monitoring Plan
CWA	Clean Water Act
CWC	California Water Code
DDT	Dichlorodiphenyltrichloroethane
EIA	Effective Impervious Area
EWMP	Enhanced Watershed Management Program
GIS	Geographic Information System
HUC-12	Hydrologic Unit Codes
IC/ID	Illicit Connection/Illicit Discharge
IMCR	Integrated Monitoring Compliance Report
IMP	Integrated Monitoring Program
JG2/3	Jurisdictional Group 2 and 3
LACDPW	County of Los Angeles Department of Public Works
LACFCD	Los Angeles County Flood Control District
LFD	Low Flow Diversion
LID	Low Impact Development
MAL	Municipal Action Limts
MCM	Minimum Control Measure
MES	Mass Emission Stations
MRP	Monitoring and Report Program
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
PCB	Polychlorinated biphenyl
PCIS	Plan Check and Inspection System
Permit	Permit No. R4-2012-0175
PMRP	Pellets Monitoring and Reporting Plan
RAA	Reasonable Assurance Analysis
Regional Board	Los Angeles Regional Water Quality Control Board
RWL	Receiving Water Limitations
SCCWRP	Southern California Coastal Water Research Project

Acronym	Definition
SDTF	Standardized Data Transfer Format
SIC	Standard Industrial Classification System
SMB	Santa Monica Bay
SMB EWMP Group	Santa Monica Bay Enhanced Watershed Management Program Group
SMBBB	Santa Monica Bay Beaches Bacteria
SMC	Southern California Stormwater Monitoring Coalition
SMURRF	Santa Monica Urban Runoff Recycling Facility
SOP	Standard Operating Procedure
SWAMP	Surface Water Ambient Monitoring Program
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TMRP	Trash Monitoring and Reporting Plan
USEPA	U.S. Environmental Protection Agency
WBPCs	Water Body-Pollutant Combinations
WDID	State Waste Discharge Identification
WLA	Waste Load Allocations
WMA	Watershed Management Area
WQBEL	Water Quality-Based Effluent Limits

Section 1
Introduction

In June 2013, the Cities of El Segundo, Los Angeles, and Santa Monica, together with the County of Los Angeles (County) and the Los Angeles County Flood Control District (LACFCD), collectively referred to as the Santa Monica Bay EWMP Group (SMB EWMP Group), submitted a notice of intent to develop an Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP) to fulfill the requirements of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) for Los Angeles County issued by the Los Angeles Regional Water Quality Control Board (Regional Board). The Permit was adopted on November 8, 2012, by the Regional Board and became effective December 28, 2012. This Permit replaced the previous MS4 permit (Order No. 01-182). The purpose of the Permit is to ensure the MS4s in Los Angeles County are not causing or contributing to exceedances of water quality objectives set to protect the beneficial uses in the receiving waters in the Los Angeles region. The Permit allows the Permittees to customize their stormwater programs to achieve compliance with certain Receiving Water Limitations (RWL) and Water Quality-Based Effluent Limits (WQBELs).

The SMB EWMP Group's CIMP establishes the requirements presented in the Monitoring and Reporting Program (MRP) portion of the Permit, which are specified in Attachment E of the Permit. The primary objectives for the MRP are listed in Part II.A of the MRP, as follows:

- Assess the chemical, physical, and biological impacts of discharges from the MS4 on receiving waters;
- Assess compliance with RWLs and WQBELs established to implement Total Maximum Daily Load (TMDL) wet-weather and dry-weather waste load allocations (WLAs);
- Characterize pollutant loads in MS4 discharges;
- Identify sources of pollutants in MS4 discharges; and
- Measure and improve the effectiveness of pollutant controls implemented under the Permit.

As an option in the MRP, the SMB EWMP Group's CIMP proposes alternative approaches, with sufficient justification, to meet the primary objectives. Additionally, the CIMP includes TMDL monitoring requirements to unify monitoring efforts and to provide consistent observations of watershed conditions.

1.1 LACFD BACKGROUND INFORMATION

In 1915, the Los Angeles County Flood Control Act was adopted by the California State Legislature after a disastrous regional flood took a heavy toll on lives and property. The act established the LACFCD and empowered it to manage flood risk and conserve stormwater for groundwater recharge. In coordination with the United States Army Corps of Engineers the LACFCD developed and constructed a comprehensive system that provides for the regulation and control of flood waters through the use of reservoirs and flood channels. The system also controls debris, protects existing vegetal covers, collects surface storm water from streets, and replenishes groundwater with storm water and imported and recycled waters. The LACFCD covers the 2,753 square-mile portion of Los Angeles County south of the east-west projection of Avenue S, excluding Catalina Island. It is a special district governed by the County of Los Angeles Board of Supervisors, and its functions are carried out by the Los Angeles County Department of Public Works. The LACFCD service area is shown in **Figure 1**.

By statute, the LACFCD has limited powers and purposes, which places constraints on the types of projects and activities which the LACFCD may fund. Unlike cities and counties, the LACFCD does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways. The LACFCD operates and maintains storm drains and other appurtenant drainage infrastructure within its service area. The LACFCD has no planning, zoning, development permitting, or other land use authority within its service area. The permittees that have such land use authority are responsible under the Permit for inspecting and controlling pollutants from industrial and commercial facilities, development projects, and development construction sites. (Permit, Part II.E, p. 17.)

The MS4 Permit language clarifies the unique role of the LACFCD in storm water management programs: "[g]iven the LACFCD's limited land use authority, it is appropriate for the LACFCD to have a separate and uniquely-tailored storm water management program. Accordingly, the storm water management program minimum control measures imposed on the LACFCD in Part VI.D of this Order differ in some ways from the minimum control measures imposed on other Permittees. Namely, aside from its own properties and facilities, the LACFCD is not subject to the Industrial/Commercial Facilities Program, the Planning and Land Development Program, and the Development Construction Program. However, as a discharger of storm and non-storm water, the LACFCD remains subject to the Public Information and Participation Program and the Illicit Connections and Illicit Discharges Elimination Program. Further, as the owner and operator of certain properties, facilities and infrastructure, the LACFCD remains subject to requirements of a Public Agency Activities Program." (Permit, Part II.F, p. 18.)

Consistent with the role and responsibilities of the LACFCD under the Permit, the [E]WMPs and CIMPs reflect the opportunities that are available for the LACFCD to collaborate with permittees having land use authority over the subject watershed area. In some instances, the opportunities are minimal, however the LACFCD remains responsible for compliance with certain aspects of the MS4 permit as discussed above.

1.2 SANTA MONICA BAY JURISDICTIONAL GROUP 2 AND 3 WATERSHED MANAGEMENT PLAN AREA

Located in the South Santa Monica Bay Watershed, **Figure 1**, SMB EWMP Group is comprised of the five participating agencies: the Cities of El Segundo, Los Angeles, and Santa Monica, the County, and LACFCD, as shown in **Figure 2**. The total area of Jurisdictional Group 2 and 3 (JG2/3) is approximately 33,967 acres. The SMB EWMP Group area encompasses approximately 25,238 acres within JG2/3. The remaining JG2/3 area encompasses approximately 8,729 acres and includes land owned by U.S. Government, State of California, California Department of Transportation (Caltrans), Chevron, and El Segundo Generation Station. Also excluded from the geographical scope are the beaches. These agencies/organizations are not participants of the SMB EWMP Group. Approximate land area and land use summaries for the JG2/3 area are presented in **Figure 3** and listed in **Table 1**. The most prevalent land uses are open space and residential. Commercial, industrial, educational facilities, and transportation land uses constitute minor portions of the jurisdictions within SMB EWMP Group area.

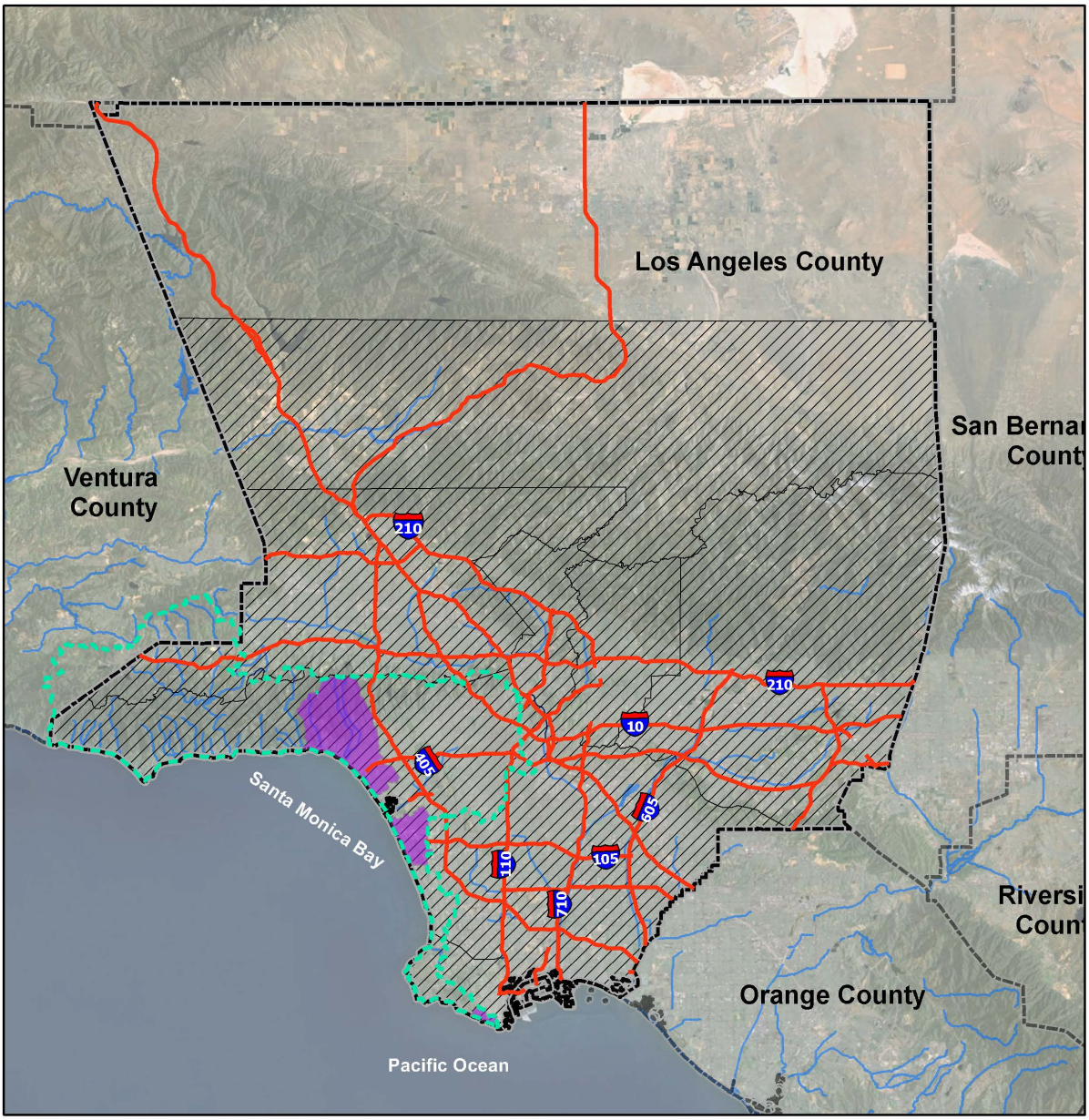

Figure 1
Area within Santa Monica Bay Watershed and the Los Angeles Basin

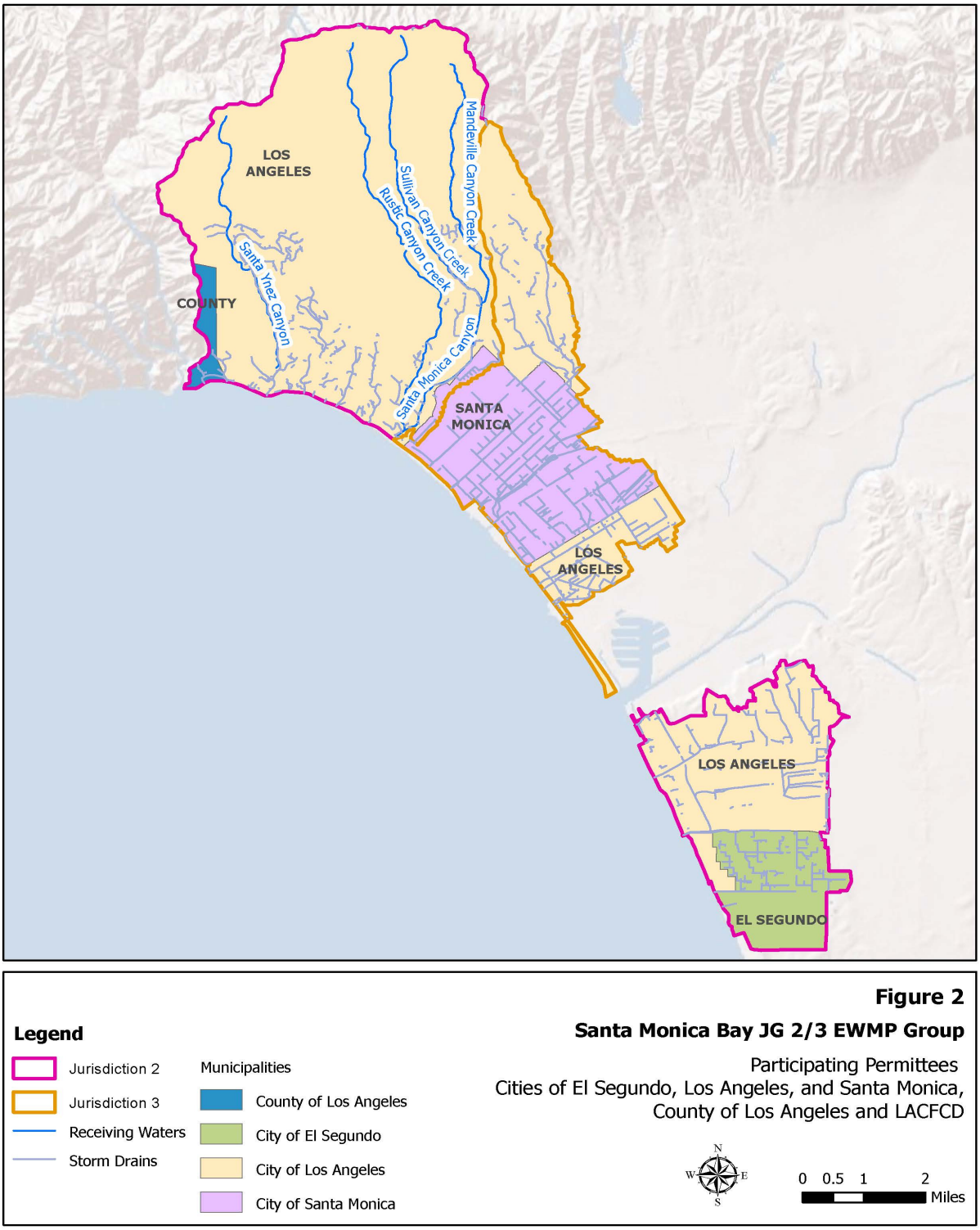

Figure 2
Santa Monica Bay Participating Permittees*

Lands owned by U.S. Government, State of California, California Department of Transportation (Caltrans), Chevron, beaches and El Segundo Generation Station are excluded from the geographical scope.

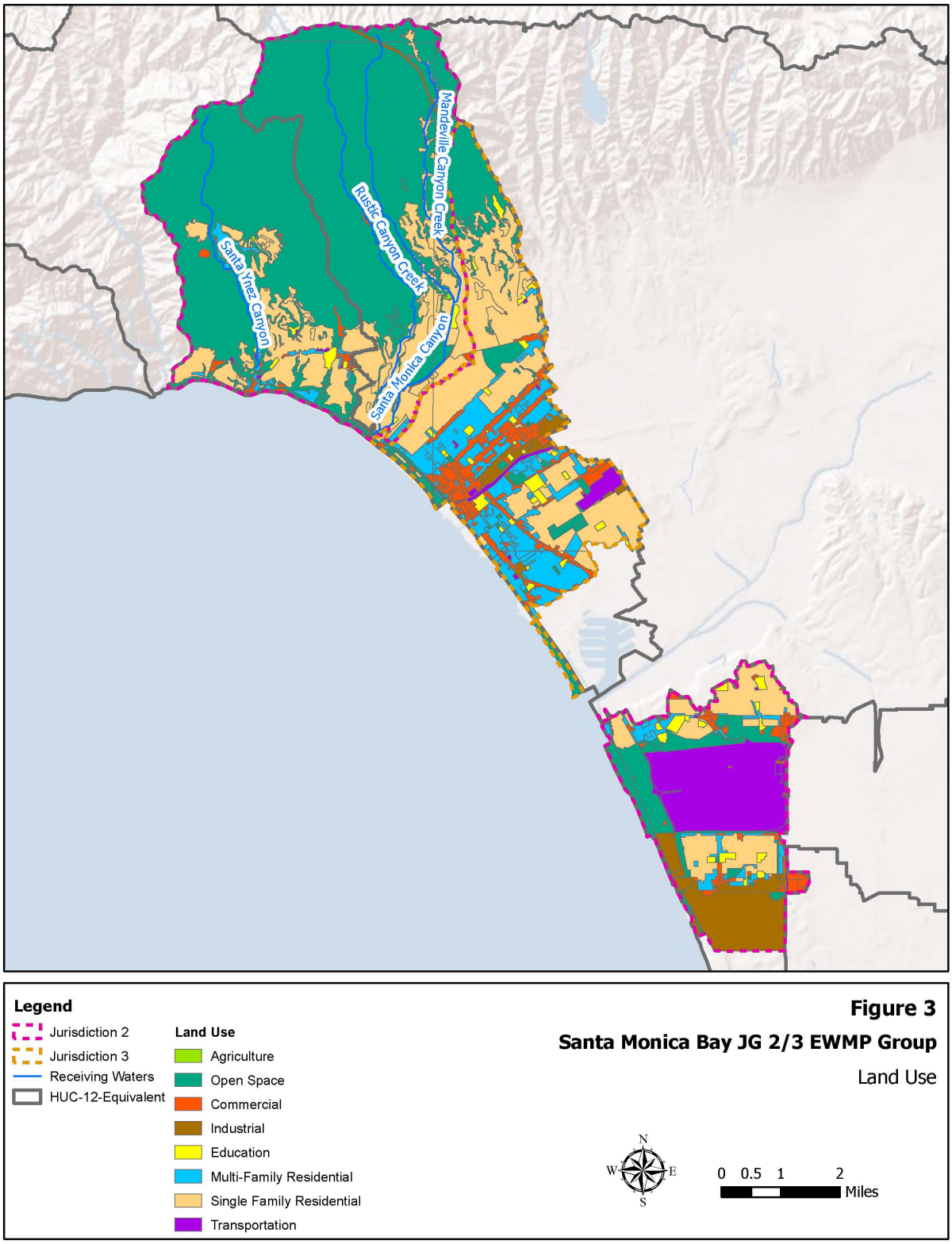

Figure 3
Land Use

Table 1
Land Use Summaries

Land Use	Los Angeles County		Los Angeles		Santa Monica		El Segundo		Total*	
	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total
Agriculture	0	0%	16.37	0.06%	0%	0%	0%	0%	16.37	0.05%
Commercial	1.7	0.44%	537.83	2.04%	929.33	18.64%	183.65	8.42%	1,652.51	4.87%
Industrial	0	0%	270.88	1.03%	230.74	4.63%	1,065.28	48.87%	1566.9	4.61%
Education	0	0%	323.56	1.23%	185.77	3.73%	58.97	2.71%	568.3	1.67%
Multi-Family Residential	7.19	1.85%	1,062.18	4.02%	1,536.01	30.80%	164.33	7.54%	2,769.71	8.15%
Single Family Residential	108.36	27.87%	6,387.27	24.18%	1,595.21	31.99%	556.86	25.54%	8647.7	25.46%
Open Space	271.6	69.85%	15,741.17	59.60%	271.75	5.45%	138.88	6.37%	1,6423.4	48.35%
Transportation	0	0%	2,072.33	7.85%	237.92	4.77%	12.04	0.55%	2,322.29	6.84%
Total	388.85	100%	26,411.59	100%	4,986.73	100%	2,180.01	100%	33,967.18	100%

*Total area for J2/3 – the area for the EWMP group is 25,238 acres

JG2 encompasses Castle Rock, Dockweiler, Pulga Canyon, Santa Monica Canyon, Santa Ynez, and Venice Beach watersheds as defined by the Regional Board. JG3 covers a small section from Santa Monica Canyon and north of the Santa Monica Freeway at the ocean to north of Marina del Rey/Venice area. The receiving waters defined by the Water Quality Control Plan, Los Angeles Region (Basin Plan) (Regional Board, 1995, Updated 2011) within the SMB EWMP Group area include:

- Santa Monica Bay
- Santa Monica Canyon Channel
    - Rustic Canyon Creek
    - Mandeville Canyon Creek
    - Sullivan Canyon Creek
- Santa Ynez Canyon

Attachment B of the MS4 Permit, mapped United States Geological Survey Hydrologic Units, and other features, based on Hydrologic Unit Codes (HUC-12) watershed boundaries. In-lieu of these specified boundaries, the March 26, 2014 Regional Board Reasonable Assurance Analysis (RAA) Guidelines allows the EWMP group to use HUC-12 equivalent watersheds, prepared by the LACFCD. Using the LACFCD HUC-12 layer and numbering conventions, the LACFCD HUC-12 boundaries, relevant to the SMB EWMP Group, are shown in **Figure 4** and identified as follows:

- Santa Monica Beach – Frontal Santa Monica Bay (180701040403)
- Santa Monica Canyon (180701040402)
- Manhattan Beach – Frontal Santa Monica Bay (180701040500)

The five-agency jurisdictional boundaries, HUC-12, MS4 drainage system, and outfall locations within JG2/3 are shown in **Figure 5**. Attachment A provides additional watershed background, including TMDL monitoring requirements and existing monitoring programs.

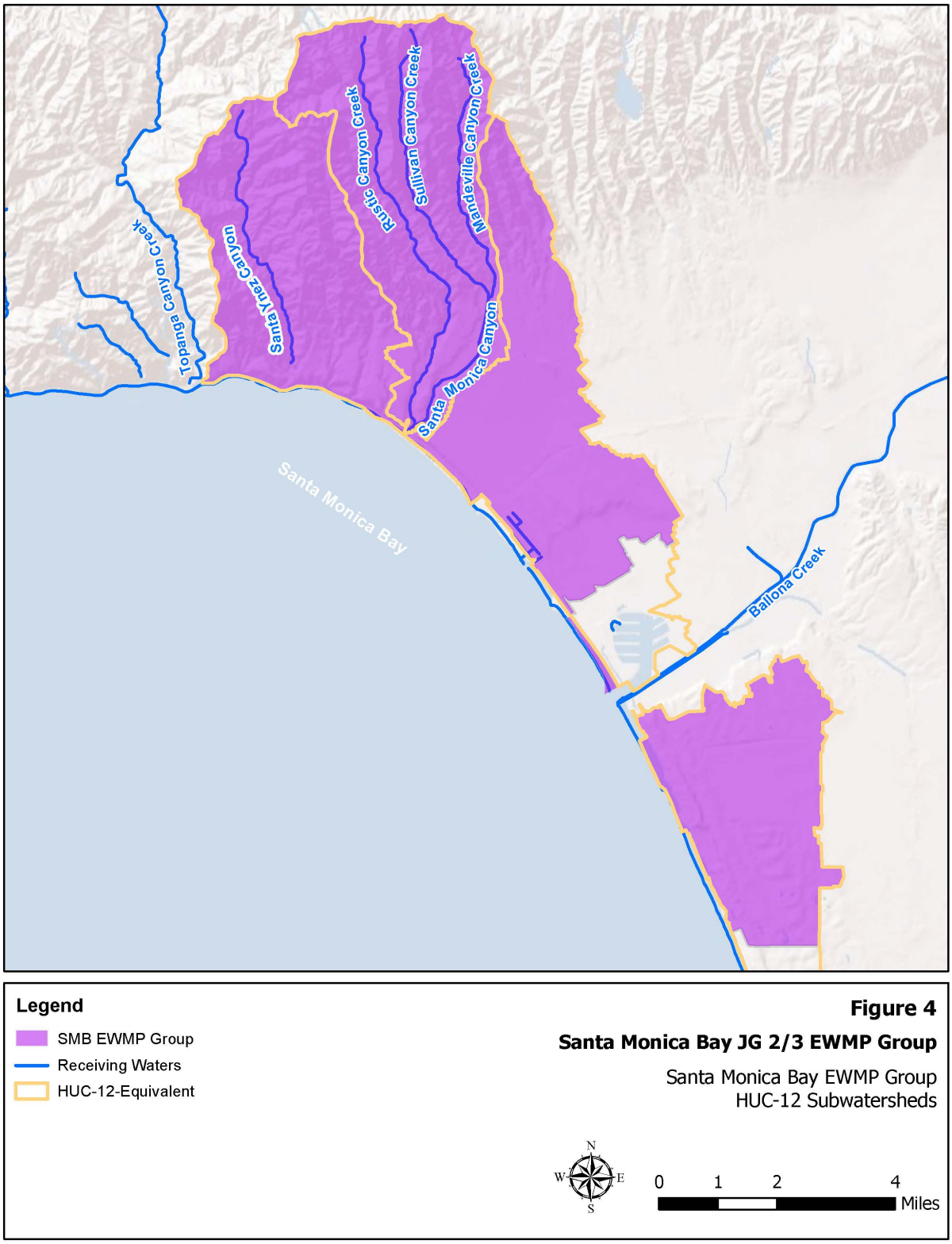

Figure 4
Santa Monica Bay JG 2/3 HUC-12 Subwatersheds

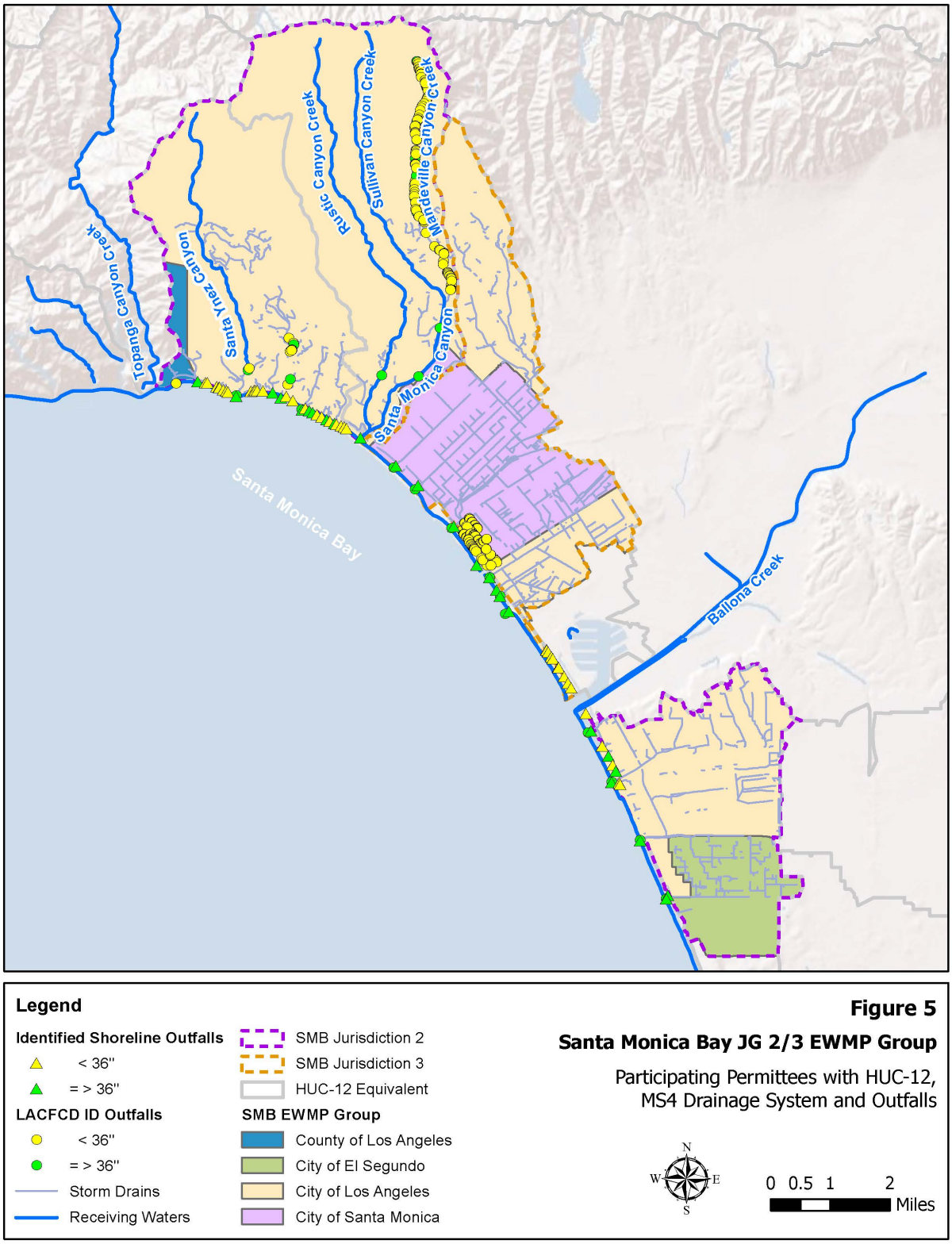

Figure 5
Participating Permitees with HUC-12, MS4 Drainage System and Outfalls

1.3 WATER QUALITY PRIORITIES

Based on the water quality characterization, the water body–pollutant combinations (WBPCs) have been classified into one of three categories, in accordance with Section IV.C.5(a)ii of the Permit. The three categories, as defined by the Permit, are as follows:

- **Category 1**: Water body-pollutant combinations under Category 1 (highest priority) are defined in the Permit as "water body-pollutant combinations for which water quality-based effluent limitations and/or receiving water limitations are established in Part VI.E and Attachments L through R *[*of *the Permit]*."
- **Category 2**: (high priority) water body-pollutant combinations are defined as "*p*ollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) and for which MS4 discharges may be causing or contributing to the impairment.*"*
- **Category 3**: (Medium Priority) designations are to be applied to water body-pollutant combinations that are not 303(d)-listed, but which exceed applicable receiving water limitations contained in the Permit and for which MS4 discharges may be causing or contributing to the exceedance.

Water quality priorities are then identified based on the WBPC categories compliance deadlines for the SMB EWMP. This categorization is intended to prioritize WBPCs in order to guide the implementation of structural and institutional best management practices (BMPs) and monitoring activities in the CIMP. Through this process, the Priority 1 WBPC has been identified as summer and winter dry-weather bacteria and wet-weather bacteria. **Table 2** presents the identified water quality priorities and the WBPC categories.

As part of the adaptive management process, categorization of WBPCs may be adjusted based on data obtained from monitoring, source evaluations, and BMP implementation. Data collected as part of the approved CIMP may result in future Category 3 designations in instances when receiving water limits are exceeded and MS4 discharges are identified as contributing to such exceedances. Under these conditions, the appropriate agencies will adhere to Section VI.C.2.a.iii of the Permit.

Additional details and supporting information for monitoring to address priorities can be found in **Attachment A**.

Table 2
Water Body Pollutant Prioritization

Category	Water Body	Pollutant	Compliance Deadline
1	SMB Beaches	Summer dry weather bacteria	7/15/2006 (Final: Single sample summer AEDs met)
	SMB Beaches	Wet weather bacteria	7/15/2009 (Interim: 10% single sample ED reduction)
			7/15/2013 (interim: 25% single sample ED reduction)
			7/15/2018 (Interim: 50% single sample ED reduction)
			7/15/2021 (Final: Single sample AED)
			7/15/2021 (Final: Geometric Mean [GM])
	SMB Beaches	Winter dry weather bacteria	7/15/2009 (Final: Single sample winter AEDs)[1]
	SMB Offshore/ Nearshore	Debris	3/20/2016 (20% load reduction)
			3/20/2017 (40% load reduction)
			3/20/2018 (60% load reduction)
			3/20/2019 (80% load reduction)
			3/20/2020 (100% load reduction)
	SMB	DDTs	[Compliance schedule to be developed through the EWMP][2]
	SMB	PCBs	[Compliance schedule to be developed through the EWMP][2]
2	Santa Monica Canyon Channel	Lead	NA
	Santa Monica Canyon Channel	Indicator bacteria	NA
3	None	None	None

[1] Compliance date per 2013 reopened TMDL, which is not yet effective (i.e., USEPA and Office of Administrative Law approval is pending).

[2] Although the TMDL lacks a formal compliance schedule for the WQBEL, the TMDL Executive Summary does state, "The time frame for attainment of the TMDL targets for the rest of Santa Monica Bay (other than the Palos Verdes shelf) is 11 years for DDT and 22 years for PCBs."

1.4 CIMP OVERVIEW

The CIMP is designed to provide the information necessary to guide management decisions in addition to providing a means to measure compliance with the Permit. The SMB EWMP Group's CIMP is composed of six elements:

1. Receiving Water Monitoring
2. Stormwater Outfall Monitoring
3. Non-Stormwater Outfall Monitoring
4. New Development and Redevelopment Effectiveness Tracking
5. Regional Studies
6. Special Studies

Each of the six CIMP elements is discussed below.

1.4.1 Receiving Water Monitoring

Receiving water monitoring is intended to assess whether water quality objectives are being achieved, to determine if beneficial uses are being supported, and to track trends in constituent concentrations over time. Three receiving water monitoring sites were selected. **Section 2** discusses SMB EWMP Group's receiving water monitoring program.

1.4.2 Stormwater Outfall Monitoring

Stormwater outfall monitoring assesses compliance with municipal action limits (MALs), WQBELs derived from TMDL WLAs, as well as the potential to have caused or contributed exceedances of RWLs derived from TMDL WLAs or receiving water quality objectives.

The majority of storm drains within the SMB EWMP Group generally drain towards Santa Monica Bay. Four stormwater outfall monitoring sites were selected. The four monitoring sites comprise about 45.7% of the drainages area of the SMB EWMP Group. The selected sites are representative of a combination of the HUC-12s, jurisdictions, and/or land uses within each drainage area that they have been chosen to represent. A synopsis of each potential outfall drainage area, along with an analysis of its land use/zoning characteristics is summarized in **Section 4**.

1.4.3 Non-Stormwater Outfall Program

The SMB EWMP Group has been addressing non-stormwater flow to Santa Monica Bay since the late 1990s and has installed 23 low flow diversions (LFDs) along the Santa Monica Bay shoreline within the J2/J3 EWMP geographical scope. To further fulfill the Permit requirements, the MRP requires Permittees to implement a non-stormwater outfall based screening and monitoring program. The Non-Stormwater Outfall Screening and Monitoring Program (Non-Stormwater Program) is focused on Non-Stormwater discharges to receiving waters from MS4 outfalls.

The Non-Stormwater Program will collect information necessary to identify significant Non-Stormwater discharges and conduct the screening process and prioritization prior to Non-Stormwater outfall monitoring. Additional details of the Non-Stormwater Program are presented in **Section 5**.

1.4.4 New Development and Redevelopment Effectiveness Tracking

The New Development/Re-Development Effectiveness Tracking is required to identify the information necessary for data management and annual compliance reporting. Each jurisdiction will be individually responsible for tracking Permit requirements, based on their specific operational procedures and internal processes. The SMB EWMP Group will maintain an informational database record for each new development/re-development project subject to the minimum control measure (MCM) and their adopted Low Impact Development (LID) Ordinance. In addition, to the SMB EWMP Group will implement a tracking system for new development/re-development projects that have been conditioned for post-construction BMPs. **Section 6** presents the new development and redevelopment effectiveness tracking system for the SMB EWMP Group.

1.4.5 Regional Studies

Only one regional study is identified in the MRP: Southern California Stormwater Monitoring Coalition (SMC), which is overseen by the Southern California Coastal Water Research Project (SCCWRP). The SMB EWMP Group is continuing to participate and support several SMC research studies, including the most recent SMC study, Bioassessment Monitoring Program. The SMB EWMP will continue to coordinate with SCCWRP and participate in regional studies. **Section 7** presents the regional studies approach for the SMB EWMP Group.

1.4.6 Special Studies

The MRP requires each Permittee to be responsible for conducting special studies required in an effective TMDL or an approved TMDL Monitoring Plan. Special studies options are further discussed in **Section 8**.

Section 2
Receiving Water Monitoring Program

Receiving water monitoring will be conducted in Santa Monica Bay and Santa Monica Canyon Channel.

As outlined in the MRP, receiving water monitoring is intended to assess whether water quality objectives are being achieved and beneficial uses are being supported, as well as to track trends in constituent concentrations over time. The requirements in the MRP for selecting receiving water monitoring sites include utilizing receiving water monitoring sites at previously designated Los Angeles County Department of Public Works (LACDPW) mass emission stations (MES), TMDL receiving water compliance points, and additional receiving water locations representative of the impacts from MS4 discharges. Through the evaluation of previously-utilized and existing receiving water monitoring sites, as summarized in **Attachment A**, no existing MES were located. Additionally, other existing receiving water monitoring sites located in relation to the SMB EWMP Group's jurisdictional area were not considered. These existing receiving water monitoring sites locations were acknowledged to be located in an area that will achieve monitoring objectives for the represented existing monitoring programs. However, these monitoring sites may not accurately assess the overall impact of the MS4 onto Santa Monica Bay due to the varying proximity of the monitoring sites to the MS4 outfalls. For other listed receiving water bodies within the SMB EWMP Group, there are no existing monitoring locations. New receiving water monitoring locations were selected and are summarized in the following sections.

2.1 RECEIVING WATER MONITORING OBJECTIVES

The objectives of the receiving water monitoring include the following (Part II.E.1 of the MRP):

- Determine whether the receiving water limitations are being achieved;
- Assess trends in pollutant concentrations over time, or during specified conditions; and
- Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

2.2 RECEIVING WATER MONITORING SITES

The primary objective of receiving water monitoring is to assess trends in pollutant concentrations over time, or during specified conditions. For that reason, the primary characteristics of an ideal receiving water monitoring site is that it has a large dataset from previously-collected monitoring events so that trends in pollutant concentration over time, or during specified conditions, can be assessed.

As previously indicated, existing receiving water monitoring sites within the SMB EWMP Group were not considered. For other listed receiving water bodies within the SMB EWMP Group, there are no existing monitoring locations. Through these findings, new receiving water monitoring sites were chosen to assess whether water quality objectives are being achieved and beneficial uses are being supported, as well as to track trends in constituent concentrations over time.

Three receiving water monitoring sites were chosen, two within Santa Monica Bay (RW-SMB-1 and RW-SMB-3) and one within Santa Monica Canyon Channel (RW-SMB-2). **Figure 6** presents the approximate locations of the receiving water monitoring sites for SMB EWMP Group including TMDL monitoring sites. Fact sheet summary for each receiving water monitoring site is presented in **Attachment B**.

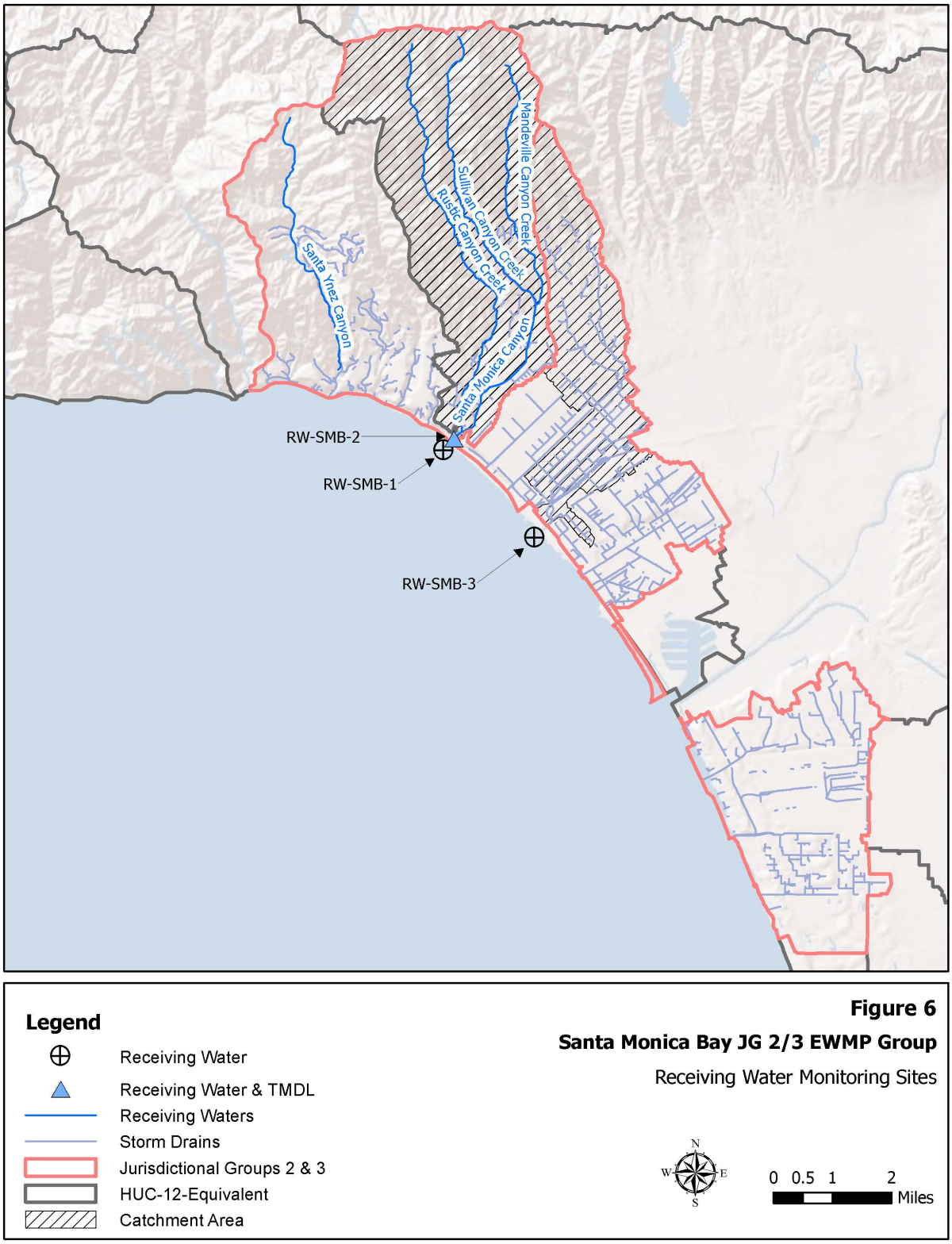

Figure 6
Receiving Water Monitoring Sites

2.2.1 Santa Monica Bay (RW-SMB-1)

Located within Santa Monica Bay, RW-SMB-1 will be monitored at the point of initial mixing and will be dependent on the intensity of a qualifying storm event. Samples will be collected within plumes, in the ocean, generated during a qualifying storm event, in the vicinity and across from Santa Monica Canyon Channel (SMBBB TMDL monitoring location SMB 2-7). Grab samples will be collected, via boat in accordance with the Los Angeles County ordinance, when it has been deemed safe for collection by the Captain of the boat.

Receiving water monitoring site RW-SMB-1 will represent the drainage characteristics of JG2. As the point of initial mixing will be a mixing of waters from Santa Monica Bay and Santa Monica Canyon Channel, the represented catchment area within SMB EWMP Group and the approximate location of RW-SMB-1 is presented in **Figure 7**. Catchment area from RW-SMB-1 represents approximately 40.36% of the total JG2 area.

The Cities of El Segundo, Los Angeles, and Santa Monica and the County of Los Angeles are all represented in the JG2 area. Drainage from the catchment area is primarily from the City of Los Angeles and a small portion from the City of Santa Monica. Primary land uses in the JG2 area and the catchment area of RW-SMB-1 are open space and single family residential. Given that the land uses of JG2 and the catchment area are comparable, monitoring at RW-SMB-1 will be representative in order assess the impact of JG2 MS4 to Santa Monica Bay. **Table 3** presents the land use composition of JG2 and the catchment area of RW-SMB-1.

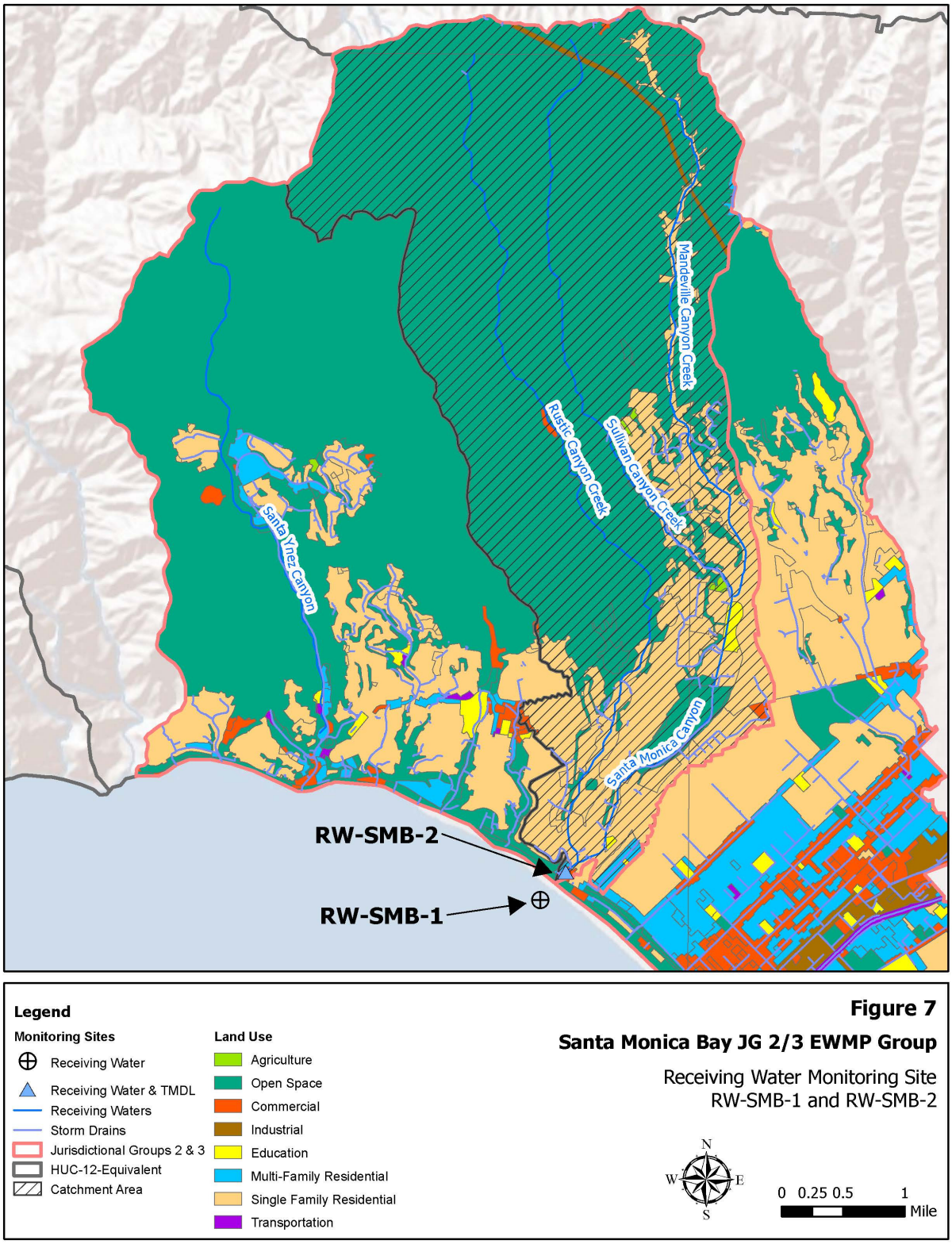

Figure 7
Receiving Water Monitoring Site RW-SMB-1 and RW-SMB-2

Table 3
RW-SMB-1 Receiving Water Monitoring Site Overview

	Catchment Area		JG2	
	Acres	% of Total	Acres	% of Total
Land Use				
Agricultural	12.82	0.13%	16.37	0.07%
Commercial	35.01	0.35%	529.39	2.12%
Industrial	60.92	0.61%	1,304.25	5.23%
Education	35.14	0.35%	294.1	1.18%
Single Family Residential	2,089.65	20.81%	5,160.31	20.71%
Multi-Family Residential	46.1	0.46%	597.68	2.40%
Open Space	7,764.02	77.30%	14,945.23	59.97%
Transportation	0%	0%	2,074.91	8.33%
Total	10,043.66	100%	24,922.24	100%
Jurisdictions				
City of Los Angeles	9,778	97.35%	22,087	88.62%
City of Santa Monica	266	2.65%	266	1.07%
City of El Segundo	0%	0%	2,180	8.75%
County of Los Angeles	0%	0%	389	1.56%

2.2.2 Santa Monica Canyon Channel (RW-SMB-2)

Monitoring site RW-SMB-2 will be used for receiving water monitoring in Santa Monica Canyon Channel. Santa Monica Canyon Channel is a receiving water body that flows into Santa Monica Bay. The outlet structure is a 40-feet by 12-feet channel. Monitoring site RW-SMB-2 will be located upstream of the LFD weir in Santa Monica Canyon Channel. RW-SMB-2 will be used to represent monitoring of runoff from Santa Monica Canyon Channel, Rustic Canyon, Mandeville Canyon, and Sullivan Canyon Creeks. Collection of samples will be done utilizing a fixed continuous autosampler. The catchment area of RW-SMB-2 will encompass 100% of the Santa Monica Canyon (180701040402) HUC-12 jurisdictional area of SMB EWMP Group.

Catchment areas for RW-SMB-1 and RW-SMB-2 are identical, but the representative samples will differ as RW-SMB-1 will characterize the mixing of Santa Monica Canyon Channel with Santa Monica Bay, and RW-SMB-2 will characterize the runoff from Santa Monica Canyon Channel and all upstream creeks.

As summarized in **Section 2.2.1**, the drainage from the catchment area is primarily from the City of Los Angeles and a small portion is from the City of Santa Monica. Primary land uses from the catchment area of RW-SMB-2, shown in Figure 7, are open space and single family residential. **Table 4** shows the land use composition within the RW-SMB-2 catchment area, HUC-12, and SMB EWMP Group area.

Table 4
RW-SMB-2 Receiving Water Monitoring Site Overview

	Catchment Area		HUC	
	Acres	% of Total	Acres	% of Total
Land Use				
Agriculture	12.82	0.13%	12.82	0.13%
Commercial	35.01	0.35%	35.01	0.35%
Industrial	60.92	0.61%	60.92	0.61%
Education	35.14	0.35%	35.14	0.35%
Single Family Residential	2,089.65	20.81%	2,089.65	20.81%
Multi-Family Residential	46.1	0.46%	46.1	0.46%
Open Space	7,764.02	77.30%	7,764.02	77.30%
Transportation	0	0%	0	0%
Total	10,043.66	100%	10,043.66	100%
Jurisdictions				
City of Los Angeles	9,778	97.35%	9,778	97.35%
City of Santa Monica	266	2.65%	266	2.65%
City of El Segundo	0	0%	0	0%
County of Los Angeles	0	0%	0	0%

2.2.3 Santa Monica Bay (RW-SMB-3)

Similar to RW-SMB-1, RW-SMB-3 will be located at the point of initial mixing and will be dependent on the intensity of a qualifying storm event. Samples will be collected within plumes generated during a qualifying storm event, in the vicinity and across from Pico Kenter storm drain (SMBBB TMDL monitoring location SMB 3-4). The samples will be collected via a boat and grab samples will be collected, when it has been deemed safe for collection by the Captain of the boat.

RW-SMB-3 will be monitored to represent the characteristic of the drainage from the JG3 area. The catchment area within SMB EWMP Group area and approximate location for receiving water monitoring site RW-SMB-3 are shown in **Figure 8**. RW-SMB-3 catchment area captures approximately 51.63% of JG3 and drains into Santa Monica Bay.

The represented agencies and discharge from the catchment area within the JG3 area are the Cities of Los Angeles and Santa Monica. Each of the eight land use categories, as shown on **Table 5**, is represented in the catchment area within SMB EWMP Group area and JG3. For both the catchment area and JG3, the primary land uses are single- and multi-family residential, open space, and commercial. Based on these similarities, RW-SMB-3 is an ideal receiving water monitoring site and is critical to the SMB EWMP Group for demonstrating compliance. Water quality data collected by the SMB EWMP Group will be valuable for assessing the impact of JG3's discharges on the receiving water.

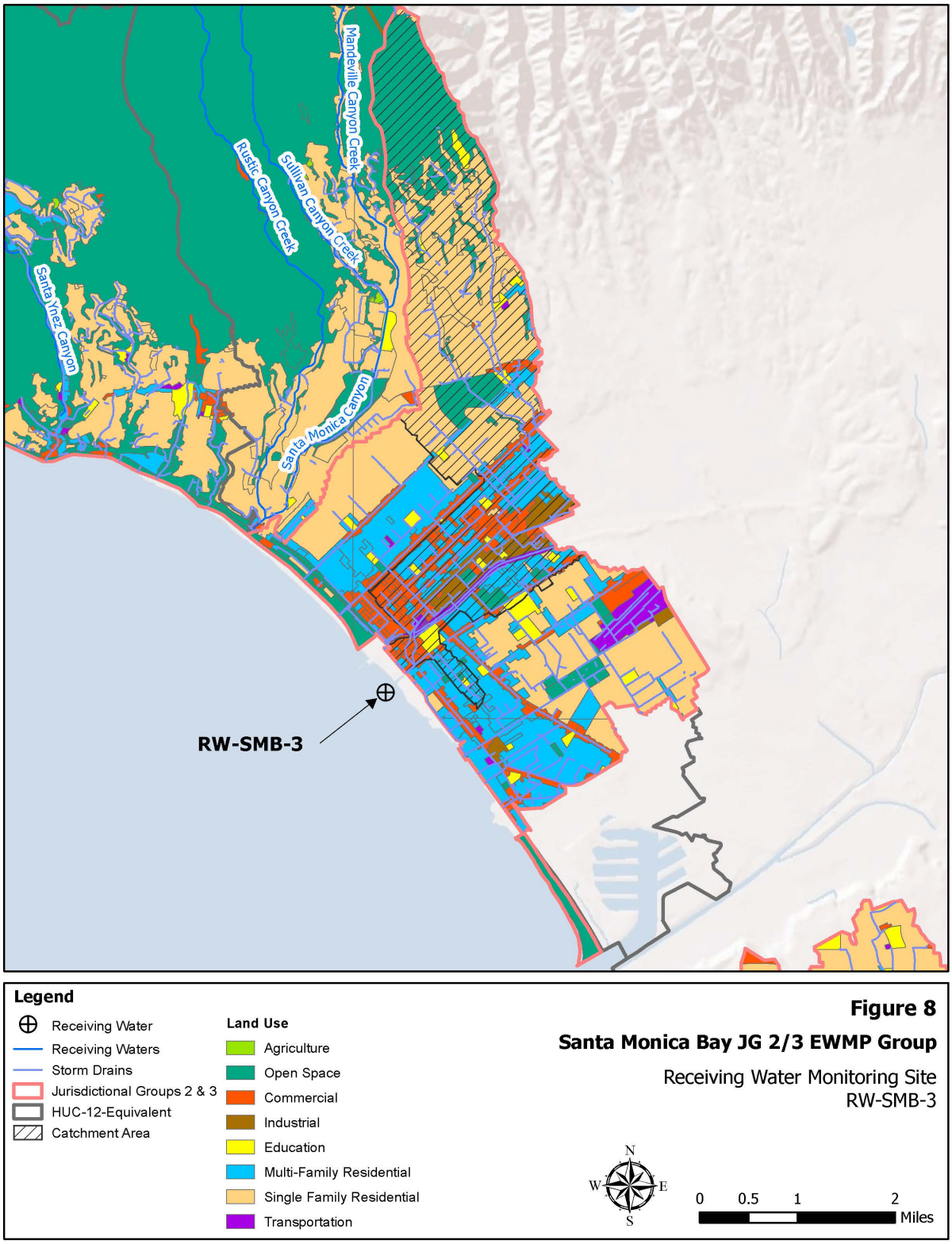

Figure 8
Receiving Water Monitoring Site RW-SMB-3

Table 5
RW-SMB-3 Receiving Water Monitoring Site Overview

	Catchment Area		JG3	
	Acres	% of Total	Acres	% of Total
Land Use				
Agricultural	0	0%	0	0%
Commercial	602.74	13.02%	1123.12	12.40%
Industrial	219.94	4.75%	262.64	2.90%
Education	137.38	2.97%	274.21	3.03%
Single Family Residential	1,786.79	38.60%	3,487.38	38.50%
Multi-Family Residential	696.42	15.04%	2,172.03	23.98%
Open Space	1,106.71	23.91%	1,490.23	16.45%
Transportation	79.02	1.71%	247.38	2.73%
Total	4,629	100%	9,056.99	100%
Jurisdictions				
City of Los Angeles	2,760	59.62%	4,242	47.33%
City of Santa Monica	1,869	40.38%	4,721	52.67%
City of El Segundo	0	0%	0	0%
County of Los Angeles	0	0%	0	0%

2.2.4 TMDL Monitoring Site

Receiving water TMDL monitoring sites within the SMB EWMP Group area are required only in Santa Monica Bay. **Attachment A** presents the TMDL monitoring requirements for the SMB EWMP Group, and TMDLs are as follows:

- Santa Monica Bay Beaches Bacteria TMDL (Wet and Dry), July 15, 2003 (SMBBB TMDL);
- Santa Monica Bay TMDL for Total Dichlorodiphenyltrichloroethane (DDTs) and Polychlorinated biphenyls (PCBs), March 26, 2012 (SMB DDT and PCB TMDL); and
- Santa Monica Bay Nearshore and Offshore Debris TMDL, March 20, 2012 (SMB Debris TMDL).

To satisfy the receiving water monitoring requirements for the SMBBB TMDL, 24 existing monitoring sites, presented in **Figure 9,** will continue to be monitored in accordance to the coordinated shoreline monitoring plan (CSMP).

SMB DDT and PCB TMDL receiving water monitoring requirements will be fulfilled at the receiving water monitoring site RW-SMB-2.

SMB Debris TMDL does not require receiving water monitoring, and the SMB EWMP Group is not required to conduct any type of monitoring if it is complying with the WLAs through the implementation of BMPs, such as full capture systems.

Permittees are to report compliance strategy through the development of a Trash Monitoring and Reporting Plan (TMRP) and Plastic Pellets Monitoring and Reporting Plan (PMRP), or demonstrate that a PMRP is not required, to be approved by the Regional Board. Once the TMRP and PMRP are approved and adopted, a progress report based on installation of structural BMPs, such as full capture or partial capture systems, institutional controls, or any BMPs, is to be reported in order to calculate the reduction in the amount of trash and plastic pellets, if applicable, being discharged into Santa Monica Bay.

Each of the jurisdictions within SMB EWMP Group will submit or have submitted a TMRP and PMRP. Each jurisdiction has conducted the following:

- **City of El Segundo**: In the process of developing the TMRP and PMRP. Submittal of these reports will be separate from the CIMP.
- **City of Los Angeles**: The *Trash TMDL Compliance Method: Structural Measures* was submitted in September 2011 and was adopted as the TMRP for the City of Los Angeles. A preliminary investigation of industries with standard industrial classification system (SIC) codes associated with manufacturing or use of plastic pellets within the City of Los Angeles was conducted, and it was found that no facilities were located within the City of Los Angeles for the SMB EWMP Group area. The City of Los Angeles is preparing to modify the emergency/spill response plan for hazardous material to include the actions required for a spill or release of plastic pellets within its jurisdictional area.
- **City of Santa Monica**: Both TMRP and PMRP were submitted on June 15, 2013 for review and approval. The City of Santa Monica has adopted the requisite bans on plastic bags, public smoking, and food container materials. The final compliance has been extended by three years.
- **County of Los Angeles**: A TMRP was submitted in September 2012. The PMRP was submitted on September 19, 2013 for all County of Los Angeles jurisdictions within Santa Monica Bay watershed management area (WMA). As stated in the PMRP, there is no plastic pellet usage by any County facility.
- **LACFCD**: A PMRP was submitted on September 19, 2013 for all LACFCD within the Santa Monica Bay WMA. A TMRP was not submitted as the LACFCD does not have any land jurisdiction that generates trash.

All submitted TMRP and PMRP for each jurisdiction will be implemented by the corresponding jurisdiction, once approved by the Regional Board. TMDL monitoring sites are presented in **Figure 9**. Additional TMDL requirements and existing TMDL monitoring programs are further detailed in **Attachment A**.

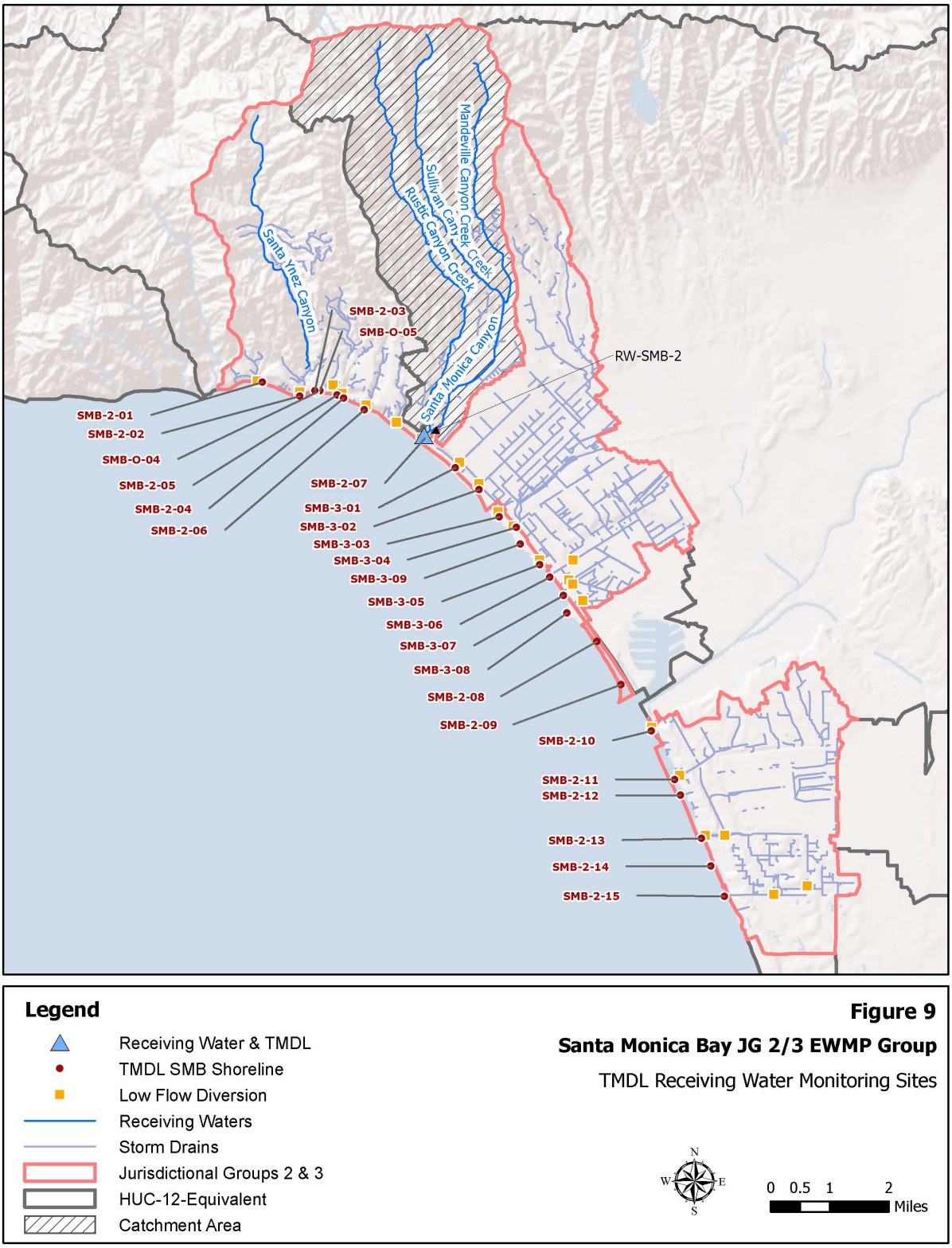

Figure 9
TMDL Receiving Water Monitoring Sites

2.3 MONITORED FREQUENCY, PARAMETERS, AND DURATION OF MONITORING

The MRP section of the MS4 Permit identifies specific requirements for fresh (Santa Monica Canyon Channel) and salt water (Santa Monica Bay). However, the CIMP will use consistent requirements for the fresh and salt water receiving sites. Wet- and dry-weather monitoring frequency, parameters, and duration will be addressed in the following sections. Parameters for monitoring were based on the water quality priorities, as discussed in **Section 1.2** and **Attachment A**. Additional analytical and monitoring procedures are discussed in **Attachment C**.

2.3.1 Wet-Weather

For all receiving water monitoring sites within SMB EWMP Group, wet-weather conditions will be defined as a storm event of greater than or equal to 0.1 inch of precipitation, as measured from at least 50 percent of the Los Angeles County controlled rain gauges within the watershed. Permittees shall target the first storm event of the storm year with a predicted rainfall of at least 0.25 inch at a seventy percent probability of rainfall at least 24 hours prior to the event start time. Wet-weather monitoring will be conducted three times a year for all parameters except for aquatic toxicity, which will be performed twice a year, per Part VI.C.1.a of the MRP. Wet-weather monitoring will target the first significant rain event of the storm year following the criteria outline in Part VI.C.b.iii of the MRP, and at least two additional wet-weather events within the same wet-weather season. Wet-weather receiving water monitoring will be performed in close coordination with stormwater outfall monitoring to be reflective of potential impacts from MS4 discharges. Parameters to be collected and sampling frequency to meet to the receiving water monitoring requirements of the MRP are summarized in **Table 6**. Wet-weather receiving water monitoring will be conducted for the duration of the MS4 permit.

Table 6
Receiving Water Monitoring Summary of Constituents to be Monitored and Annual Frequency (wet/dry)[1]

Constituents	Site ID		
	RW-SMB-1	RW-SMB-2	RW-SMB-3
Flow and field parameters[2]	3/0	3/1	3/0
Pollutants identified in Table E-2 of the MRP	1[3]/0	1[3]/1[3]	1[3]/0
Aquatic Toxicity and Toxicity Identification Evaluation (TIE)	2/0	2/1	2/0
Total Coliform[4]			
Fecal Coliform/(*E. coli*)[4]			
Enterococcus[4]			
Suspended Sediment: DDT[5], PCBs[6]		3/0[7]	
Lead		3/1	
E. coli (Indicator Bacteria)		3/1	

1. Annual frequency listed as number of wet-weather/dry-weather events per year, respectively (e.g., 3/2 signifies three wet weather and two dry weather events per year).
2. Field parameters are defined as DO, hardness, pH, temperature, and specific conductivity; ocean parameters will be DO, pH, temperature, and salinity
3. Monitoring frequency only applies during the first year of monitoring. For pollutants identified in Table E-2 of the MRP that are not detected at the Method Detection Limit (MDL) or the result is below the lowest applicable water quality objective, additional monitoring will not be conducted (i.e., the monitoring frequency will become 0/0). For pollutants detected above the lowest applicable water quality objective, future monitoring will be conducted at the frequency specified in the MRP (i.e., the monitoring frequency will become 3/2).
4. Will be monitored at the existing CSMP monitoring locations and CSMP sampling schedule.
5. DDT is defined as the sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
6. PCBs are defined as the sum of aroclors when analyzed in water and the sum of the 40 PCB congeners when analyzed in sediment or suspended solids.
7. Annually, utilizing High Resolution Mass Spectrometry (HRMS) from three storm events.

2.3.2 Dry-Weather

Part VI.D.1.a of the MRP states dry-weather receiving water monitoring shall be conducted two times per year. As detailed in **Attachment A, Section 2.1.1** and presented in **Table 7**, the SMB EWMP Group has installed 23 LFDs at all outfalls along the Santa Monica shoreline within the JG2 and 3 to address dry-weather flows. The LFDs are operational year round and divert dry-weather flows from the storm drains to the sanitary sewer system, keeping dry-weather flows from reaching Santa Monica Bay. Given that the LFDs divert all dry-weather flow from reaching Santa Monica Bay, the SMB EWMP Group will not conduct dry-weather receiving water monitoring for the Santa Monica Bay. All LFDs will be closely monitored and maintained to ensure that no dry-weather flow will reach Santa Monica Bay shoreline.

In Santa Monica Canyon Channel, receiving water monitoring site RW-SMB-2 is located upstream of the LFD, which diverts dry-weather flow, within Santa Monica Canyon Channel, from reaching Santa Monica Bay. Although dry-weather flow from Santa Monica Canyon Channel is captured by the LFD and diverted from entering Santa Monica Bay, dry-weather flow into Santa Monica Canyon Channel is not captured by any LFD, MCMs, or BMPs. Dry-weather monitoring for RW-SMB-2 will be conducted once per year for all parameters including aquatic toxicity, as dry-weather flow is diverted from reaching Santa Monica Bay. Parameters and sampling frequency are further detailed in **Table 6**. Dry-weather receiving water monitoring will be conducted for the duration of the MS4 permit.

Table 7
Santa Monica Bay Enhanced Watershed Management Program Group Low Flow Diversions

Name	Owner	Latitude	Longitude	Project Title
Bay Club Drive	City of Los Angeles	34.040784	-118.545169	Bay Club Drive Low Flow Diversion Project
Thronton Avenue	City of Los Angeles	33.993324	-118.475411	Thornton Avenue Low Flow Diversion Project
Palisades Park	City of Los Angeles	34.031694	-118.526400	Palisades Park Low Flow Diversion Project
Santa Monica	City of Los Angeles	34.027704	-118.518952	Santa Monica Low Flow Diversion Project
Venice Pavilion	City of Los Angeles	33.988239	-118.471236	Venice Pavilion Low Flow Diversion Project
Imperial Highways	City of Los Angeles	33.930915	-118.429173	Imperial Highway Low Flow Diversion Project
Temescal Canyon	City of Los Angeles	34.035875	-118.535386	Temescal Canyon Low Flow Diversion
Pulga Canyon	LACFCD	34.038724	-118.542464	Pulga Canyon Low Flow Diversion Project
Marques Avenue	City of Los Angeles	34.039604	-118.549626	Marquez Avenue Low Flow Diversion
Santa Ynez	LACFCD	34.039079	-118.555013	Santa Ynez Low Flow Diversion
Castlerock/Parker Canyon	LACFCD	34.041694	-118.567516	Castlerock/Parker Canyon Low Flow Diversion
Rose Avenue	LACFCD	33.998155	-118.474197	Rose Ave. Low Flow Diversion
Ashland Avenue	LACFCD	33.998087	-118.484046	Ashland Ave. Low Flow Diversion
Brooks Avenue	LACFCD	33.992216	-118.474245	Brooks Ave. Low Flow Diversion
Playa del Rey	LACFCD	33.957210	-118.450879	Playa del Rey Low Flow Diversion
North Westchester	LACFCD	33.945531	-118.442492	North Westchester Low Flow Diversion
Santa Monica	City of Santa Monica	34.009925	-118.496375	Santa Monica Pier (SMURRF) Low Flow Diversion
Wilshire Boulevard	City of Santa Monica	34.016712	-118.502077	Wilshire Blvd Low Flow Diversion
Montana Avenue	City of Santa Monica	34.021984	-118.507841	Montana Ave. Low Flow Diversion
Pico-Kenter (SMURFF)	City of Santa Monica	34.006439	-118.491889	Pico-Kenter (SMURRF)
Imperial Highway	LACFCD	33.930892	-118.434895	Imperial Highway Low Flow Diversion Project
Arena Pump Plant	LACFCD	33.916390	-118.414636	Arena Pump Plant
El Segundo Pump Plant	LACFCD	33.918549	-118.404877	El Segundo Pump Plant

2.3.3 SMB TMDLs

Bacteria TMDL – Shoreline Monitoring

The SMB EWMP Group's shoreline monitoring schedule currently has twenty (20) monitoring sites sampled on a weekly basis and four (4) sampled five (5) times per week in accordance with the bacteria TMDL CSMP which was approved by the Los Angeles Regional Board in April 2004 and implemented since November 2004. MRP section VI.B.2.c of the MS4 Permit requires all SMBBB TMDL shoreline monitoring sites to be monitored on a five (5) times per week schedule in place of the current SMBBB

TMDL sampling schedule. The SMB EWMP Group is proposing to keep the current sampling schedule. To justify keeping the current sampling schedule, an evaluation for each shoreline monitoring site within the SMB EWMP Group was conducted. Each shoreline monitoring site has one or more of the following characteristics:

- The site is subject to the anti-degradation criterion;
- The site is located at an open beach with no MS4 discharge; and/or
- An LFD, which diverts all dry-weather flow, is located upstream of the site.

Table 8 indicated which of the three characteristics listed above apply to each shoreline monitoring site, and includes additional location information for each site.

Table 8
Santa Monica Bay Beaches Bacterial TMDL Sampling Frequency

Site ID	JG	Type	LFD	Description	Sampling Frequency in Accordance with the 2004 CSMP
SMB-2-1	2	Point Zero	Yes	Castlerock (Parker Mesa)storm drain	Weekly
SMB-2-2	2	Point Zero	Yes	Santa Ynez storm drain	Weekly
SMB-2-3	2	Open Beach	No	Will Rogers State Beach, ¼ mile east of Gladstone's restaurant (DHS101)	Weekly
SMB-2-4	2	Point Zero	Yes	Pulga storm drain (S3)	Weekly
SMB-2-5	2	Point Zero	Yes	Bay Club Storm drain in front of the Bel Air Bay Club (DHS102)	Weekly
SMB-2-6	2	Point Zero	Yes	Temescal Canyon storm drain(DHS103)	Weekly
SMB-2-7	2	Point Zero	Yes	Santa Monica Canyon	Daily
SMB-2-8	2	Open Beach	No	Venice Beach, 50 yards south of the pier (DHS108)	Weekly
SMB-2-9	2	Open Beach	No	Venice Beach at Topsail Street(DHS109)	Weekly
SMB-2-10	2	Point Zero	Yes	Culver storm drain (S11)	Weekly
SMB-2-11	2	Point Zero	Yes	North Westchester storm drain	Weekly
SMB-2-12	2	Open Beach	No	Dockweiler Beach at WorldWay (DHS110)	Weekly
SMB-2-13	2	Point Zero	Yes	Imperial storm drain (S12)	Weekly
SMB-2-14	2	Open Beach	No	Dockweiler Beach opposite the Hyperion Treatment Plant (DHS111)	Weekly
SMB-2-15	2	Point Zero	Yes	Dockweiler Beach, at the wavewash of Grand Avenue stormdrain outlet (DHS112)	Weekly
SMB-3-1	3	Point Zero	Yes	Montana storm drain (DHS104)	Weekly
SMB-3-2	3	Point Zero	Yes	Wilshire storm drain (DHS105)	Weekly
SMB-3-3	3	Point Zero	Yes	Santa Monica Pier storm drain(S5)	Daily
SMB-3-4	3	Point Zero	Yes	Pico-Kenter storm drain (S6)	Daily
SMB-3-5	3	Point Zero	Yes	Ashland storm drain (S7)	Daily
SMB-3-6	3	Point Zero	Yes	Rose storm drain	Weekly
SMB-3-7	3	Point Zero	Yes	Brooks storm drain (DHS107)	Weekly
SMB-3-8*	3	Point Zero	Yes	Windward storm drain (S8)	Weekly
SMB-3-9	3	Open Beach	No	Santa Monica Beach at Strand Street (DHS106)	Weekly

* Beach monitoring locations subject to the anti-degradation implementation provision in the TMDL.

In the event an exceedance has occurred at a SMBBB TMDL monitoring site, procedures following Elevated Bacteria Levels (Exceedances), per the CSMP, will be executed. SMB EWMP Group will conduct accelerated testing 48 hours after the initial bacteria exceedances, and if necessary, SMB EWMP Group will conduct accelerated testing 96 hours for those sites still exceeding bacterial indicators after 48 hours. The purpose of the increased monitoring is to identify the persistence of an exceedance, especially during dry-weather when source identification will be a priority. This accelerated monitoring may not be as critical during wet-weather at every location when the source of the exceedance is known to be storm water runoff.

Toxic TMDL – Storm Sediment Monitoring

Receiving water monitoring site RW-SMB-2 has been selected as the monitoring site for the SMB Toxics TMDL, as mentioned in **Section 2.2.2** and **4.2.2**. It is proposed that three wet-weather sampling events be conducted to evaluate the annual WLA of DDT and PCB for SMB EWMP Group based on the three (3) year average loading.

A summary of constituents and monitoring frequency for each of the receiving water monitoring sites is presented in **Table 6**.

2.4 RECEIVING WATER MONITORING SUMMARY

Three receiving water monitoring sites, which include monitoring for SMB Toxics, and 24 existing SMBBB TMDL sites have been selected to meet the MRP objects for receiving water monitoring. **Table 9** provides a summary of receiving water monitoring sites. Approximate locations of the monitoring sites are presented in **Figure 6** through **Figure 9**. A summary of constituents and monitoring frequency for each of the receiving water monitoring sites is presented in **Table 6**.

Attachment B provides summary sheets for each receiving water monitoring site, which include photos and additional information. Sampling and analytical methods for receiving water monitoring is provided in **Attachment C**.

Table 9
Summary of Receiving Water Monitoring Sites

Site ID	Water Body/Location	JG	LFD	Coordinates		Monitoring Type	
				Latitude	Longitude	RW	TMDL
New Monitoring Sites							
RW-SMB-1	SMB/ Santa Monica Canyon (SMC) Channel (In Ocean outward transect)	2	Yes	34.02519	-118.52362	X	
RW-SMB-2	Santa Monica Canyon (SMC) Channel/ Upstream of Low Flow Diversion (LFD)	2	Yes	34.02879	-118.51784	X	X(1)
RW-SMB-3	SMB/ Pico-Kenter (In Ocean outward transect)	3	Yes	34.00326	-118.49643	X	
Existing Monitoring Sites							
SMB-2-1	Santa Monica Bay/Shoreline	2	Yes	34.04135	-118.56600		X(2)
SMB-2-2	Santa Monica Bay/Shoreline	2	Yes	34.03801	-118.55500		X(2)
SMB-2-3	Santa Monica Bay/Shoreline	2	No	34.03934	-118.55052		X(2)
SMB-2-4	Santa Monica Bay/Shoreline	2	Yes	34.03757	-118.54200		X(2)
SMB-2-5	Santa Monica Bay/Shoreline	2	Yes	34.03837	-118.54400		X(2)
SMB-2-6	Santa Monica Bay/Shoreline	2	Yes	34.03473	-118.53600		X(2)
SMB-2-7	Santa Monica Bay/Shoreline	2	Yes	34.02784	-118.51800		X(2)
SMB-2-8	Santa Monica Bay/Shoreline	2	No	33.97826	-118.46714		X(2)
SMB-2-9	Santa Monica Bay/Shoreline	2	No	33.96768	-118.45994		X(2)
SMB-2-10	Santa Monica Bay/Shoreline	2	Yes	33.95641	-118.45100		X(2)
SMB-2-11	Santa Monica Bay/Shoreline	2	Yes	33.94447	-118.44400		X(2)
SMB-2-12	Santa Monica Bay/Shoreline	2	No	33.94064	-118.44226		X(2)
SMB-2-13	Santa Monica Bay/Shoreline	2	Yes	33.93005	-118.43600		X(2)
SMB-2-14	Santa Monica Bay/Shoreline	2	No	33.92331	-118.43326		X(2)
SMB-2-15	Santa Monica Bay/Shoreline	2	Yes	33.91592	-118.42926		X(2)
SMB-3-1	Santa Monica Bay/Shoreline	3	Yes	34.02061	-118.50900		X(2)
SMB-3-2	Santa Monica Bay/Shoreline	3	Yes	34.01535	-118.50200		X(2)
SMB-3-3	Santa Monica Bay/Shoreline	3	Yes	34.0087	-118.49600		X(2)
SMB-3-4	Santa Monica Bay/Shoreline	3	Yes	34.00615	-118.49100		X(2)
SMB-3-5	Santa Monica Bay/Shoreline	3	Yes	33.99702	-118.48400		X(2)
SMB-3-6	Santa Monica Bay/Shoreline	3	Yes	33.99398	-118.48100		X(2)
SMB-3-7	Santa Monica Bay/Shoreline	3	Yes	33.98946	-118.47700		X(2)
SMB-3-8	Santa Monica Bay/Shoreline	3	Yes	33.9852	-118.47600		X(2)
SMB-3-9	Santa Monica Bay/Shoreline	3	No	34.00199	-118.48979		X(2)

1. SMB Total DDT and PCB TMDL
2. SMBBB TMDL

Section 3
MS4 Infrastructure Database

To meet the requirements of Part VII of the MRP, a map(s) and/or database of the MS4 storm drains, channels, and outfalls must be submitted with the CIMP and include the following information (Part VII.A of the MRP):

1. Surface water bodies within the Permittee(s) jurisdiction
2. Sub-watershed (HUC-12) boundaries
3. Land use overlay
4. Effective Impervious Area (EIA) overlay (if available)
5. Jurisdictional boundaries
6. The location and length of all open channel and underground pipes 18 inches in diameter or greater (with the exception of catch basin connector pipes)
7. The location of all dry-weather diversions
8. The location of all major MS4 outfalls within the Permittee's jurisdictional boundary. Each major outfall shall be assigned an alphanumeric identifier, which must be noted on the map
9. Notation of outfalls with significant non-stormwater discharges (to be updated annually)
10. Storm drain outfall catchment areas for each major outfall within the Permittee(s) jurisdiction
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:

    a. Ownership
    b. Coordinates
    c. Physical description
    d. Photographs of the outfall, where possible, to provide baseline information to track operation and maintenance needs over time
    e. Determination of whether the outfall conveys significant non-stormwater discharges
    f. Stormwater and non-stormwater monitoring data

Attachment A of the MS4 Permit defines a major MS4 outfall (or ''major outfall'') as a municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive stormwater from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage area of 2 acres or more) (40 CFR § 122.26(b)(5)).

Available Geographic Information System (GIS) data were reviewed to determine whether components 1 through 11.f from the list specified in the MRP were available for submittal. Based on the review of the GIS data, components 1 through 11.f from the list specified in the MRP were divided into available information or pending information and the associated schedule for completion, **Section 3.2** and **3.3**, respectively.

3.1 PROGRAM OBJECTIVES

Each year, a storm drain, channel, outfall map as well as an associated database for the SMB EWMP Group are required to be updated to incorporate the most recent characterization data for outfalls with significant non-stormwater discharge.

3.2 AVAILABLE INFORMATION

The SMB EWMP Group reviewed Part VII.A of the MRP and gathered the available information for the group. The following data are readily available for submittal as a map and/or in a database (Note: the numbering below corresponds to the item number in the Permit list):

1. **Surface water bodies within the Permittee(s) jurisdiction**
   Two surface water body layers were obtained from the City of Los Angeles and clipped to the JG2/JG3 boundaries. These layers include a *Streams* layer and an *Impaired Rivers* layer in the geodatabase.

2. **Sub-watershed (HUC-12) boundaries**
   HUC-12 boundaries were obtained from the National Resources Conservation Service and are included as a layer named *HUC12bndys* in the geodatabase.

3. **Land use overlay**
   The Southern California Association of Governments 2008 Existing Land Use Database has been clipped to the JG2/JG3 boundaries to create a layer named *LU_2008SCAG* in the geodatabase.

4. **Effective Impervious Area (EIA) overlay**
   The Hydrologic Response Unit (HRU) Impervious Area Shapefile was obtained from the LACDPW and has been clipped to the JG2/JG3 boundaries to create a layer named *Effective Impervious Area* in the geodatabase.

5. **Jurisdictional boundaries**
   The *J237Watersheds* layer in the geodatabase identifies the boundaries of Jurisdiction 2 and Jurisdiction 3 of the SMB EWMP Group.

6. **The location and length of all open channel and underground pipes 18 inches in diameter or greater (with the exception of catch basin connector pipes)**
   Three layers obtained from the LACFCD identify the locations of all open channel and underground pipes 18 inches in diameter or greater. These layers have been clipped to the JG2/JG3 boundaries and have been named *ForceMainGT18in*, *GravityMainGT18in*, and *OpenChannelGT18in* in the geodatabase.

7. **The location of all dry-weather diversions**
   The location of dry-weather Low Flow Diversions are mapped on the *Low Flow Diversion Points* layer that was obtained from the City of Los Angeles and clipped to the JG2/JG3 boundaries.

8. **The location of all major MS4 outfalls within the Permittee's jurisdictional boundary**
   MS4 outfalls are inventoried on the *MS4Outfalls* layer that was obtained from LACDPW and clipped to the JG2/JG3 boundaries.

11. Storm drain outfall catchment areas for each major outfall within the Permittee(s) jurisdiction

The *Subwatershed* layer of the geodatabase was obtained from the Los Angeles County Hydraulic Water Conservation & Environmental Programs Division and clipped to the JG2/JG3 boundaries. The *MS4 Outfalls* layer contains a column that indicates the subwatershed the outfall is located in. Detailed analyses of storm drain catchment areas will be conducted as needed at outfall monitoring locations, locations that may have significant NSW discharges, and outfalls that will host structural BMPs.

12. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:

b. Coordinates

c. Physical description

The attribute tables for the *MS4Outfalls* layer include the coordinates and a physical description of each major MS4 outfall in the geodatabase.

Figure 2 through **5** and **10** presents the available database information, listed above, for the SMB EWMP Group.

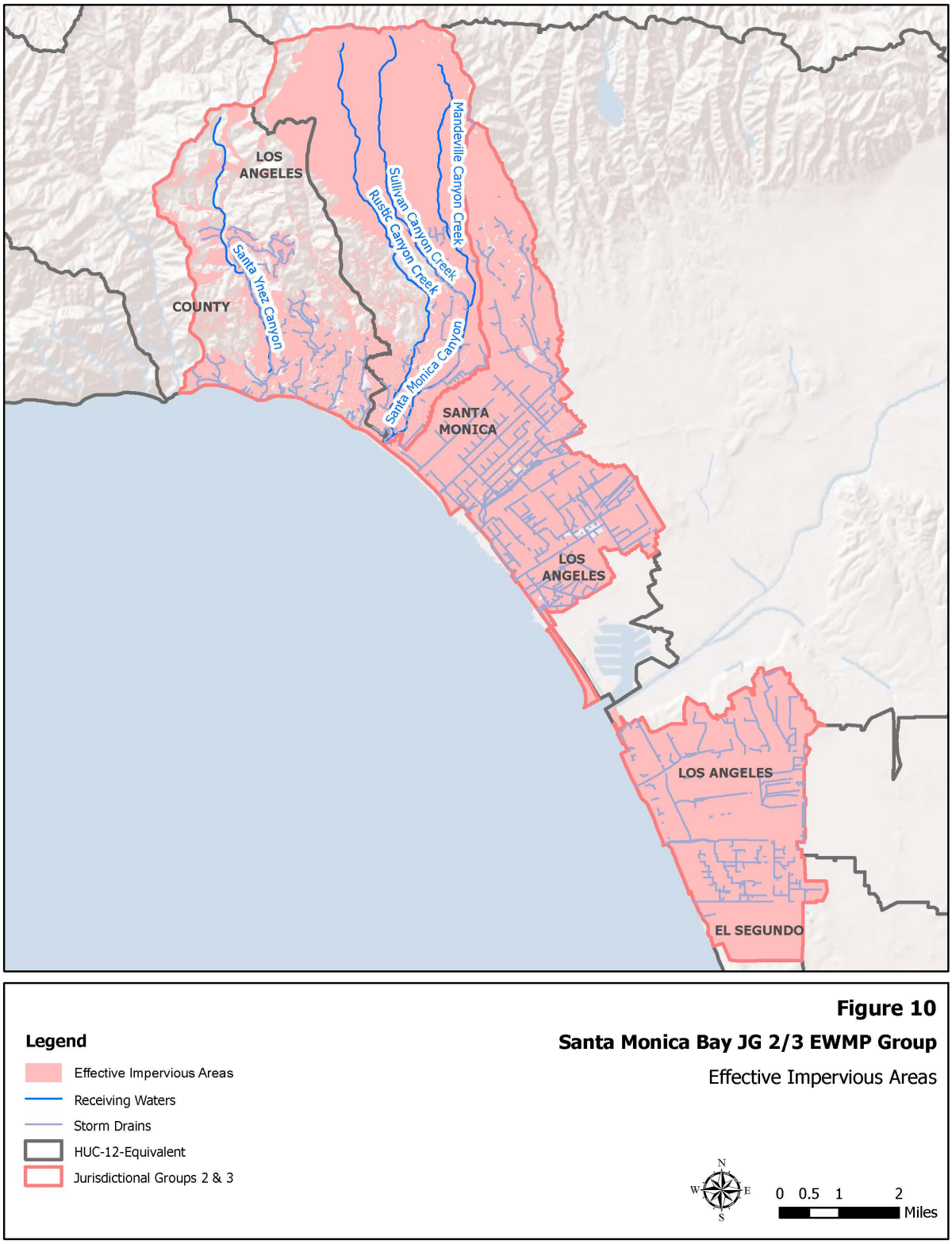

Figure 10
Effective Impervious Areas

3.3 PENDING INFORMATION AND SCHEDULE FOR COMPLETION

From the review, the following data are not currently available for submittal with the CIMP:

9. **Notation of outfalls with significant non-stormwater discharges (to be updated annually)**

11. **Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:**
    a. **Ownership**
    d. **Photographs of the outfall, where possible, to provide baseline information to track operation and maintenance needs over time**
    e. **Determination of whether the outfall conveys significant non-stormwater discharges**
    f. **Stormwater and non-stormwater monitoring data**

The Los Angeles County Storm Drain System geometric network model has the goal of integrating countywide drainage infrastructure, regardless of ownership or jurisdiction. Therefore, ownership data has not been indicated in the *MS4Outfalls* layer. Photographs, and stormwater and non-stormwater monitoring data information have been collected and will be added as needed during the MS4 outfall screening process. Based on preliminary investigations, outfalls with significant non-stormwater discharges were not found. As further investigations are conducted and additional data is collected, updates to the maps and/or database will be conducted over time. Updates to the maps and/or database will be submitted through the Annual Report. Completion of the pending data will be collected through the implementation of the Non-Stormwater Outfall Screening and Monitoring Program, summarized in **Section 5**.

Section 4
Stormwater Outfall Monitoring

Stormwater outfall monitoring assesses compliance with municipal action limits (MALs), WQBELs derived from TMDL WLAs, as well as the potential to cause or contribute exceedances of RWLs derived from TMDL WLAs or receiving water quality objectives. The majority of SMB EWMP Group storm drains generally drain towards Santa Monica Bay through multiple jurisdictions. An analysis of land use per HUC-12, drainage area and SMB EWMP Group area was conducted for each monitoring site.

4.1 STORMWATER OUTFALL MONITORING OBJECTIVES

As outlined in the Part VIII.A of the MRP, stormwater discharges from the MS4 shall be monitored at outfalls and/or alternative access points such as manholes, or in channels representative of the land uses within the Permittee's jurisdiction to support meeting the three objectives of the stormwater outfall based monitoring program:

1. Determine the quality of a Permittee's discharge relative to MALs;
2. Determine whether a Permittee's discharge is in compliance with applicable stormwater WQBELs derived from TMDL WLAs; and
3. Determine whether a Permittee's discharge causes or contributes to an exceedance of receiving water limitations.

Each stormwater outfall monitoring site was evaluated and assessed on how representative it is of the surrounding land use of the SMB EWMP Group area, jurisdictions, and the HUC-12. Each zoning category provided by the RAA guidance manual was fit into one of the following eight land use categories:

- Agricultural
- Industrial
- Single Family Residential
- Open Space
- Commercial
- Education
- Multi-Family Residential
- Transportation

4.2 STORMWATER OUTFALL MONITORING SITES

Four stormwater outfall monitoring sites, as shown in **Figure 11**, were selected (designated as OF-SMB-01 to -04). The selected sites are representative of a combination of the HUC-12s, jurisdictions, and/or land uses within each catchment area, which they have been chosen to represent. A synopsis of each potential outfall catchment area, along with an analysis of its land use/zoning characteristics is summarized in the following sections.

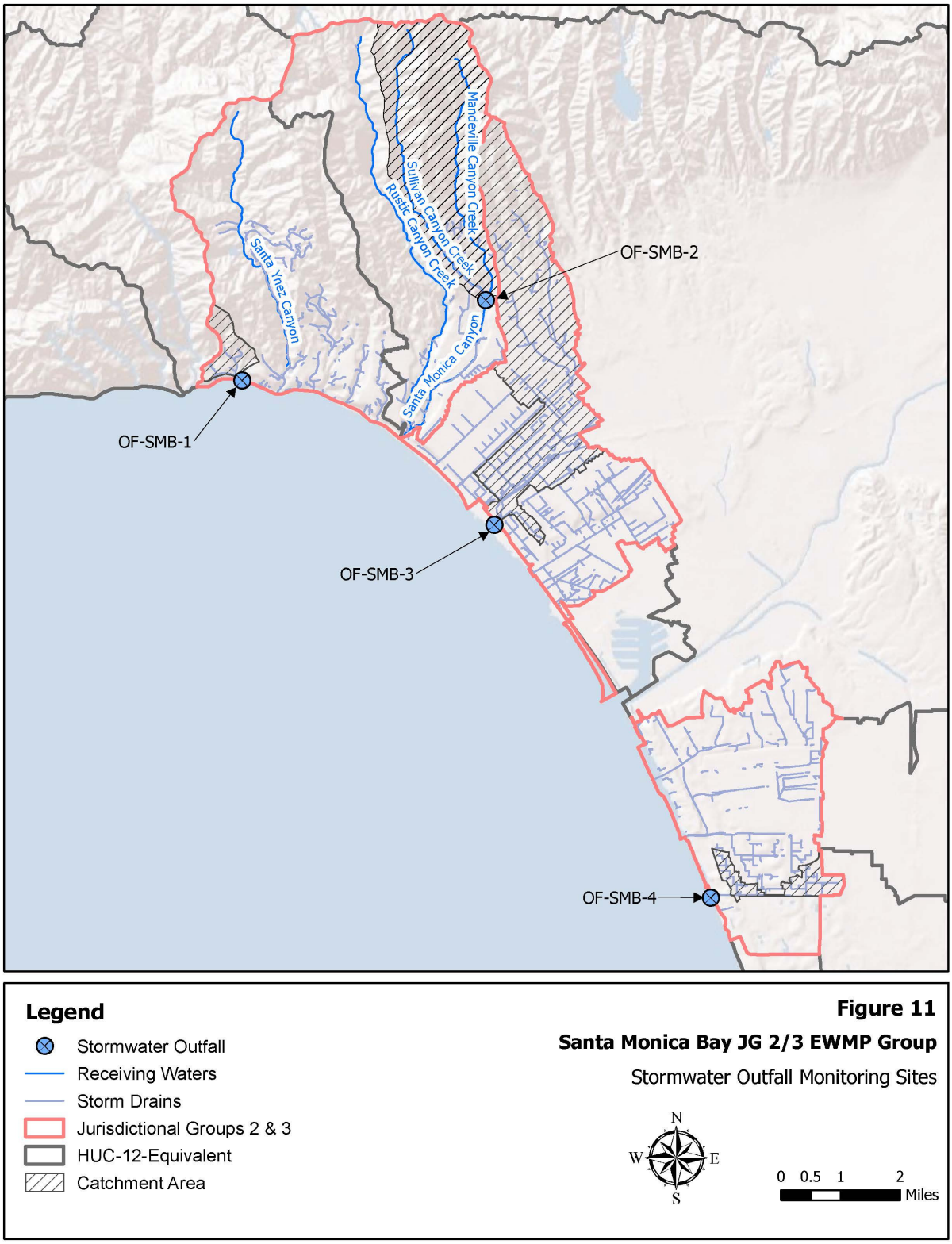

Figure 11
Stormwater Outfall Monitoring Sites

4.2.1 OF-SMB-1

OF-SMB-1 is located upstream of SMBBB TMDL monitoring location SMB 2-1, as shown on **Figure 12**. This stormwater outfall monitoring site is the Castlerock (Parker Mesa) storm drain, which discharges into Santa Monica Bay. The outfall is a 5-feet by 8-feet reinforced concrete box structure. OF-SMB-1 currently has a LFD upgradient of the discharge point, which diverts all dry weather flows. The outfall is located near the intersection of Coastline Drive and Pacific Coast Highway. Samples will be collected via a fixed autosampler installed at the outfall location, preferably at the discharge point, where it has been evaluated to be safe.

Stormwater outfall monitoring site OF-SMB-1 was selected to represent of the Santa Monica Beach – Frontal Santa Monica Bay (180701040403) HUC-12 JG2 area. The City of Los Angeles and a small portion from the County of Los Angeles are the represented agencies in the Santa Monica Beach – Frontal Santa Monica Bay (180701040403) HUC-12 JG2 area. The catchment area from OF-SMB-1 encompasses approximately 4.55% of the Santa Monica Beach – Frontal Santa Monica Bay (180701040403) HUC-12 JG2 area.

Runoff from OF-SMB-1 is primarily from the County of Los Angeles and the City of Los Angeles, 57.75% and 42.25%, respectively. As shown on **Table 10**, the represented land uses for the OF-SMB-1 catchment area, HUC-12, and the SMB EWMP Group area are open space and single family residential. Accordingly, OF-SMB-1 is an ideal outfall monitoring site to assess MS4 discharge for open space and single family residential land uses, and the County of Los Angeles.

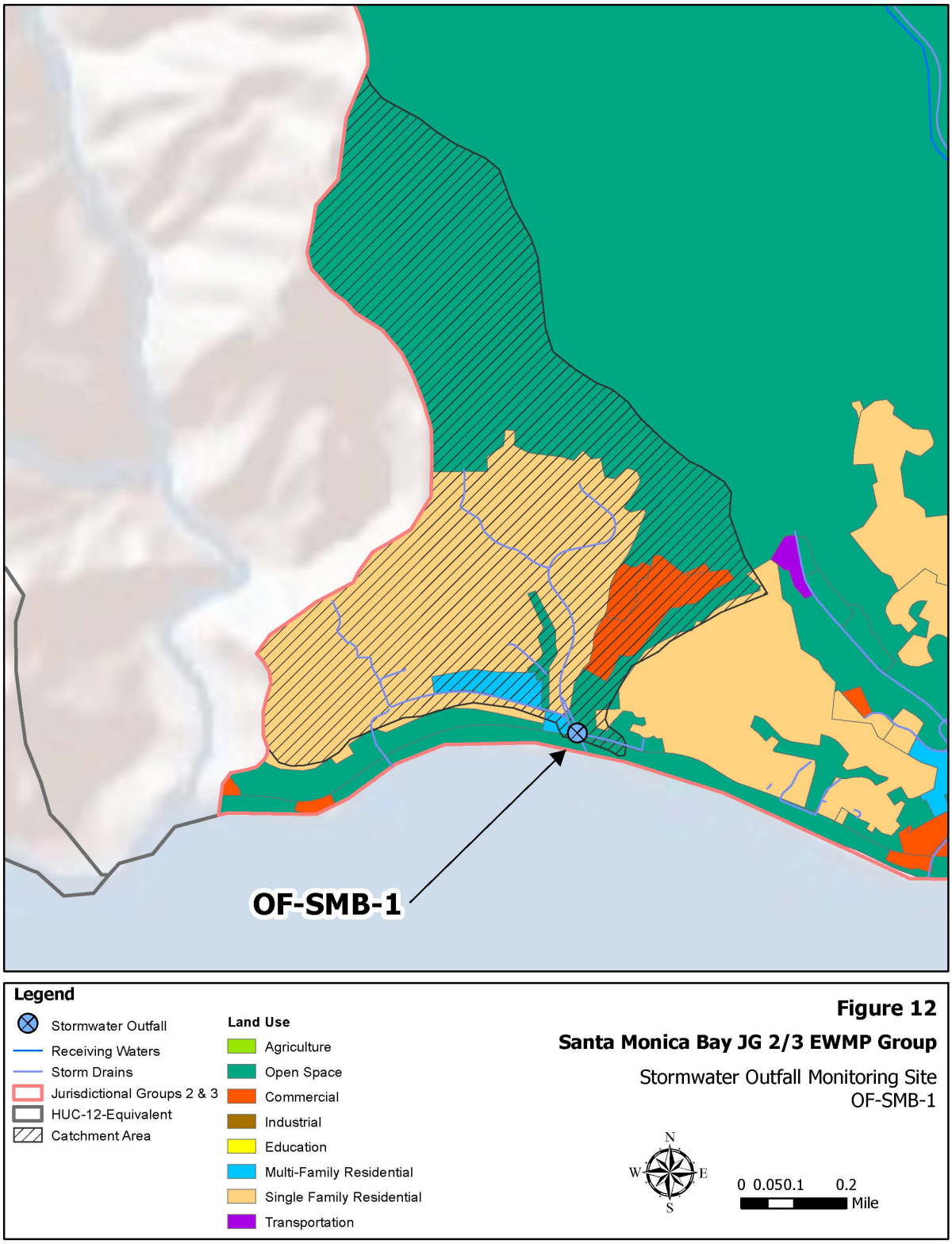

Figure 12
Stormwater Outfall Monitoring Site OF-SMB-1

Table 10
Stormwater Outfall Monitoring Site OF-SMB-1 Tributary Area
(Castlerock – Parker Mesa Storm Drain)

	Catchment Area	HUC	SWB EWMP Area
	% of Total	% of Total	% of Total
Land Use			
Agricultural	0%	0.04%	0.05%
Commercial	4.67%	1.49%	4.86%
Industrial	0%	0%	4.61%
Education	0%	0.82%	1.67%
Single Family Residential	42.63%	20.36%	25.45%
Multi-Family Residential	1.82%	2.37%	8.15%
Open Space	50.88%	74.67%	48.37%
Transportation	0%	0.25%	6.83%
Total	100%	100%	100%
Jurisdictions			
City of Los Angeles	42.25%	95.26%	77.70%
City of Santa Monica	0%	0%	14.72%
City of El Segundo	0%	0%	6.43%
County of Los Angeles	57.75%	4.74%	1.15%

4.2.2 OF-SMB-2

Stormwater outfall monitoring site OF-SMB-2 receives runoff from the Sullivan Canyon storm drain and Mandeville Canyon storm drain, as shown in **Figure 13**, which discharges into Santa Monica Canyon Channel. Sullivan Canyon storm drain is a 108 inch by 192 inch reinforced concrete box located near the North Old Ranch Road, and Mandeville Canyon storm drain is a 144 inch by 192 inch reinforced concrete box located near Mandeville Canyon Road. Samples will be collected via a fixed autosampler installed at the confluence point, preferably where the discharge points meet and where it has been evaluated to be safe.

OF-SMB-2 was selected to represent the Santa Monica Canyon (180701040402) HUC-12 area. The City of Los Angeles and a small portion of the City of Santa Monica are the represented agencies within the Santa Monica Canyon (180701040402) HUC-12 area. The catchment area from OF-SMB-2 encompasses approximately 41.42% of the Santa Monica Canyon (180701040402) HUC-12 area.

Runoff from OF-SMB-2 is entirely from the City of Los Angeles. **Table 11** compares the land use composition within the OF-SMB-2 catchment area, HUC-12, and SMB EWMP Group area. As shown on **Table 11**, the represented land uses of the OF-SMB-2 catchment area are open space and single family residential land use, and will characterize the upstream portion of Santa Monica Canyon Channel. Based on this comparison, OF-SMB-2 would be an ideal outfall monitoring site to represent the water quality assessment for open space and single family residential land use.

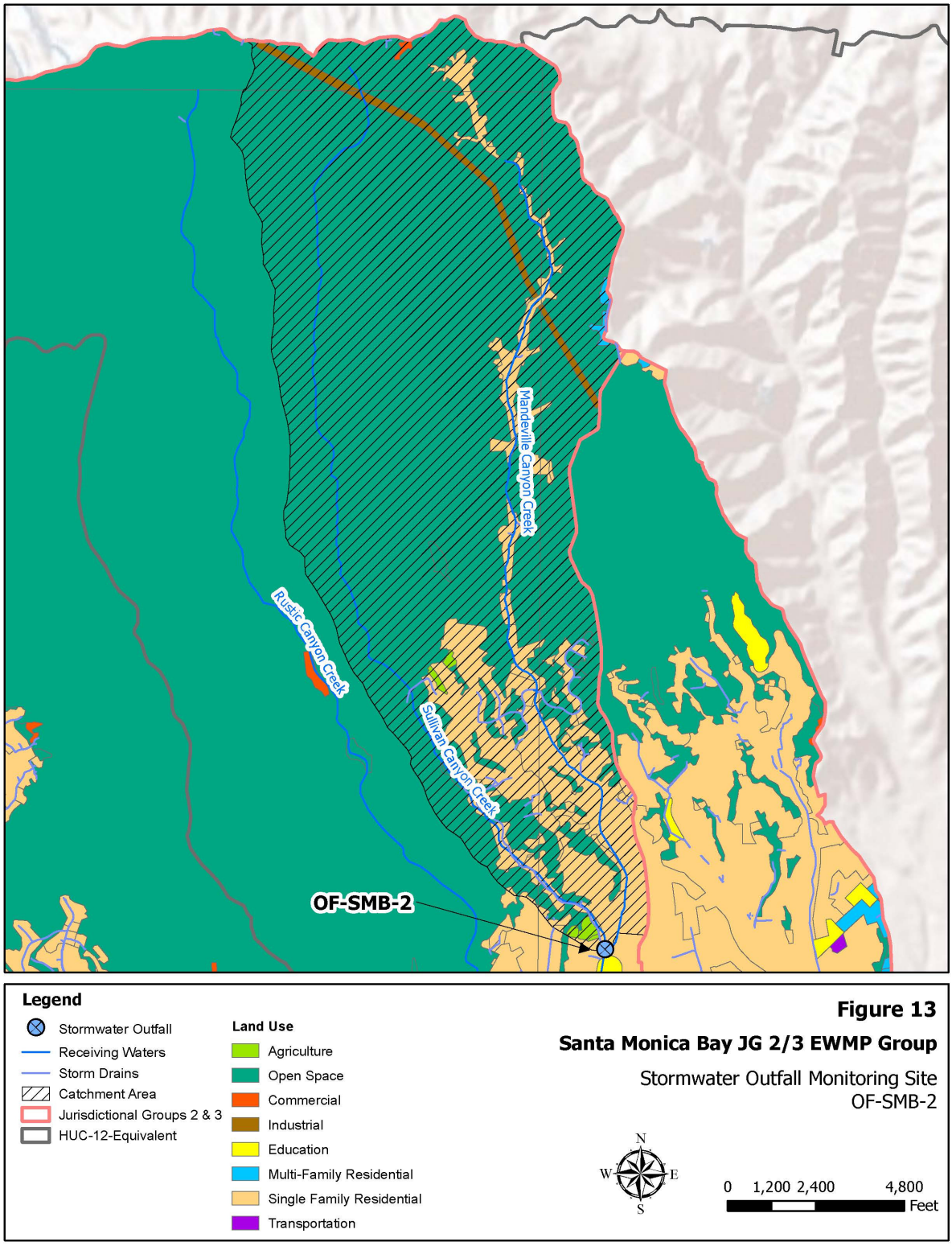

Figure 13
Stormwater Outfall Monitoring Site OF-SMB-2

Table 11
Stormwater Outfall Monitoring Site OF-SMB-2 Tributary Area
(Sullivan Canyon and Mandeville Canyon Storm Drains)

	Catchment Area	HUC	SMB EWMP Area
	% of Total	% of Total	% of Total
Land Use			
Agricultural	0.31%	0.13%	0.05%
Commercial	0.07%	0.35%	4.86%
Industrial	1.46%	0.61%	4.61%
Education	0%	0.35%	1.67%
Single Family Residential	15.40%	20.81%	25.45%
Multi-Family Residential	0.21%	0.46%	8.15%
Open Space	82.55%	77.30%	48.37%
Transportation	0%	0%	6.83%
Total	100%	100%	100%
Jurisdictions			
City of Los Angeles	100%	97.35%	77.70%
City of Santa Monica	0%	2.65%	14.72%
City of El Segundo	0%	0%	6.43%
County of Los Angeles	0%	0%	1.15%

4.2.3 OF-SMB-3

Stormwater outfall monitoring site OF-SMB-3 is the Pico-Kenter storm drain located upstream of SMBBB TMDL monitoring location SMB3-4, as shown in **Figure 14**. The Pico-Kenter storm drain is generally blocked by sand from June to the first large storm event in winter. All flow during dry-weather is diverted to the Santa Monica Urban Runoff Recycling Facility (SMURRF). The outfall is located south of the Santa Monica Pier and can be found right at the end of Pico Boulevard. Samples will be collected via a fixed autosampler installed at the outfall location, preferably at the discharge point, where it has been evaluated to be safe.

OF-SMB-3 was selected to represent the Santa Monica Beach – Frontal Santa Monica Bay (180701040403) HUC-12 JG3 area. The Cities of Los Angeles and Santa Monica are the represented agencies in the Santa Monica Beach – Frontal Santa Monica Bay (180701040403) HUC-12 JG3 area. The catchment area of OF-SMB-3 will encompass approximately 51.11% of the Santa Monica Beach – Frontal Santa Monica Bay (180701040403) HUC-12 JG3 area.

Runoff from OF-SMB-3 is primarily from the City of Santa Monica and the City of Los Angeles, 40.38% and 59.62% respectively. As shown on **Table 12**, the represented land uses of OF-SMB-3 are commercial, mixed residential, and open space. Stormwater outfall monitoring site OF-SMB-3 was selected to represent the MS4 discharge characteristics of the City of Santa Monica and commercial, mixed residential and open space land uses. Accordingly, OF-SMB-3 is an ideal outfall monitoring site.

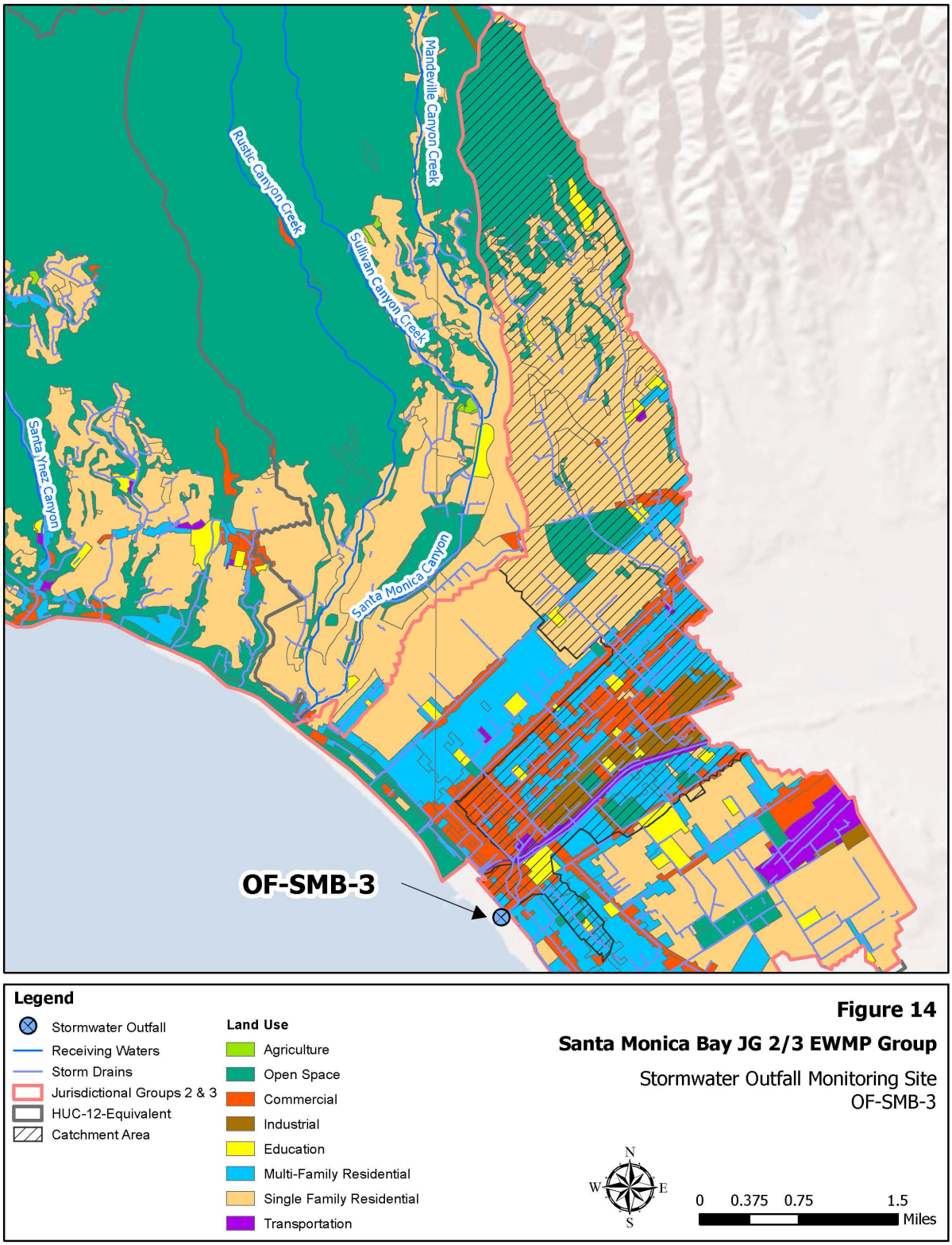

Figure 14
Stormwater Outfall Monitoring Site OF-SMB-3

Table 12
Stormwater Outfall Monitoring Site OF-SMB-3 Tributary Area
(Pico-Kenter Storm Drain)

	Catchment Area	HUC	SWB EWMP Area
	% of Total	% of Total	% of Total
Land Use			
Agricultural	0%	0%	0.05%
Commercial	13.02%	12.40%	4.86%
Industrial	4.75%	2.90%	4.61%
Education	2.97%	3.03%	1.67%
Single Family Residential	38.60%	38.50%	25.45%
Multi-Family Residential	15.04%	23.98%	8.15%
Open Space	23.91%	16.45%	48.37%
Transportation	1.71%	2.73%	6.83%
Total	100%	100%	100%
Jurisdictions			
City of Los Angeles	59.62%	47.33%	77.70%
City of Santa Monica	40.38%	52.67%	14.72%
City of El Segundo	0%	0%	6.43%
County of Los Angeles	0%	0%	1.15%

4.2.4 OF-SMB-4

Stormwater outfall monitoring site OF-SMB-4 is the Grand Avenue storm drain, as shown in **Figure 15**, located upstream of SMBBB TMDL monitoring location SMB 2-15. The Grand Avenue storm drain is a 34-inch diameter reinforced concrete pipe located in the parking lot of Dockweiler State Beach near the intersection of W Grand Avenue and Vista Del Mar Boulevard. Grand Avenue storm drain has a LFD up gradient, which diverts all dry-weather flow. The LFD is approximately 0.75 mile up gradient of stormwater outfall monitoring site OF-SMB-4. Samples will be collected via a fixed autosampler installed at the outfall location, preferably at the discharge point, where it has been evaluated to be safe.

OF-SMB-4 was selected to represent the Manhattan Beach – Frontal Santa Monica Bay (180701040500) HUC-12 area. The Cities of Los Angeles and El Segundo are the represented agencies within the Manhattan Beach – Frontal Santa Monica Bay (180701040500) HUC-12 area. The catchment area from OF-SMB-4 will encompass approximately 6.58% of the Manhattan Beach – Frontal Santa Monica Bay (180701040500) HUC-12 area.

Runoff from OF-SMB-4 is primarily from the Cities of El Segundo and Los Angeles, 97.49% and 2.51% respectively. **Table 13** compares the land use composition within the OF-SMB-4 catchment area, HUC-12, and SMB EWMP Group area. The represented land uses of the OF-SMB-4 catchment area are commercial, industrial, mixed residential. Accordingly, OF-SMB-4 has been selected to assess the MS4 discharge characteristic for commercial, industrial, and mixed residential land uses and the City of El Segundo.

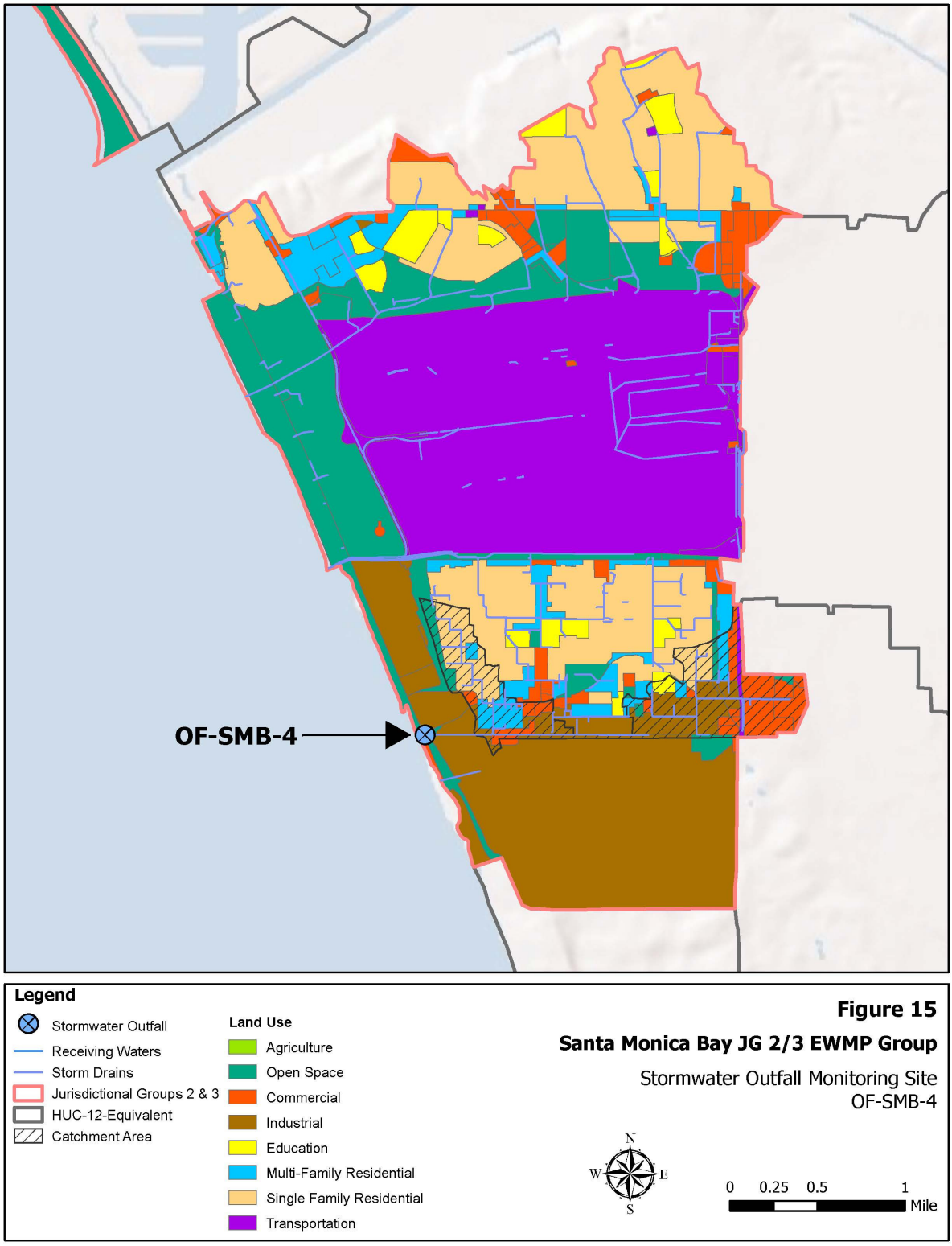

Figure 15
Stormwater Outfall Monitoring Site OF-SMB-4

Table 13
Stormwater Outfall Monitoring Site OF-SMB-4 Tributary Area
(Grand Avenue Storm Drain)

	Catchment Area	HUC	SWB EWMP Area
	% of Total	% of Total	% of Total
Land Use			
Agricultural	0%	0%	0.05%
Commercial	27.71%	5.58%	4.86%
Industrial	27.57%	18.64%	4.61%
Education	1.50%	2.87%	1.67%
Single Family Residential	21.93%	20.97%	25.45%
Multi-Family Residential	11.77%	5.35%	8.15%
Open Space	6.81%	15.79%	48.37%
Transportation	2.71%	30.80%	6.83%
Total	100%	100%	100%
Jurisdictions			
City of Los Angeles	2.51%	67.36%	77.70%
City of Santa Monica	0%	0%	14.72%
City of El Segundo	97.49%	32.64%	6.43%
County of Los Angeles	0%	0%	1.15%

4.3 MONITORED FREQUENCY, PARAMETERS, AND DURATION

Stormwater outfall monitoring sites will be monitored for three (3) storm events per year, prior to receiving water monitoring, for all required constituents except aquatic toxicity. Aquatic toxicity will be monitored when triggered by recent receiving water toxicity monitoring, where a toxicity identification evaluation (TIE) on the observed receiving water toxicity test was inconclusive. The requirements for monitored constituents at each outfall are outlined in the MRP Section VIII.B.1.c and presented in **Table 14**. Parameters in Table E-2 of the MRP, as listed in **Attachment C**, will not be identified as exceeding applicable water quality objectives until after the first year of receiving water monitoring. Monitoring for the selected sites would occur for at least the duration of the Permit term, unless an alternative site is warranted, per the adaptive management process, as presented in **Section 10**. Additional analytical and monitoring procedures are discussed in **Attachment C**.

Table 14
List of Constituents for Stormwater Outfall Monitoring(1)

Constituent	Site ID			
	OF-SMB-1	OF-SMB-2	OF-SMB-3	OF-SMB-4
Flow, hardness, pH, dissolved oxygen, temperature, specific conductivity, and TSS	X	X	X	X
Table E-2 pollutants detected above relevant objectives	X	X	X	X
Aquatic Toxicity and Toxicity Identification Evaluation (TIE)(2)				
Total Coliform	X		X	X
Fecal Coliform/(*E. coli)*	X		X	X
Enterococcus	X		X	X
Lead		X		
E. coli (Indicator Bacteria)		X		

1. Annual frequency for stormwater outfall monitoring would be 3 times per storm year.
2. Toxicity is only monitored from outfalls when triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test identifies pollutants or where the results were inconclusive. If toxicity is observed at the outfall a TIE must be conducted.

4.4 SUMMARY OF STORMWATER OUTFALL MONITORING

Four stormwater outfall monitoring sites, as presented in **Figure 11**, were selected to represent a combination of the HUC-12, jurisdictions, and the land uses within each drainage area of the SMB EWMP Group (OF-SMB-1 through -4). A summary of outfall characteristics are presented in **Table 15** and **Attachment B**.

Table 15
Summary of Stormwater Outfall Monitoring Sites

Outfall ID	Latitude	Longitude	LFD	Tributary HUC-12 Area	Drainage System
OF-SMB-1	34.041362	118.567045	Yes	Santa Monica Beach – Frontal Santa Monica Bay (180701040403) (Upper JG2)	Castle Rock (Parker Mesa)
OF-SMB-2	34.060808	-118.495170	No	Santa Monica Canyon (180701040402)	Sullivan Canyon and Mandeville Canyon
OF-SMB-3	34.006370	118.49184	Yes	Santa Monica Beach – Frontal Santa Monica Bay (180701040403) (JG3)	Pico Kenter
OF-SMB-4	33.917430	118.42858	Yes	Manhattan Beach – Frontal Santa Monica Bay (180701040500) (Lower JG2)	Grand Avenue

Section 5
Non-Stormwater Outfall Monitoring Program

The MRP requires Permittees to implement a non-stormwater outfall based screening and monitoring program. The non-stormwater outfall screening and monitoring program (non-stormwater program) is focused on non-stormwater discharges to receiving waters from major outfalls.

Since the late 1990s, the SMB EWMP Group has been addressing non-stormwater flow to Santa Monica Bay with the installation of LFDs, as summarized in **Attachment A** and in **Section 2**. The SMB EMWP Group has installed 23 LFDs throughout the SMB EWMP shoreline. The LFDs are operational year round and divert non-stormwater flow from the storm drains to the sanitary sewer system, keeping non-stormwater flows from reaching Santa Monica Bay. Non-stormwater flows at beach outfalls within Santa Monica Bay are non-existent due to the installation of the LFD. As non-stormwater flow at beach outfalls are non-existent, and have been reviewed for over 10 years, outfall screening of these outfalls will not be conducted.

Non-stormwater flows at outfalls within Santa Monica Canyon Channel are not diverted and will require an inventory. However, an LFD near the end of Santa Monica Canyon Channel exists and diverts all non-stormwater flow from reaching Santa Monica Bay.

5.1 NON-STORMWATER OUTFALL MONITORING OBJECTIVES

The objectives of the non-stormwater outfall program include the following (Part II.E.3 of the MRP):

a. Determine whether a Permittee's discharge is in compliance with applicable non-stormwater WQBELs derived from TMDL WLAs;
b. Determine whether a Permittee's discharge exceeds non-stormwater action levels, as described in Attachment G of the MS4 Permit;
c. Determine whether a Permittee's discharge contributes to or causes an exceedance of receiving water limitations; and
d. Assist a Permittee in identifying illicit discharges as described in Part VI.D.10 of the MS4 Permit.

Additionally, the outfall screening and monitoring process is intended to meet the following objectives (Part IX.A of the MRP):

1. Develop criteria or other means to ensure that all outfalls with significant non-stormwater discharges are identified and assessed during the term of this MS4 Permit.
2. For outfalls determined to have significant non-stormwater flow, determine whether flows are the result of illicit connection/illicit discharge (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows, or from unknown sources.
3. Refer information related to identified IC/IDs to the IC/ID Elimination Program (Part VI.D.10 of the MS4 Permit) for appropriate action.
4. Based on existing screening or monitoring data or other institutional knowledge, assess the impact of non-stormwater discharges (other than identified IC/IDs) on the receiving water.
5. Prioritize monitoring of outfalls, considering the potential threat to the receiving water and applicable TMDL compliance schedules.

6. Conduct monitoring or assess existing monitoring data to determine the impact of non-stormwater discharges on the receiving water.
7. Conduct monitoring or other investigations to identify the source of pollutants in non-stormwater discharges.
8. Use results of the screening process to evaluate the conditionally exempt non-stormwater discharges identified in Parts III.A.2 and III.A.3 of the MS4 Permit and take appropriate actions pursuant to Part III.A.4.d of the MS4 Permit for those discharges that have been found to be a source of pollutants. Any future reclassification shall occur per the conditions in Parts III.A.2 or III.A.6 of the MS4 Permit.
9. Maximize the use of Permittee resources by integrating the screening and monitoring process into existing or planned Integrated Monitoring Program (IMP) and/or CIMP efforts.

The outfall screening and investigations must be completed prior to initiating monitoring at an individual outfall. Detailed discussion of each element is provided in the following subsections.

5.2 NON-STORMWATER OUTFALL SCREENING AND MONITORING PROGRAM

The Non-Stormwater Outfall Screening and Monitoring Program are focused on dry-weather discharges to receiving waters from major outfalls that are (1) not served by an LFD, and (2) flows that reach the receiving water. The program fills two roles: (1) to provide assessment of whether the non-stormwater discharges are potentially impacting the receiving water, and (2) to determine whether significant non-stormwater discharges are allowable. The non-stormwater outfall program is complimentary to the IC/ID minimum control measure. Non-stormwater outfall monitoring sites will be determined after the screening events are completed and an inventory of outfalls is created. Parameters monitored at each non-stormwater outfall site will depend upon the receiving water on which it is located.

To determine the number of outfalls that are required to be monitored for the non-stormwater outfall monitoring, SMB EWMP Group has developed an outfall screening and monitoring program. The section starting with **Section 5.3** are part of the monitoring program. Within 90 days of the approval of this CIMP, the SMB EWMP Group will initiate steps to identify, inventory, prioritize, and monitor the non-stormwater discharges. The non-stormwater outfall program will involve following steps:

1. **Outfall Screening**: Because data required to implement the non-stormwater program is not available, the SMB EWMP Group will implement a screening process to determine which outfalls exhibit non-stormwater discharges and those that do not require further investigation.
2. **Identification of Outfalls with Significant Non-Stormwater Discharge** (Part IX.C of the MRP): Based on data collected during the outfall screening process the SMB EWMP Group will identify MS4 outfalls with significant non-stormwater discharges.
3. **Inventory of Outfalls with Non-Stormwater discharges** (Part IX.D of the MRP): Develop an inventory of major MS4 outfalls with known significant non-stormwater discharges and those requiring no further assessment.
4. **Prioritized Source Identification** (Part IX.E of the MRP): The data collected during the screening process will be used to prioritize outfalls for source identification investigations.
5. **Significant Non-stormwater Discharge Source Identification** (Part IX.F of the MRP): For outfalls exhibiting significant non-stormwater discharges, the SMB EWMP Group will perform source identification per the prioritization completed in the previous element.
6. **Monitoring Non-Stormwater Discharges Exceeding Criteria** (Part IX.G of the MRP): Using the information collected during screening and source identification efforts, the SMB EWMP Group will monitor outfalls that have been determined to convey significant non-stormwater discharges comprised of either unknown or non-essential conditionally exempt non-stormwater discharges, or continuing discharges attributed to illicit discharges must be monitored.

5.3 IDENTIFICATION OF OUTFALLS WITH SIGNIFICANT NON-STORMWATER DISCHARGES

An initial field survey allowed for the identification of outfalls, the majority of which were observed along the beaches, Santa Monica Canyon Channel, and Rustic Canyon Creek. Santa Ynez Canyon Creek and parts of Sullivan Canyon Creek were found to be natural creeks with no outfalls. Mandeville Canyon Creek was observed to be an underground storm drain. The upstream parts of Mandeville Canyon creek include a natural ditch that runs parallel to the storm drain with a catch basin connection. Natural flows from Sullivan Canyon Creek drain to an underground storm drain that daylights at the confluence of Mandeville Canyon Creek and Sullivan Canyon Creek. Rustic Canyon Creek has a concrete bottom from the confluence of Santa Monica Canyon Channel to the end of W. Rustic Road. After W. Rustic Road, Rustic Canyon Creek is a soft bottom creek. **Attachment D** presents the photos from this field survey.

Based on a review of the available information, identification of significant non-stormwater discharges is not available at this time. Under this task, the SMB EWMP Group will undertake a field reconnaissance to evaluate the major outfalls within Santa Monica Canyon Channel. The major outfalls for the SMB EWMP Group are defined as follows:

- 36-inch or larger pipes, and
- 12-inch or larger pipes from industrial zoned areas.

Table 16 and **Figure 16** present a listing of all known outfalls that match the major outfall criteria along the receiving waters within Santa Monica Canyon Channel.

Table 16
Known Major Outfalls in Santa Monica Channel

Station ID	Type of Outlet	Outlet Size	Storm Drain
SULLC-054	Reinforced Concrete Pipe (RCP)	51"	BI 0246 - Georgina Av
SULLC-085	Reinforced Concrete Pipe (RCP)	60"	Carpri Drain - U1

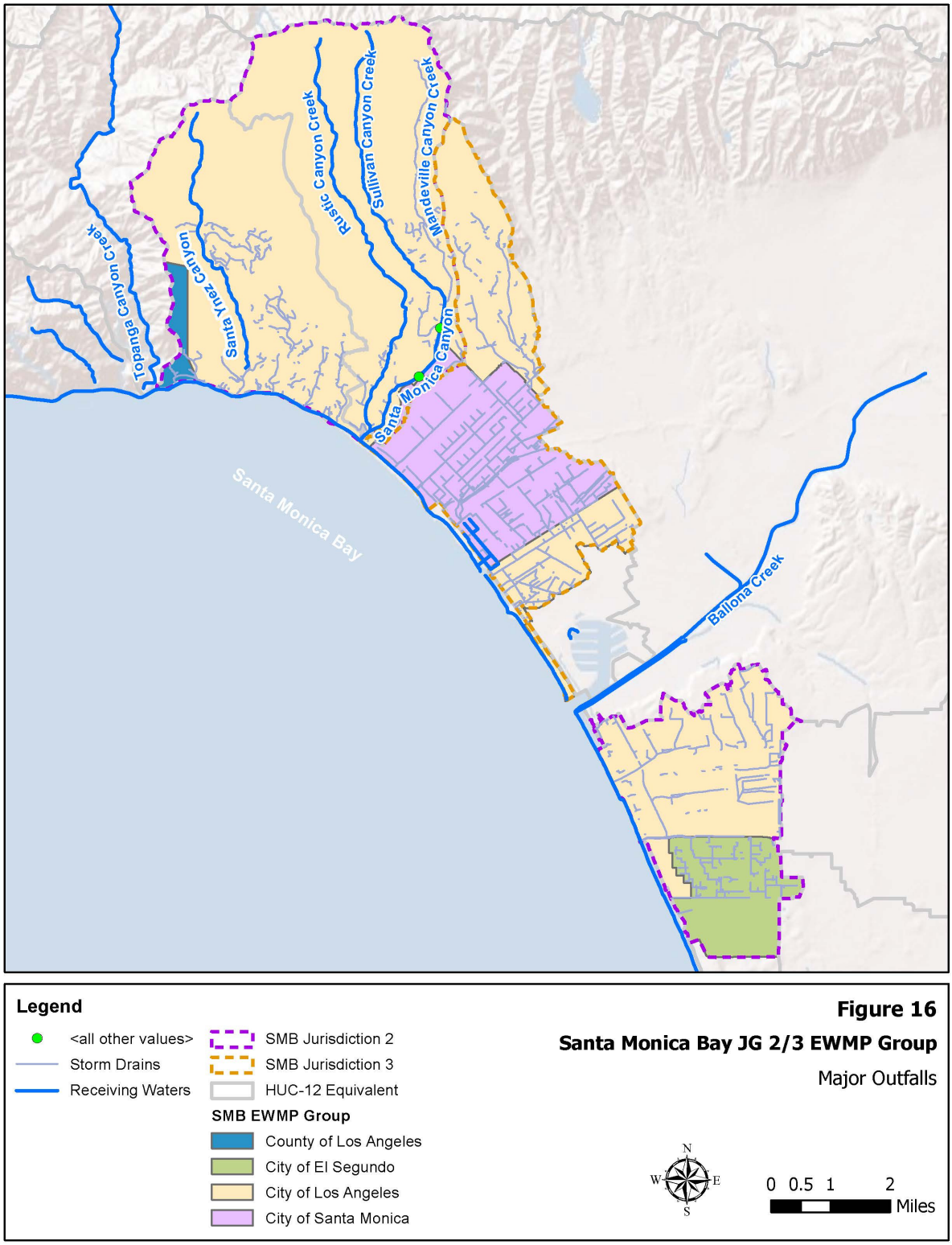

Figure 16
Major Outfalls

E. coli is listed on the CWA 303(d) list for Santa Monica Canyon Channel and is assumed to be a reasonable evaluation characteristic. Flow reach the receiving water and *E. coli* are proposed as the primary characteristic along with flow for determining significant non-stormwater discharge for the SMB EWMP group. To determine *E. coli* presence, the SMB EWMP Group will perform three outfall screenings at Santa Monica Canyon Channel for the first year after CIMP approval. All flow and *E. coli* data gather during the three initial screenings will be processed and evaluated. As all data are gathered and processed, major outfalls with dry-weather flows reaching the receiving water body and presence of *E. coli* at all three screening events will be deemed as exhibiting significant non-stormwater discharge. **Table 17** outlines the SMB EWMP Group's screening and ranking process.

The initial screenings will serve the dual purpose of data collection for completing the MS4 infrastructure database, addressed in **Section 3**, and the initial evaluation of outfalls for significant non-stormwater discharge. Each outfall along Santa Monica Canyon Channel will be visited during the first screening and major outfalls identified as having flows reaching the receiving water body will be visited during subsequent screenings. A standard field data collection form will be used, consisting of:

- Channel bottom, and flow rate
- Whether discharge ponds, or reaches the receiving water
- Clarity
- Presence of odors and foam
- *E. coli* sampling

Additionally, outstanding information for the MS4 inventory database will be collected, including, at a minimum, geographically referenced photographs. Outfall screening is necessary to collect the information to identify outfalls exhibiting significant non-stormwater discharges and to develop the information needed for the inventory of outfalls with significant non-stormwater discharges.

Table 17

Non-Stormwater Outfall Screening Process Utilizing *E.coli* for Determining Significant Non-Stormwater Discharge

Component	Description
Characteristics for Defining Significant Non-Stormwater Discharges	Outfalls will be determined to be significant non-stormwater discharges through the following criteria:
	1. Does the non-stormwater discharge reach the receiving water during dry-weather? If yes, continue through the ranking criteria.
	2. Was *E. coli* detected at all three screening events?
Data Collection	Data that would need to be collected include accurate flow measurements AND *E. coli.* Additionally, information needed to complete the inventory would be collected.
Frequency	Three times as part of the initial screening process.
Timeline	Initiation of the screening process will occur within 90 day of approval of the CIMP.
Timeline	The screening process will occur within 90 day of approval of the CIMP.

5.4 INVENTORY OF MS4 OUTFALLS WITH NON-STORMWATER DISCHARGES

An inventory of MS4 outfalls identified during outfall screening will be developed by the SMB EWMP Group to classify outfalls with known significant non-stormwater discharges and those requiring no further assessment (Part IX.D of the MRP). If the MS4 outfall requires no further assessment, then the inventory will include the rationale for the determination of no further action required based on the following:

- The outfall is not within the geographical scope of the EWMP Group;
- The outfall does not have flow;
- The outfall does not have a known significant non-stormwater discharge; or
- Discharges observed were determined to be exempt during the source identification (**Section 5.6**).

The inventory will be recorded in the database as required in Part VII.A of the MRP. Each year, the inventory will be updated to incorporate the most recent characterization data for outfalls with significant non-stormwater discharges. The following physical attributes of outfalls with significant non-stormwater discharges will be included in the inventory and should be collected as part of the screening process:

a. Date and time of last visual observation or inspection;
b. Outfall alpha-numeric identifier;
c. Description of outfall structure including size (e.g., diameter and shape);
d. Description of receiving water at the point of discharge (e.g., natural, soft-bottom with armored sides, trapezoidal, concrete channel);
e. Latitude/longitude coordinates;
f. Nearest street address;
g. Parking, access, and safety considerations;
h. Photographs of outfall condition;
i. Photographs of significant non-stormwater discharge (or indicators of discharge) unless safety considerations preclude obtaining photographs;
j. Estimation of discharge rate;
k. All diversions either upstream or downstream of the outfall; and
l. Observations regarding discharge characteristics such as turbidity, odor, color, presence of debris, floatables, or characteristics that could aid in pollutant source identification.

5.5 PRIORITIZED SOURCE IDENTIFICATION

Once significant non-stormwater outfalls have been identified through the screening process and incorporated into the inventory, Part IX.E of the MRP requires Permittees to prioritize outfalls for further source investigations. The SMB EWMP Group proposes the following alternative prioritization criteria to be utilized:

1. Outfalls that have the highest ranking score, and
2. Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the Action Levels identified in Attachment G of the Permit.

Once the prioritization is completed, a source identification of identified significant non-stormwater outfall will be achieved. The SMB EWMP Group proposes the following schedule:

- 25 percent by December 28, 2015
- 100 percent by December 28, 2017

5.6 SIGNIFICANT NON-STORMWATER DISCHARGE SOURCE IDENTIFICATION

Based on the prioritized list of major outfalls with significant non-stormwater discharge, source identification will be conducted to identify the source(s) or potential source(s) of non-stormwater discharge.

Part IX.A.2 of the MRP requires Permittees to classify the source identification results into the following types as summarized in **Table 17**:

A. **IC/ID**: If the source is determined to be an illicit discharge, then the Permittee must implement procedures to eliminate the discharge consistent with IC/ID requirements (Permit Part VI.D.10) and document actions.
B. **Authorized or Conditionally-Exempt Non-Stormwater Discharges**: If the source is determined to be an NPDES permitted discharge, a discharge subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or a conditionally exempt essential discharge, then the Permittee must document the source. For non-essential conditionally exempt discharges, the Permittee must conduct monitoring consistent with Part IX.G of the MRP for the Regional Board Executive Officer to determine whether the discharge should remain conditionally exempt or be prohibited.
C. **Natural Flows**: If the source is determined to be natural flows, then the Permittee must document the source.
D. **Unknown Sources**: If the source is unknown, then the Permittee must conduct monitoring consistent with Part IX.G of the MRP.
E. **Originates Upstream of SMB EWMP Group**: If the source is determined to originate from an upstream WMA, then the Permittee must inform the upstream WMA and Regional Board in writing within 30 days of identifying the presence of the discharge, provide all available characterization data and determination efforts, and document actions taken to identify its source.

Table 17
Source Identification Types

Type	Follow-up	Action Required by Permit
A. Illicit Discharge or Connection	Refer to IC/ID program	Implement control measures and report in annual report. Monitor if cannot be eliminated.
B. Authorized or Conditionally Exempt Discharges[1]	Document and identify if essential or non-essential	Monitor non-essential discharges
C. Natural Flows	End investigation	Document and report in annual report
D. Unknown	Refer to IC/ID program	Monitor
E. Upstream of SMB EWMP Group	End investigation	Inform upstream WMA and the Regional Board in writing within 30 days of identifying discharge.

1 Discharges authorized by a separate NPDES permit, a discharge subject to a Record of Decision approved by USEPA pursuant to section 121 of CERCLA, or is a conditionally exempt NSW discharge addressed by other requirements. Conditionally exempt NSW discharge addressed by other requirements are described in detail in Part III.A. Prohibitions – NSW Discharges of the Permit.

Source identification will be conducted using site-specific procedures based on the characteristics of the non-stormwater discharge. Investigations could include:

- Performing field measurements to characterize the discharge;
- Following dry-weather flows from the location where they are first observed in an upstream direction along the conveyance system; and
- Compiling and reviewing available resources, including past monitoring and investigation data, land use/MS4 maps, aerial photography, and property ownership information.

Where the source identification has determined the non-stormwater source to be authorized, natural, or essential conditionally-exempt flows, the outfall will require no further assessment and will move onto the next highest priority outfall. However, if the source identification determines that the source of the discharge is non-essential conditionally exempt, an ID, or is unknown, then further investigation will be conducted to eliminate the discharge or to demonstrate that it is not causing or contributing to receiving water impairments and will be added to the monitoring list until non-stormwater discharge is eliminated.

In some cases, source investigations may ultimately lead to prioritized programmatic or structural BMPs. Where the SMB EWMP Group has determined that they will address the non-stormwater discharge through modifications to programs or by structural BMP implementation, the SMB EWMP Group will incorporate the approach into the implementation schedule developed in the EWMP, and the outfall can be eliminated from the monitoring list.

5.7 NON-STORMWATER DISCHARGE MONITORING

As outlined in the MRP (Part II.E.3), outfalls with significant non-stormwater discharges that remain unaddressed after source investigation shall be monitored to meet the following objectives:

a. Determine whether a Permittee's discharge is in compliance with applicable dry-weather WQBELs derived from TMDL WLAs;
b. Determine whether the quality of a Permittee's discharge exceeds non-stormwater action levels, as described in Attachment G of the Permit; and
c. Determine whether a Permittee's discharge causes or contributes to an exceedance of receiving water limitations.

Thus, outfalls that have been determined to convey significant non-stormwater discharges where the source identification concluded that the source is attributable to a continued ID (Type A from **Table 17**, non-essential conditionally exempt (Type B from **Table 17**), or unknown (Type D from **Table 17**) must be monitored. Monitoring will be implemented within 90 days of completing the source identification and will be coordinated with the following receiving water dry-weather monitoring event.

5.7.1 Non-Stormwater Outfall-Based Monitoring Sites

The information to determine the number and location of outfalls requiring monitoring is not available at this time. After the outfall screening, inventory, prioritization, and source identification process, outfalls identified to require monitoring will be monitored per the permit requirements.

5.7.2 Monitored Frequency, Parameters, and Duration of Monitoring

After the outfall screening and determining which outfalls have significant non-stormwater flows, non-stormwater monitoring sites will be monitored for two (2) monitoring events. The monitoring events will be coordinated with receiving water monitoring site RW-SMB-2, which will allow for an evaluation

of whether the non-stormwater discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water. Significant non-stormwater outfalls will be monitored for all required constituents, per receiving water bodies, as outlined in Part IX.G.1.a-e of the MRP, except toxicity. Toxicity monitoring is only required when triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test was inconclusive. An overview of the constituents to be monitored and the corresponding frequency is listed in **Table 18**. Outfalls on the monitoring list will be monitored for at least the duration of the Permit term, or until the non-stormwater discharge is eliminated. Additional analytical and monitoring procedures are discussed in **Attachment C**.

Table 18
List of Constituents for Non-Stormwater Monitoring

Constituent	Outfalls on Monitoring List
Flow, hardness, pH, dissolved oxygen, temperature, specific conductivity, and TSS	X
Table E-2 pollutants detected above relevant objectives	X
Aquatic Toxicity and Toxicity Identification Evaluation (TIE)[(1)]	
Lead	X
E. coli (Indicator Bacteria)	X

1. Annual frequency for non-stormwater outfall monitoring will be 2 times per storm year.
2. Toxicity is only monitored from outfalls when triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test identifies pollutants or where the results were inconclusive. If toxicity is observed at the outfall a TIE must be conducted.

5.8 NON-STORMWATER OUTFALL PROGRAM SUMMARY

At this time, non-stormwater outfall monitoring sites have not been identified. The SMB EWMP Group will conduct the following steps as part of the non-stormwater outfall program to identify non-stormwater outfall monitoring sites:

1. Outfall screening;
2. Identification of outfalls with significant non-stormwater discharge (Part IX.C of the MRP);
3. Inventory of outfalls with non-stormwater discharge (Part IX.D of the MRP);
4. Prioritized source investigation (Part IX.E of the MRP); and
5. Identify sources of significant non-stormwater discharges (Part IX.F of the MRP).

Once non-stormwater discharges are eliminated, monitoring at the outfall will cease. Additionally, if monitoring demonstrates that discharges do not exceed any WQBELs, then action levels or water quality standards for pollutants identified on the 303(d) list, monitoring will cease at an outfall after the first year. Thus, the number and location of outfalls monitored has the potential to change on an annual basis.

Section 6
New Development/Re-Development Effectiveness Tracking Program

The New Development/Re-Development Effectiveness Tracking Program is used for tracking information data in regards to new and re-development activities. To meet the MRP requirements of Permit Attachment E, Part X.A, the SMB EWMP Group will maintain an informational database record for each new development/re-development project subject to the MCM requirements in Part VI.D.7 of the Permit and their adopted LID Ordinance. The database should track the following information:

1. Name of the Project and Developer;
2. Mapped project location (preferably linked to the Geographic Information System (GIS) storm drain map);
3. Issuance date of the project Certificate of Occupancy;
4. 85th percentile 24-hour storm event for project design (inches);
5. 95th percentile 24-hour storm event for projects draining to natural water bodies (inches);
6. Other design criteria required to meet hydromodification requirements for drainages to natural water bodies;
7. Project design storm (inches per 24 hours);
8. Project design storm volume (gallons or million gallons);
9. Percent of design storm volume to be retained onsite;
10. Design volume for water quality mitigation treatment BMPs (if any);
11. If flow through, water quality treatment BMPs are approved, provide the one-year, one-hour storm intensity as depicted on the most recently issued isohyetal map published by the Los Angeles County Hydrologist;
12. Percent of design storm volume to be infiltrated at an off-site mitigation or groundwater replenishment project site;
13. Percent of design storm volume to be retained or treated with biofiltration at an off-site retrofit project;
14. Location and maps (preferably linked to the GIS storm drain map) of off-site mitigation, groundwater replenishment, or retrofit sites; and
15. Documentation of issuance of requirements to the developer.

Until the EWMP is approved by the Regional Board or the Executive Officer, the SMB EWMP Group is only required to implement and track MCM information in its existing stormwater management program per Part V.C.4.d.i.

In addition to the requirements in Part X.A of the MRP, Part VI.D.7.d.iv of the Permit requires that the SMB EWMP Group implement a tracking system for new development/re-development projects that have been conditioned for post-construction BMPs. The following information is to be tracked using GIS or another electronic system:

1. Municipal Project ID
2. State Waste Discharge Identification (WDID) Number
3. Project Acreage
4. BMP Type and Description
5. BMP Location (coordinates)
6. Date of Acceptance

7. Date of Maintenance Agreement
8. Maintenance Records
9. Inspection Date and Summary
10. Corrective Action
11. Date Certificate of Occupancy Issued
12. Replacement or Repair Date

6.1 PROGRAM OBJECTIVES

The objective of the New Development/Re-Development Effectiveness Tracking is to assess whether post-construction BMPs, as outlined in permits issued by the Permittees, are implemented, and to ensure the volume of stormwater associated with the design storm is retained onsite, as required by Part VI.D.7.c.i. of the Permit. The New Development/Re-Development Effectiveness Tracking will gather necessary data to assess whether construction MCM, LID ordinances and BMPs are effective and being implemented.

6.2 EXISTING NEW DEVELOPMENT/RE-DEVELOPMENT TRACKING PROCEDURES

Within the SMB EWMP Group, each jurisdiction has a unique approach to tracking some or the entire 27 required development program tracking elements (15 elements identified in Attachment E.X.A and 12 elements in Part VI.D.7.d.iv.). For private development projects, a Building Department, or a variation of, is typically the entity responsible for collecting and recording the program tracking elements. In contrast, public improvement projects are normally the responsibility of a Public Works Department.

Based on a review of the existing new development/re-development tracking procedure for the different jurisdictions within the SMB EWMP Group, additional effort will be needed to track the 27 program tracking elements required by the Permit. Information has currently been recorded and stored differently across jurisdictions, with some using commonly-available software packages, such as Microsoft Office products and GIS, and others using proprietary software programs, such as Plan Check and Inspection System (PCIS), or in some instances paper files. SMB EWMP Group members will develop or modify their current tracking systems to set up a centrally-located spreadsheet template that includes the required information fields for each project that can be tracked separately by the individual jurisdiction's proprietary software system if integrated accordingly. Each jurisdiction will dedicate resources to develop a complete tracking system that works for their individual needs and internal processes.

6.3 SPECIAL CONSIDERATIONS FOR DATA MANAGEMENT AND REPORTING

A fundamental step in establishing individual data management protocols consists of developing a recommended standard operating procedure (SOP) and determining the responsible person within each jurisdiction for collecting, reviewing, and reporting the data. The SOP developed by each jurisdiction will consist of written instructions regarding documentation of routine activities and delineation of the primary steps in the land development approval process, relevant data generated at each step, and procedures for "handoff" of the project to the next group. Development and use of an SOP is an integral part of successful data management as it provides information to perform a task properly, and facilitates consistency in the quality and integrity of the tracking data.

6.3.1 Data Management

Each jurisdiction will conduct tracking to meet Permit requirements and facilitate reporting. The data management protocols will include:

- Designing and testing data entry sheets for the required information fields identified in **Section 6.1**;
- Describing the procedures and identifying the persons responsible for inputting data, assessing accuracy and consistency, and coordinating follow up actions when questions arise;
- Strategy for checking and validating data entry, including identifying persons responsible for managing and safeguarding data, performing data entry, supervising the data entry, and ensuring quality control of the data; and
- Specifying procedures for routinely and safely archiving data files.

Data collection for development review processes generally consist of the following similar steps:

- **Planning**: Project proponents submit an application to agency planning department to determine whether or not the project meets jurisdictional requirements. When required, the project may require a public hearing for conditions and entitlements. Project conditions may include water quality related requirements.
- **Building**: Projects may be conditioned subject to engineering, community services, or building department review and approval of plans or technical reports. During review, required water quality BMP designs are reviewed and accepted. When a building and/or grading permit is issued, project construction usually proceeds without further discretionary approvals.
- **Construction**: During construction, approved BMPs are implemented and then verified by the jurisdiction's inspector prior to issuance of a Certificate of Occupancy.
- **Post-Construction Inspections**: Once constructed, inspection and verification of maintenance is transferred to the jurisdiction's water quality program manager.

Relevant project data is collected during each phase of the development review process described above. Based on this general process and information gathered through the questionnaire, **Table 19** illustrates data collection opportunities throughout the planning, building, construction, and post-construction inspection processes for requirements in Part VI.D.7 of the Permit.

Table 19
Development Review Process and Data Collection

Stage	Process	Data Collection Opportunity
Planning	Planning review, conditions, and entitlements	Project name
		Developer name
		Location/Map
		Documentation of issuance of requirements
Building	Engineering review and approval of plans and technical reports	85^{th} and 95^{th} percentile storm event criteria
		Other hydromodification management requirements
		Project design storm intensity and volume
		Percent of design storm volume retained onsite
		Design volume for treatment BMPs
		One year/one hour storm intensity
		Percent of design storm infiltrated offsite
		Percent of design storm retained/treated with biofiltration offsite
		Location/Maps of offsite mitigation
Construction	Approval of BMP construction and issuance of Certificate of Occupancy	Issuance date of Certificate of Occupancy
Post-Construction Inspections	Inspection and tracking of post-construction BMPs	Inspection and maintenance dates

6.3.2 Additional Data

To facilitate annual assessment and reporting and future Reasonable Assurance Analyses (RAA) input data compilation, the SMB EWMP Group may also track the following questions and/or information:

- Do any modified MCMs apply to this project?
- Assessor's Identification Number (AIN)
- Street address
- Revised land use (based on City/County Land Use Categories)
- BMP maintenance funding source
- Tributary area to each BMP

6.3.3 Reporting

Coordinated effectiveness tracking among the SMB EWMP Group for watershed-scale reporting and compliance assessment will require a common reporting approach that complements individual Planning and Land Development Program MCM implementation. It is assumed that all group members have access to, can export data to, and use Microsoft Office products such as Access, Excel, and Word. Use of this software will facilitate the sharing of data to fulfill the reporting requirements in Part XVIII.A.1 and A.2 of the MRP.

Development of a data collection template and established SOPs for each jurisdiction will aid in future analyses and annual reporting. The example data collection template, presented in **Table 20**, includes the information to be tracked for each project.

Table 20
Example Data Collection Template

PLANNING									
Project Name / Description	New or Re-Development	Planning ID	Name of Developer	Assessor's Identification Number (AIN)	Location (Lat/Long or Cross Streets)	Address	City	Zip	Issuance of Requirements Date
ABC Development	*New Development*	*PA14-0001*	*XYZ Development, LLC*	*4272-029-017*	*Ocean Park and 31st Street 34.012603, 118.270348*	*3250 Ocean Park*	*Santa Monica*	*90405*	*3/11/2014*

BUILDING									
Building ID	Project Acreage (Acres)	Design Storm (in/24 hr)	Design Storm Volume (Gallons or MGD)	Units	Storm Volume Retained On-site (%)	85th % Storm Event (in/24 hr)	95th % Storm Event - Projects Draining to Natural Water Bodies (in/24 hr)	Type of BMP (Please select from list)	BMP Location (Lat/Long or Coordinates)
B14-0001	*18.943*	*0.920*	*473,200*	*Gallons*	*100%*	*0.920*	*None*	*(Bio)Infiltration Basins*	*34.012711, 118.271411*
								Permeable Pavement	*34.012311, 118.272411*
								Water Harvesting	*34.012311, 118.271411*
								Media Filtration Practices	*34.012511, 118.271411*
								Wet Detention	*34.012811, 118.271811*

BUILDING								
Contributing Area (Acres)	Design Volume for Treatment BMPs	Units	Offsite Run-on / Mitigation	Offsite Run-on Location	Design Storm Volume - Infiltrated at an Off-Site Mitigation Project (%)	Design Storm Volume - Retained or Treated with Biofiltration Off-Site (%)	Date of Maintenance Agreement	State WDID #
5.540	-		*No*	*None*	*0.00%*	*0.00%*	*11/15/2014*	*4 19C123456*
3.400	-				*0.00%*	*0.00%*		
2.400	-				*0.00%*	*0.00%*		
2.103	*6722*	*cf*			*0.00%*	*0.00%*		
5.500	-				*0.00%*	*0.00%*		

CONSTRUCTION		POST-CONSTRUCTION BMP INSPECTIONS			
Acceptance Date	Certificate of Occupancy Date	Maintenance Records	Inspection Date and Summary	Replacement or Repair Date	Corrective Action
11/5/2016	*11/15/2016*	*Yes*	*11/21/2017*	*None*	*No*
		No	*11/21/2018 - No Records*	*Unknown*	*Yes*
		Yes	*11/21/2019*	*None*	*No*
		Yes	*11/21/2020*	*None*	*No*
		Yes	*11/21/2021*	*None*	*No*

Required	**= Required Field**
Recommended	**= Recommended**

Annual Assessment and Reporting requirements to be included in an Annual Report are outlined in Part XVIII.A.1 through A.7 of the MRP. With regard to New Development/Re-Development Effectiveness Tracking, the SMB EWMP Group is required to annually track, analyze, and report on the following stormwater control measures in Part XVIII.A.1:

- Estimate the cumulative change in percent effective impervious area (EIA) since the effective date of the Permit and, if possible, the estimated change in the stormwater runoff volume during the 85th percentile storm event.
- Summarize new development/re-development projects constructed within the Permittee's jurisdictional area during the reporting year.
- Summarize retrofit projects that reduced or disconnected impervious area from the MS4 during the reporting year.
- Summarize other projects designed to intercept stormwater runoff prior to discharge to the MS4 during the reporting year.
- For the projects summarized above, estimate the total runoff volume retained onsite by the implemented projects.
- Summarize actions taken in compliance with TMDL implementation plans or approved Watershed Management Programs to implement TMDL provisions in Part VI.E and Attachments L-R of the Permit.
- Summarize riparian buffer/wetland restoration projects completed during the reporting year. For riparian buffers include width, length and vegetation type; for wetland include acres restored, enhanced, or created.
- Summarize other MCMs implemented during the reporting year, as deemed relevant.
- Provide status of all multi-year efforts that were not completed in the current year and will therefore continue into the subsequent year(s). Additionally, if any of the requested information cannot be obtained, then the Permittee shall provide a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts.

Group members are also required to track, evaluate, and provide an effectiveness assessment of stormwater control measures per Attachment E, Part XVIII.A.2:

- Summarize rainfall for the reporting year. Summarize the number of storm events, highest volume event (inches/24 hours), highest number of consecutive days with measureable rainfall, total rainfall during the reporting year compared to average annual rainfall for the subwatershed. Precipitation data may be obtained from the LACDPW rain gauge stations available at http://www.ladpw.org/wrd/precip/.
- Provide a summary table describing rainfall during stormwater outfall and wet-weather receiving water monitoring events. The summary description shall include the date, time that the storm commenced and the storm duration in hours, the highest 15-minute recorded storm intensity (converted to inches/hour), the total storm volume (inches), and the time between the storm event sampled and the end of the previous storm event.
- Where control measures were designed to reduce impervious cover or stormwater peak flow and flow duration, provide hydrographs or flow data of pre- and post-control activity for the 85th percentile, 24-hour rain event, if available.
- For natural drainage systems, develop a reference watershed flow duration curve and compare it to a flow duration curve for the subwatershed under current conditions.
- Provide an assessment as to whether the quality of stormwater discharges as measured at designed outfalls is improving, staying the same, or declining. The Permittee may compare water quality data from the reporting year to previous years with similar rainfall patterns, conduct

trends analysis, or use other means to develop and support its conclusions (e.g., use of non-stormwater action levels or municipal action levels as provided in Attachment G of the Permit).

- Provide an assessment as to whether wet-weather receiving water quality within the jurisdiction of the Permittee is improving, staying the same, or declining when normalized for variations in rainfall patterns. The Permittee may compare water quality data from the reporting year to previous years with similar rainfall patterns, conduct trends analysis, draw from regional bioassessment studies, or use other means to develop and support its conclusions.
- Provide status of all multi-year efforts, including TMDL implementation, that were not completed in the current year and will continue into the subsequent year(s). Additionally, if any of the requested information cannot be obtained, then the Permittee shall provide a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts.

Additional reporting elements required are identified in Part VI.D.7 of the Permit and include:

- A summary of total offsite project funds raised to date and a description (including location, general design concept, volume of water expected to be retained, and total estimated budget) of all pending public offsite projects.
- A list of mitigation project descriptions and estimated pollutant and flow reduction analyses.
- A comparison of the expected aggregate results of alternative compliance projects to the results that would otherwise have been achieved by retaining onsite the stormwater quality design volume.

Part XV.A of the MRP requires each Permittee or group to submit an Annual Report to the Regional Board by December 15th of each year. The annual reporting period is from July 1st through June 30th, and information reported will cover approved and constructed projects that have been issued occupancy.

6.4 SUMMARY OF NEW DEVELOPMENT/RE-DEVELOPMENT EFFECTIVENESS TRACKING

New Development/Re-Development Effectiveness Tracking is used for tracking information data in regards to new and re-development activities and their associated post-construction BMPs. The information is stored and will be submitted in an annual compliance report. Each jurisdiction will be individually responsible for tracking Permit requirements, based on their specific operational procedures and internal processes.

Section 7
Regional Studies

The MRP identifies one regional study: the SMC Regional Watershed Monitoring Program. The SMC is a collaborative effort between SCCWRP, State Water Board's Surface Water Ambient Monitoring Program (SWAMP), three Southern California Regional Water Quality Control Boards, and several county stormwater agencies. SCCWRP acts as a facilitator to organize the monitoring program, conducts the data analysis, and prepares monitoring results reports. The goal of the SMC is to develop a monitoring program on a regional level for Southern California's coastal streams and rivers.

Prior to the initiation of the SMC Regional Watershed Monitoring Program, in-stream monitoring in southern California was conducted by over a dozen different organizations, each of which had disparate monitoring programs that varied in design, frequency, and the indicators selected for measurement. Even where the monitoring designs were similar, the field techniques, laboratory methods, and quality assurance requirements were often not comparable, making region-wide assessments impossible. In addition, the lack of an integrated information management system precluded data sharing among programs. To address these problems, SCCWRP helped the SMC design and implement a coordinated and regional watershed monitoring program. The SMC works with local programs in the region to facilitate greater data collection and provide a regional context to address site- and watershed-specific questions.

The SMB EWMP Group, through the City of Los Angeles and LACFCD will continue to participate in the Regional Watershed Monitoring Program (Bioassessment Program) being managed by the Southern California Stormwater Monitoring Coalition (SMC). Initiated in 2008, the SMC's Regional Bioassessment Program is designed to run over a five-year cycle. Monitoring under the first cycle concluded in 2013, with reporting of findings and additional special studies planned to occur in 2014. SMC, is currently working on designing the bioassessment monitoring program for the next five-year cycle, which is scheduled to run from 2015 to 2019.

7.1 PROGRAM OBJECTIVES

The SMC Regional Watershed Monitoring Program seeks to coordinate and leverage existing monitoring efforts so as to produce regional estimates of condition, improve data comparability and quality assurance, and maximize data availability, but at the same time conserving monitoring expenditures. This program addresses watersheds, though, rather than the marine environment. The primary goal of the SMC Regional Watershed Monitoring Program is to implement an ongoing, large-scale regional monitoring program for southern California's coastal streams and rivers. The monitoring program addresses three main questions:

1. What is the condition of streams in our region?
2. What are the stressors that affect stream condition?
3. Are conditions getting better or worse?

7.2 REGIONAL STUDY PARTICIPATION

The MRP states that each Permittee shall be responsible for supporting the monitoring described at the sites within the watershed management area(s) that overlap with the Permittee's jurisdictional area. One program initiated under the SMC is the Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program (Bioassessment Program), which included six (6) monitoring sites

that were monitored annually within the SMB EWMP Group area. The SMC Bioassessment Program initiated in 2009 and occurs in five years cycles. Sampling under the 2009 cycle concluded in 2013. The next five-year cycle is scheduled to begin in 2015, with additional special study monitoring scheduled to occur in 2014.

The City of Los Angeles and the LACFCD were participants of the 2009 Bioassessment Program, and the SMB EWMP Group will continue to coordinate with SCCWRP to participate in the SMC Regional Monitoring Program. During the next five-year Bioassessment Program cycle (2015 Bioassessment Program), as indicated by SCCWRP, previous types of monitoring resources will be available to Permittees to participate in the Bioassessment Program. The SMB EWMP Group will contact and discuss with the SCCWRP if the previous location will continue to be monitored in the 2015 Bioassessment Program. If so, then the SMB EWMP Group will coordinate with SCCWRP to participate in the 2015 Bioassessment Program.

Section 8
Special Studies

The MRP requires each Permittee to be responsible for conducting special studies required in an effective TMDL or an approved TMDL Monitoring Plan. The effective TMDLs, revised TMDLs, and approved monitoring plans relevant to the SMB EWMP Group do not require the completion of special studies. However, the SMB DDT and PCB TMDL have identified optional special studies as follows:

- Refine the relationship between sediment and concentrations of pollutants and fish tissue contamination;
- Determine total mass of DDT and PCBs in Santa Monica Bay subsurface sediments through sediment coring profiles;
- Identify flux rate of pollutants from the sediments to the water column; and
- Evaluate sediments embedded in storm drains to better estimate potential loadings of DDT and PCBs to Santa Monica Bay and identify potential sources.

At this time, the SMB EWMP Group will not participate in any special studies. At a future date, if implementation of a special study is desirable, then a separate work plan that coordinates with the CIMP will be developed.

Section 9
Non-Direct Measurements

Existing monitoring programs that collect water quality data in the watershed, as summarized in **Attachment A**, will be incorporated into the CIMP database to the extent practicable. Gathering and compiling information from outside the CIMP programs will be dictated by the cost. Water quality data reported by these monitoring programs will be evaluated for suitability for inclusion in the CIMP database. If the water quality data is deemed to be suitable, then it will be included in the database.

Section 10
Adaptive Management

An adaptive management approach provides a structured process that allows for taking action under uncertain conditions based on the best available science, closely monitoring and evaluating outcomes, and re-evaluating and adjusting decisions as more information is obtained.

The EWMP and CIMP are to be implemented using the adaptive process. As new program elements are implemented and data gathered over time, the EWMP and CIMP will undergo revision to reflect the most current understanding of the watershed and present a sound approach to addressing changing conditions. As such, the EWMP and CIMP will employ an adaptive management process that will allow the two programs to evolve over time.

10.1 INTEGRATED MONITORING AND ASSESSMENT PROGRAM

Part XVIII.A of the MRP details the annual assessment and reporting that is required as part of the annual report. The annual assessment and reporting is composed of seven parts:

1. Stormwater Control Measures
2. Effectiveness Assessment of Stormwater Control Measures
3. Non-stormwater Control Measures
4. Effectiveness Assessment of Non-stormwater Control Measures
5. Integrated Monitoring Compliance Report
6. Adaptive Management Strategies
7. Supporting Data and Information

Based on the findings of the annual assessment, revisions to the CIMP will be included as part of the Integrated Monitoring Compliance Report (IMCR), which is further outlined in **Section 11.2**, and submitted as part of the annual report.

10.2 CIMP REVISION PROCESS

Implementation of the CIMP will be used to gather data on receiving water conditions and stormwater/non-stormwater quality to assess water quality and the effectiveness of the EWMP. As part of the adaptive management process, re-evaluation of the CIMP will need to be conducted to better inform the SMB EWMP Group of ever-changing conditions of the watershed. Each program of the CIMP will be re-evaluated every two years, in line with the EWMP's adaptive management process, for the following:

- **Monitoring Site Locations**: As water quality priorities change and certain WBPCs are being address or identified, monitoring site locations may either need to be added or changed.
- **Monitoring Constituents**: Eliminate monitoring of constituents that are not detected.
- **Sampling and Testing Methods**: Modify the sampling and testing methodology as necessary based on lessons learned from previous year(s) and data analysis.
- **Monitoring Frequency**: Increase or decrease monitoring frequency based on the evaluation of RWL, WQBELs, and non-stormwater action levels.

Based on the re-evaluation, CIMP revisions will be made and submitted to the Regional Board for approval. CIMP revisions will be implemented upon approval by the Regional Board or within 60 days of submittal if the Regional Board expresses no objections.

Section 11
Reporting

Analysis and reporting of data is an integral part of verifying whether the CIMP is meeting MRP objectives. The MRP, establishes NPDES permit monitoring, reporting, and recordkeeping requirements, including those for large MS4s, based on federal Clean Water Act (CWA) section 308(a) and Code of Federal Regulations (40 CFR) sections 122.26(d)(2)(i)(F), (iii)(D), 122.41(h)-(l), 122.42(c), and 122.48. In addition, California Water Code (CWC) section 13383 authorizes the Regional Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The following sections outline the CIMP reporting process for the SMB EWMP Group.

11.1 DOCUMENTS AND RECORDS

Consistent with the Part XIV.A of the MRP requirements, the SMB EWMP Group will retain records of all monitoring information for a period of at least 3 years from the date of the sample, measurement, report, or application, including:

- Calibration data;
- Major maintenance records;
- Original lab and field data sheets;
- Original strip chart recordings for continuous monitoring instrumentations;
- Copies of reports required by the permit; and
- Records of data used to complete the application for the permit.

Records of monitoring will include:

- Date, time of sampling or measurements, exact place, weather conditions, and rainfall amount;
- Individual(s) who performed the sampling or measurements;
- Date(s) analyses were performed;
- Individual(s) who performed the analyses;
- Analytical techniques or methods used;
- Results of such analyses; and
- Data sheets showing toxicity test results.

11.1.1 Semi-Annual Analytical Data Submittal

Monitoring results data will be submitted semi-annually, as stated in Part XIV.L of the MRP. The transmitted data will be in the most recent update of the Southern California Municipal Storm Water Monitoring Coalition's (SMC) Standardized Data Transfer Formats (SDTFs) and sent electronically to the Regional Board Stormwater site to MS4stormwaterRB4@waterboards.ca.gov. The SMC SDTFs can be found at the SCCWRP web page http://www.sccwrp.org/data/DataSubmission.aspx. The submitted monitoring data will highlight the following:

- Exceedances of applicable WQBELs;
- Receiving water limitations;
- Action levels; and/or
- Aquatic toxicity thresholds for all test results, with corresponding sampling dates per receiving water monitoring station.

11.2 MONITORING REPORTS

Part XVIII.A.5, of the MRP presents the requirements of the IMCR that will be included and submitted on an annual basis as part of the Annual Report. As discussed in **Section 10**, the IMCR is one of seven parts of the Annual Assessment and Reporting.

The IMCR will include the following information as required by the MRP:

- Summary of exceedances against all applicable RWL, WQBELs, non-stormwater action levels, and aquatic toxicity thresholds for:
    - Receiving water monitoring – Wet- and dry-weather
    - Stormwater outfall monitoring
    - Non-stormwater outfall monitoring
- Summary of actions taken:
    - To address exceedances for WQBELs, non-stormwater action levels, or aquatic toxicity for stormwater and non-stormwater outfall monitoring
    - To determine whether MS4 discharges contributed to RWL exceedances and efforts taken to control the discharge causing the exceedances to the receiving water
- If aquatic toxicity was confirmed and a TIE was conducted, then identify the toxic chemicals determined by the TIE, and include all relevant data to allow the Regional Board to review the adequacy and findings of the TIE.

The IMCR will be submitted, as part of the Annual Assessment Report section of the Annual Report, to the Regional Board by December 15th of each year, for at least the duration of the Permit term. As indicated earlier, event summary reports will be attached to the IMCR.

In addition to the IMCR, the SMB EWMP Group will continue to submit the monthly SMBBB TMDL Monitoring Report.

11.3 SIGNATORY AND CERTIFICATION REQUIREMENTS

Part V.B of Attachment D of the Permit presents the Signatory and Certification Requirements and states:

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or US Environmental Protection Agency (USEPA) shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below [40 CFR section 122.41(k)(1)].
2. All applications submitted to the Regional Water Board shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer includes: (i) the chief executive officer of the agency (e.g., Mayor), or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., City Manager, Director of Public Works, City Engineer, etc.).[40 CFR section 122.22(a)(3)].
3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
    a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above [40 CFR section 122.22(b)(1)];
    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant

manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) [40 CFR section 122.22(b)(2)]; and

c. The written authorization is submitted to the Regional Water Board [40 CFR section 122.22(b)(3)].

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative [40 CFR section 122.22(c)].
5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." [40 CFR section 122.22(d)].

All required signatures and statements will be included as an attachment of the Annual Report, which will be submitted to the Regional Board by December 15th of each year, for at least the duration of the Permit term.

Section 12
Schedule for CIMP Implementation

As stated in Part IV.C.6 of the MRP, the SMB EWMP Group's CIMP implementation will initiate within 90 days after approval by the Executive Officer of the Regional Board. Monitoring of the existing twenty-four (24) SMBBB TMDL monitoring sites will continue per the CSMP schedule. Implementation of the seven CIMP monitoring sites will be initiated upon approval. Five of the sites will require installation of fixed autosamplers and appurtenances. Implementation of the CIMP may be subject to the availability and approval of construction permits from U.S. Army Corps of Engineers (Section 404 Nationwide Permit), Regional Board (Section 401 Water Quality Certification), Department of Fish and Wildlife (1602 Streambed Alteration Agreement), California Coastal Commission, California Department of Transportation, California State Parks, LACFCD, County Department of Beaches and Harbor, and other property owners It is anticipated that the permitting and installation process may take 18 months.

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Attachment A

Watershed Management Plan Area Background

Section 1
Watershed Background

The Santa Monica Bay Enhanced Watershed Management Program Group (SMB EWMP Group) is located in Los Angeles County within the Santa Monica Bay Watershed Management Area (Santa Monica Bay WMA). This attachment provides background information on the SMB EWMP Group watershed.

1.1 Watershed Management Program Area Overview

The Santa Monica Bay WMA encompasses an area of approximately 264,960 acres. The SMB EWMP Group is located within the central region of the Santa Monica Bay Watershed that drains into the Santa Monica Bay.

The total area of JG2/3 is approximately 33,967 acres. The SMB EWMP Group encompasses approximately 25,238 acres within JG2/3 of Santa Monica Bay. The remaining JG2/3 area encompasses approximately 8,729 acres and includes land owned by the California Department of Transportation (Caltrans), Chevron, El Segundo Generation Station, State of California, and the U.S. Government. These agencies/organizations are not participants of the SMB EWMP Group.

The receiving waters defined by the Basin Plan within the SMB EWMP Group include:

- Santa Monica Bay
- Santa Monica Canyon Channel
    - Rustic Canyon Creek
    - Mandeville Canyon Creek
    - Sullivan Canyon Creek
- Santa Ynez Canyon

Attachment B of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) for Los Angeles County (MS4 Permit) mapped United States Geological Survey Hydrologic Units, and other features, based on antiquated Hydrologic Unit Codes (HUC-12) watershed boundaries. In-lieu of these Permit specified boundaries, on March 26, 2014 the Regional Board Reasonable Assurance Analysis (RAA) Guidelines allows EWMP group to use HUC-12 equivalent watersheds, prepared by the Los Angeles County Flood Control District (LACFCD). Using the LACFCD HUC-12 layer and numbering conventions, the LACFCD HUC-12 boundaries, relevant to the SMB EWMP Group, and identified as follows:

- Santa Monica Beach – Frontal Santa Monica Bay (180701040403)
- Santa Monica Canyon (180701040402)
- Manhattan Beach – Frontal Santa Monica Bay (180701040500)

1.2 Participating Permittees

The SMB EWMP Group is comprised of the five participating agencies: the Cities of El Segundo, Los Angeles, and Santa Monica, the County of Los Angeles, and the LACFCD.

1.3 Geographic Boundaries

Santa Monica Bay is an integral part of the larger geographic region commonly known as the Southern California Bight (or bend in the coastline). It is bordered offshore by the Santa Monica Basin, to the north by the rocky headlands of Point Dume, and to the south by the Palos Verdes Peninsula, and onshore by the Los Angeles Coastal Plain and Santa Monica Mountains. The 264,960 acres of land that drains naturally to Santa Monica Bay is bordered on the north by the Santa Monica Mountains from the Ventura-Los Angeles County line (to the west) to Griffith Park (to the east), extending south and west across the Los Angeles Coastal Plain to include the area east of Ballona Creek and north of Baldwin Hills. South of Ballona Creek, a narrow coastal strip between Playa del Rey and the Palos Verdes Peninsula forms the southern boundary of the watershed. The Santa Monica Bay itself is the submerged portion of the Los Angeles Coastal Plain. The continental shelf extends seaward to the shelf break about 265 feet underwater, then drops steeply to the Santa Monica Basin at about 2,630 feet underwater.

Near shore Santa Monica Bay is defined by the Ocean Plan as a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot contour, whichever is further from the shoreline. Offshore is defined as the waters between the near shore zone and the limit of State Waters. Lastly, State Waters, according to Section 13200 of the California Water Code (CWC), extends three nautical miles into the Pacific Ocean from the line of mean lower low water marking the seaward limits of inland waters and three nautical miles from the line of mean lower low water on the mainland and each offshore island.

Section 2
Total Maximum Daily Load Monitoring Requirements

The Total Maximum Daily Loads (TMDLs) addressing water body-pollutant combinations within or downstream of the SMB EWMP Group include:

- Santa Monica Bay Beaches Bacteria TMDL (Wet and Dry), July 15, 2003 (SMBBB TMDL)
- Santa Monica Bay TMDL for Dichlorodiphenyltrichloroethane (DDTs) and Polychlorinated biphenyls (PCBs), March 26, 2012 (SMB DDT and PCB TMDL)
- Santa Monica Bay Nearshore and Offshore Debris TMDL, March 20, 2012 (SMB Debris TMDL)

The only approved coordinated monitoring plan for the TMDLs addressing water body-pollutant combinations within the SMB EWMP Group is the SMBBB TMDL (as will be described in **Section 2.1**). Part XIX of the MRP includes TMDL monitoring requirements, which are summarized in the following subsections below.

2.1 Santa Monica Bay Beaches Bacteria Total Maximum Daily Load

SMBBB TMDL was the first bacteria TMDL adopted by the Regional Board in the State of California. The dry-weather criterion was first adopted on January 24, 2002, and the wet-weather criterion was adopted on December 12, 2002. Both came in effect on July 15, 2003.

As this was the first bacteria TMDL, new approaches for regulating bacteria were developed. A 2-year work plan was implemented to support the TMDL, including an intensive wet-weather monitoring effort, watershed modeling, and various special studies. Based on these studies, new implementation provisions for bacteria were incorporated into the Basin Plan. The SMBBB TMDL used these new approaches, including the reference beach/antidegradation approach and the corresponding exceedance day approach to expressing TMDL allocations.

In 2012, the Regional Board put forward the *Reconsideration of Certain Technical Matters for the Santa Monica Bay Beach Bacteria TMDLs; the Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL; and the Los Angeles Harbor Inner Cabrillo Beach and Main Ship Channel Bacteria TMDL.* The reconsideration examined certain elements of the SMBBB TMDL, which is presented in **Table A-1**. Through the reconsideration process, winter dry-weather single sample allowable exceedance days were increased and modifications were made to the geometric mean calculation.

Table A-1

Summary of Reconsideration Elements for Santa Monica Bay Beach Bacteria TMDL

TMDL	Reconsideration Items [(1)]
Santa Monica Bay Beaches Dry- Weather TMDL 4 years after effective date of July 15, 2003	Re-consider TMDL to re-evaluate allowable winter dry weather exceedance days based on additional data on bacterial indicator densities in the wave wash, a reevaluation of the reference system selected to set allowable exceedance levels, and a re-evaluation of the reference year used in the calculation of allowable exceedance days.
Santa Monica Bay Beaches Wet- Weather TMDL 4 years after effective date of July 15, 2003	Refine allowable wet weather exceedance days based on additional data on bacterial indicator densities in the wave wash and an evaluation of site-specific variability in exceedance levels.
	Re-evaluate the reference system selected to set allowable exceedance levels, including a reconsideration of whether the allowable number of exceedance days should be adjusted annually dependent on the rainfall conditions and an evaluation of natural variability in exceedance levels in the reference system(s).
	Re-evaluate the reference year used in the calculation of allowable exceedance days.
	Re-evaluate whether there is a need for further clarification or revision of the geometric mean implementation provision.

1. Elements for this reconsideration are to be re-evaluated in 2018, before the final compliance deadline of 2021.

The SMBBB TMDL establishes multi-part numeric targets for total coliform, fecal coliform, and enterococcus densities, reported as bacteria counts (Most Probable Number, MPN or colony forming unit, cfu) per 100 milliliters of sample. The TMDL waste load allocation (WLA), expressed as water quality-based effluent limitations (WQBELs) for outfall discharges, are based on the Los Angeles Basin Plan objectives for body-contact recreation (REC-1) as summarized in **Table A-2.** Dry-weather WQBELs compliance was anticipated as of December 28, 2012, the effective date of the order, while wet-weather compliance is anticipated by July 15, 2021.

Table A-2

Santa Monica Bay Bacteria Total Maximum Daily Load Water Quality-Based Effluent Limitations

Constituent	Daily Maximum (MPN or colony forming unit)	Rolling 30-day Geometric Mean (MPN or colony forming unit)
Total coliform[1]	10,000/100 mL[(1)]	1,000/100 mL
Fecal coliform	400/100 mL	200/100 mL
Enterococcus	104/100 mL	35/100 mL

1. Total coliform density shall not exceed a daily maximum of 1,000/100 mL, if the ratio of fecal to total coliform exceeds 0.1.

The TMDL WLA, expressed as receiving water limitations (RWLs), are based on the Los Angeles Basin Plan objectives for body-contact recreation (REC-1) as summarized in **Table A-3**. Dry-weather WQBELs compliance was anticipated as of December 28, 2012, the effective date of the order, while wet-weather compliance is anticipated by July 15, 2021.

Table A-3

Santa Monica Bay Bacteria Total Maximum Daily Load Receiving Water Limitation

Constituent	Single Sample Limits (MPN or colony forming unit)	Rolling 30-day Geometric Mean (MPN or colony forming unit)
Total coliform	10,000/100 mL[(1)]	1,000/100 mL
Fecal coliform	400/100 mL	200/100 mL
Enterococcus	104/100 mL	35/100 mL

1. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.

Recognizing that rainfall and other natural events may cause an exceedance, the TMDL limits the number of allowed annual exceedance days. An exceedance day occurs when the average of samples taken within the preceding 30 days exceeds the geometric mean limit or when any single sample exceeds the RWL.

The interim single sample bacteria RWL schedule for wet-weather exceedance day percent reduction is presented in **Table A-4**.

Table A-4

Interim Single Sample Receiving Water Limitations Schedule

Deadline	Cumulative Percentage Reduction from the Total Exceedance Day Reductions Required for Each Jurisdictional Group as Identified in Table M-1 of the MS4 Permit
July 15, 2009	10%
July 15, 2013	25%
July 15, 2018	50%

Table A-5 presents the interim single sample bacteria RWLs for the SMB EWMP Group. Permittees in each jurisdictional group must comply with the interim for all shoreline monitoring stations within their jurisdictional area during wet-weather.

Table A-5

Interim Maximum Allowable Exceedance Days during Wet-Weather

JG	Primary Jurisdiction	Additional Responsible Jurisdiction and Agencies	Monitoring Sites	Reduction Milestone		
				10%	25%	50%
2	City of Los Angeles	City of El Segundo (Dockweiler only) City of Santa Monica County of Los Angeles	SMB 2-1 to SMB 2-15	342	324	294
3	City of Santa Monica	City of Los Angeles County of Los Angeles	SMB 3-1 SMB 3-2 SMB 3-3 SMB 3-4 SMB 3-5 SMB 3-6 SMB 3-7 SMB 3-8[#] SMB-3-9	257	237	203

[1] Interim Single Sample Bacteria Receiving Water Limitations.

[#] Monitoring locations subject to the antidegradation implementation provision in the TMDL.

Through the 2012 reconsideration process, the grouped final single sample bacteria RWLs for all monitoring stations along Santa Monica Bay, except for those monitoring stations subject to the antidegradation implementation provisions as summarized in **Table A-6**. Compliance is anticipated by July 15, 2021.

Table A-6

Annual Allowable Exceedance Days of the Single Sample Objective (days)[1]

Time Period	Daily Sampling	Weekly Sampling
Summer Dry Weather (April 1 to October 31)	0	0
Winter Dry Weather (November 1 to March 31)	3	1
Wet Weather[2] (Year-round)	17	3

1 The final receiving water limitations are group-based and shared among all MS4 Permittees located within the sub-drainage area to each beach monitoring location.

2 Wet-weather is defined as days with 0.1 inch of rain or greater and the three days following the rain event.

In addition, the 2012 reconsideration also modified the grouped final single sample bacteria RWL for beaches identified as anti-degradation beaches as summarized in **Table A-7**. These new calculations were made using monitoring data collected from 2004 to 2010.

Table A-7

Annual Allowable Exceedance Days of the Single Sample Objective (days) [1]

Monitoring Sites	Beach Monitoring Locations	Summer Dry-Weather (April 1 - October 31)		Winter Dry-Weather (November 1 - March 31)		Wet-Weather (Year-round)	
		Daily Sampling	Weekly Sampling	Daily Sampling	Weekly Sampling	Daily Sampling	Weekly Sampling
SMB 2-13	Imperial Highway storm drain	0	0	2	1	17	3
SMB 3-8	Windward Ave. storm drain at Venice Pavilion	0	0	2	1	13	2

1 The final receiving water limitations are group-based and shared among all MS4 Permittees located within the sub-drainage area to each beach monitoring location.

2.1.1 Low Flow Diversions

To comply with dry-weather flow and SMBBB TMDL dry-weather exceedances, SMB EMWP Group has installed 23 low flow diversions (LFDs), as details are listed in Error! Reference source not found. and shown in **Figure A-1** . The LFDs are operational year round and divert dry-weather flow from the storm drains to the sanitary sewer system, keeping dry-weather flows from reaching Santa Monica Bay. Once

in the sanitary sewer system, flows are treated at the Hyperion Treatment Plant (HTP) before being discharged through the 5-mile outfall, which discharges un-chlorinated secondary treated wastewater.

Table A-8

Santa Monica Bay Enhanced Watershed Management Program Group Low Flow Diversions

Name	Owner	Latitude	Longitude	Project Title
Bay Club Drive	City of Los Angeles	34.040784	-118.545169	Bay Club Drive Low Flow Diversion Project
Thronton Avenue	City of Los Angeles	33.993324	-118.475411	Thornton Avenue Low Flow Diversion Project
Palisades Park	City of Los Angeles	34.031694	-118.526400	Palisades Park Low Flow Diversion Project
Santa Monica	City of Los Angeles	34.027704	-118.518952	Santa Monica Low Flow Diversion Project
Venice Pavilion	City of Los Angeles	33.988239	-118.471236	Venice Pavilion Low Flow Diversion Project
Imperial Highways	City of Los Angeles	33.930915	-118.429173	Imperial Highway Low Flow Diversion Project
Temescal Canyon	City of Los Angeles	34.035875	-118.535386	Temescal Canyon Low Flow Diversion
Pulga Canyon	LACFCD	34.038724	-118.542464	Pulga Canyon Low Flow Diversion Project
Marques Avenue	City of Los Angeles	34.039604	-118.549626	Marquez Avenue Low Flow Diversion
Santa Ynez	LACFCD	34.039079	-118.555013	Santa Ynez Low Flow Diversion
Castlerock/Parker Canyon	LACFCD	34.041694	-118.567516	Castlerock/Parker Canyon Low Flow Diversion
Rose Avenue	LACFCD	33.998155	-118.474197	Rose Ave. Low Flow Diversion
Ashland Avenue	LACFCD	33.998087	-118.484046	Ashland Ave. Low Flow Diversion
Brooks Avenue	LACFCD	33.992216	-118.474245	Brooks Ave. Low Flow Diversion
Playa del Rey	LACFCD	33.957210	-118.450879	Playa del Rey Low Flow Diversion
North Westchester	LACFCD	33.945531	-118.442492	North Westchester Low Flow Diversion
Santa Monica	City of Santa Monica	34.009925	-118.496375	Santa Monica Pier Low Flow Diversion
Wilshire Boulevard	City of Santa Monica	34.016712	-118.502077	Wilshire Blvd Low Flow Diversion
Montana Avenue	City of Santa Monica	34.021984	-118.507841	Montana Ave. Low Flow Diversion
Pico-Kenter (SMURFF)	City of Santa Monica	34.006439	-118.491889	Pico-Kenter (SMURRF)
Imperial Highway	LACFCD	33.930892	-118.434895	Imperial Highway Low Flow Diversion Project
Arena Pump Plant	LACFCD	33.916390	-118.414636	Arena Pump Plant
El Segundo Pump Plant	LACFCD	33.918549	-118.404877	El Segundo Pump Plant

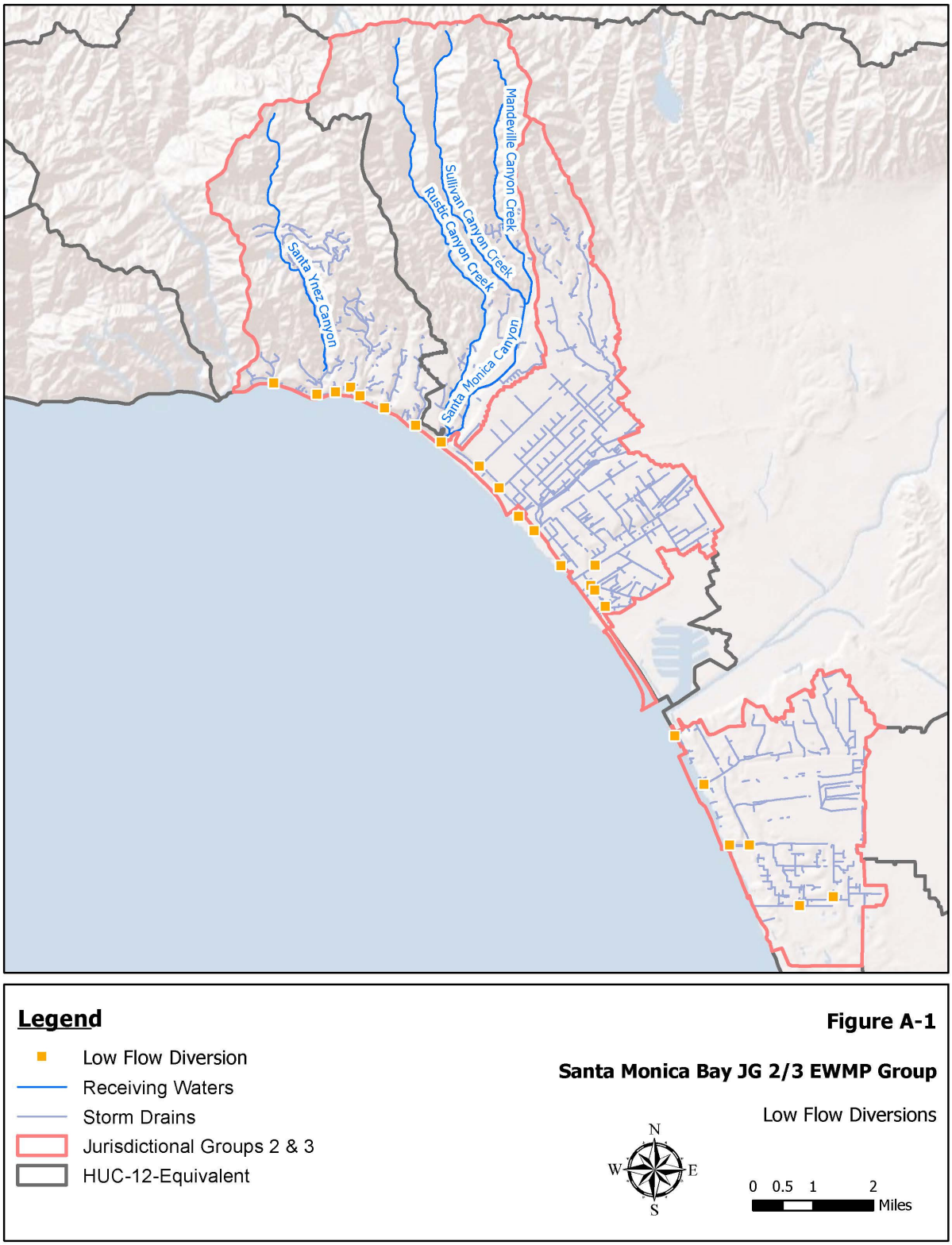


Figure A-1
Low Flow Diversions

Since the installation of the LFDs, data from the tested samples for the Santa Monica Bay Beaches Bacteria Total Maximum Daily Loads (SMBBB TMDL) monitoring sites show a significant improvement in dry weather water quality, due to elimination of MS4 discharge into Santa Monica Bay. This in turn, resulted in a significant decrease in dry weather exceedances and beach closures. One example of this was from the Marquez LFD. The facility started operation on April 1, 2007 and continued to operate until October 31, 2007. During this period the facility was periodically inspected to ensure proper operation. The data from the tested samples at the site show a marked improvement in water quality, due to the fact there was only one exceedance during testing period. Also, the geometric means for the three indicators are at, or near, the lower detection limits for these samples (10 MPN/100 mL). The data for the tests conducted during the dry-weather period indicates that the construction/installation of the Marquez LFD has reduced the exceedance days in Santa Monica Bay.

Heal the Bay has also noted in their Beach Report Card for 2006-2007 that, as a result of the SMB EWMP Groups LFD projects and other initiatives, *"Stretches of beach with good water quality included all of Will Rogers State Beach, including Santa Monica Canyon. Clean water for all two miles of Will Rogers State Beach was a first in Beach Report Card history - a testament to Los Angeles City and County runoff diversions and the tougher summer beach water quality regulations."* LFDs within SMB EWMP Group area have helped to clean up waterways by treating polluted dry-weather runoff before it reaches beaches and ultimately Santa Monica Bay. Comparison graphs of the Heal the Bay Beach Report Cards for 2008-2013and the current 2013-2014 Beach Report Cards are also included in **Appendix A**.

Currently, pilot testing is being conducted to improve telemetry capabilities, optimize operation and maintenance, and minimize downtime of the LFDs, in addition to enhancing some of the LFDs at existing locations.

No dry-weather receiving water monitoring in the Santa Monica Bay is being proposed as the existing LFDs divert all dry-weather flows from entering the Bay.

2.2 Santa Monica Bay Dichlorodiphenyl-trichloro-ethene and Polychlorinated Biphenyls Total Maximum Daily Loads

The SMB DDTs and PCBs TMDLs are regulated for Santa Monica Bay from Point Dume to Point Vicente, and the Palos Verdes shelf from Point Vicente to Point Fermin. As the TMDL originates through the United States Environmental Protection Agency (USEPA). Within the Permit, the WLA targets are stated in **Table A-9**, which is expressed as an annual loading of pollutants to Santa Monica Bay.

Table A-9

Santa Monica Bay DDTs and PCBs Total Maximum Daily Load Waste Load Allocations Targets

Constituent	Annual Mass-Based WLA (g/yr)[1]
DDT	27.08
PCBs	140.25

1 Compliance shall be determined based on a three-year averaging period.

SMB DDT and PCB TMDL will be fulfilled at the receiving water monitoring site RW-SMB-2. It is proposed that three wet-weather sampling events be conducted to evaluate the annual WLA of DDT and PCB for SMB EWMP Group based on the three (3) year average loading.

2.3 Santa Monica Bay Debris Total Maximum Daily Loads

Compliance with the SMB Debris TMDL is based on the final Numeric Target, WLA, and Load Allocation (LA), which are defined as zero trash in and on the shorelines of Santa Monica Bay, and no plastic pellets discharged from plastic manufacturers and facilities. The compliance deadline is to be achieved no later than March 20, 2020, and every year thereafter. If a Permittee adopts local ordinances to ban plastic bags, smoking in public places, and single-use expanded polystyrene food packaging by November 4, 2013, the final compliance deadline will be extended to March 20, 2023. The SMB Debris TMDL compliance is assessed in accordance with the Permittees' implementation of BMP to address point and non-point source trash and plastic pellet abatement, and attainment of the progressive trash reductions in accordance with the TMDL compliance schedule as shown in **Table A-10**.

Table A-10

Santa Monica Bay Debris Total Maximum Daily Load Compliance Schedule

Permittees	Baseline[1]	March 20, 2016	March 20, 2017	March 20, 2018	March 20, 2019	March 20, 2020[2]
		Annual Trash Discharge (gals/yr)				
County of LA	5,138	4,110	3,083	2,055	1,028	0
El Segundo	2,732	2,186	1,639	1,093	546	0
Los Angeles	25,112	20,090	15,067	10,045	5,022	0
Santa Monica	5,672	4,537	3,403	2,269	1,134	0

1 If a Permittee elects not to use the default baseline, then the Permittee shall include a plan to establish a site specific trash baseline in their TMRP.

2 Permittees shall achieve their final effluent limitation of zero trash discharge for the 2019-2020 storm year and every year thereafter.

Permittees are to report compliance strategy through the development of a Trash Monitoring and Reporting Plan (TMRP) and Plastic Pellets Monitoring and Reporting Plan (PMRP), or demonstrate that a PMRP is not required, to be approved by the Regional Board. Once the TMRP and PMRP are approved and adopted, a progress report based on installation of structural BMPs, such as full capture or partial capture systems, institutional controls, or any BMPs, is to be reported in order to calculate the reduction in the amount of trash and plastic pellets, if applicable, being discharged into Santa Monica Bay.

To fulfill these requirements each of the jurisdictions within SMB EWMP Group will submit or have already submitted a TMRP and PMRP, as summarized in **Section 2.2.4** All submitted TMRPs and PMRPs for each jurisdiction will be implemented by the corresponding jurisdiction, once approved by the Regional Board. As the SMB Debris TMDL is fulfilled through the implementation of BMPs to achieve compliance of zero trash in and on the shorelines of Santa Monica Bay, monitoring is not required if complying with the WLA. Manufacturers of plastic pellets were not identified within any of the SMB EWMP Group's jurisdictional area, and monitoring for plastic pellets at the MS4 is not required. Appropriate actions for emergency spills and special circumstances for safety considerations are addressed for each jurisdiction.

Section 3
Existing Watershed Monitoring Programs

Existing watershed monitoring programs provide historical data and identification of constituents for monitoring. The following subsections briefly describe significant existing and historical monitoring programs relevant to the SMB EWMP Group.

3.1 MS4 Permit Monitoring

MS4 Permit monitoring within SMB EMWP Group area consist of the following:

- Los Angeles World Airport Storm Water Monitoring Program
- Santa Monica Urban Runoff Recycling Facility Monitoring

3.1.1 Los Angeles World Airport Storm Water Monitoring Program

Under the NPDES General Industrial Stormwater Permit, the Los Angeles World Airports (LAWA) implemented an airport-wide Storm Water Pollution Preventon Plan (SWPPP) as mandated by the Federal, State, and local stormwater regulations. The goal of the SWPPP is to identify and eliminate the sources of pollutants associated with industrial and construction activities that may affect the quality of stormwater discharges and authorized NSW discharges from the facility, and to identify and implement site-specific BMPs to reduce or prevent pollutants associated with industrial and construction activities in stormwater discharges and authorized NSW discharges. To maintain compliance with LAWA permitted discharge operations, the following are regularly performed:

- Conduct regular stormwater compliance inspections of all airport tenants' facilities;
- Document airport chemical spills, release responses and notifications, and monitor and document wet and dry season airport industrial discharge activities;
- Prepare and provide annual reports to the Regional Board, and prepare and update SWPPPs; and
- Conduct annual stormwater compliance training on SWPPP requirements and BMPs to LAWA and airport tenant personnel.

Surface water runoff at Los Angeles International Airport (LAX) is collected in catch basins and drainage ditches throughout the airport. The runoff flows through an underground storm sewer system, which is owned and operated by LAWA, and discharges into one of three main stormwater conveyances: Argo Storm Drain, Dominguez Channel, or the Imperial (County) Storm Drain. The Argo and Imperial storm drains discharge directly to Santa Monica Bay.

To monitor the surface water runoff at LAX, a Storm Water Monitoring Program Plan (SWMPP) was developed and implemented prior to January 1, 1993. The objectives of the monitoring program include:

- Monitoring the quality of stormwater discharges;
- Evaluating the effectiveness of on-site conditions and practices that control the discharge of pollutants to stormwater;
- Aiding in the implementation of the SWPPP; and

- Measuring the effectiveness of BMPs implemented to remove or prevent potential pollutants from entering stormwater.

In order to document the elimination or reduction of pollutants as required in the SWPPP, the following elements of a stormwater monitoring program were implemented:

- Document annual comprehensive site compliance evaluation;
- Perform quarterly visual observations for the presence of NSW discharges during dry-weather conditions;
- Conduct visual observations from one storm per month, to be performed during the first hour of discharge at all discharge locations during the wet season (October 1 - May 31);
- Collect and analyze stormwater samples during the first hour of discharge from (1) the first storm event of the wet season and (2) at least one other storm event in the wet season. If samples are not collected from the first storm event of the wet season, two other storms are required to be sampled during the remainder of the wet season; and

Submit an annual report by July 1 of each year to the Regional Board Note - annual LAX rainfall data is published by the National Oceanic Atmospheric Agency (NOAA)). **Figure A-2** illustrates the locations of the monitored sampling sites at LAX.

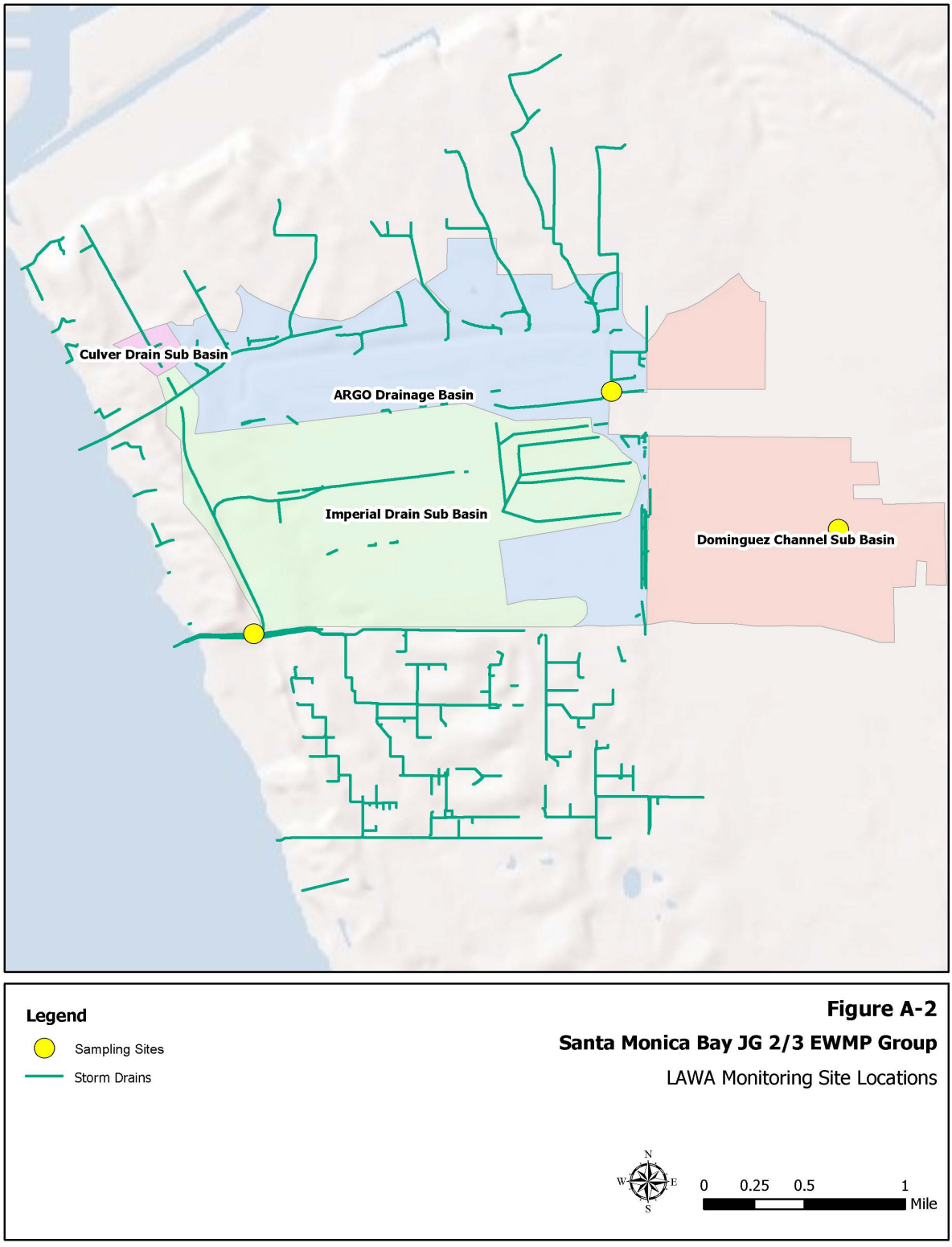


Figure A-2
LAWA Monitoring Site Locations

3.1.2 Santa Monica Urban Runoff Recycling Facility Monitoring

The primary objective of the Santa Monica Urban Runoff Recycling Facility (SMURRF) is to capture and eliminate pollution to Santa Monica Bay caused by dry-weather urban runoff and low precipitation storm events. SMURFF diverts and treats all dry-weather urban runoff (from excessive irrigation, spills, construction sites, pool draining, car washing, the washing down of paved areas, and some initial wet-weather runoff) and low precipitation storm events, that was previously discharged into Santa Monica Bay through storm drain outlets and releasing pollutants such as litter, oil, and animal waste.

The SMURFF project is a joint venture of the City of Los Angeles and the City of Santa Monica. The SMURFF has a treatment design capacity of approximately 500,000 gallons per day (gpd) and currently treats approximately 175,000 to 225,000 gpd of urban runoff generated in parts of the City of Los Angeles and the City of Santa Monica. The urban runoff is diverted from the two cities' two main storm drains (Santa Monica Pier and Pico-Kenter) into the SMURRF, whereby pollutants such as trash, sediment, oil, grease, and pathogens are removed and prevented from entering into Santa Monica Bay. The main treatment processes include:

- Coarse and fine screening to remove trash and debris;
- Dissolved air flotation to remove oil and grease;
- Degritting systems to remove sand and grit;
- Micro-filtration to remove turbidity;
- Ultra-violet (UV) radiation to kill pathogens; and
- Chlorination.

Once treated, the effluent meets the water quality standards for landscaping, irrigation application, and dual-plumbed systems (buildings plumbed to accept recycled water for the flushing of toilets) as prescribed by the California Department of Health (CDPH). The treated water must meet all of California's Title 22 requirements.

Landscape irrigation customers include Caltrans highway landscaping along the Santa Monica Freeway, City of Santa Monica parks, the Woodlawn Cemetery, RAND Corporation, Olympic Boulevard median landscaping, and public school grounds. Dual-plumbed customers include the City of Santa Monica's Public Safety Facility and the Water Garden located at Olympic Boulevard and Cloverfield Boulevard.

SMURRF sampling occurs at the influent, incoming dry-weather urban runoff (prior to water treatment), and the effluent, post-treated water, sampling points. The samples are analyzed for fecal coliform, total coliform, general minerals, metals, nutrients, PCBs, pesticides, semi-volatile organic compounds (SVOCs), turbidity, and volatile organic compounds (VOCs).

3.2 Regional Monitoring Programs

Regional Monitoring Programs within the SMB EWMP Group area consists of the following programs:

- Hyperion NPDES Permit Monitoring;
- Surface Water Ambient Monitoring Program; and
- Bight Regional Monitoring

Details for each monitoring program are provided in the following sections.

3.2.1 Hyperion NPDES Permit Monitoring

The HTP, located in Playa Del Rey, discharges advanced secondary treated wastewater through two outfalls located one (1) mile and five (5) miles from the Santa Monica Bay shoreline. The one-mile outfall discharges intermittent chlorinated secondary wastewater, except during emergencies such as intense storms or power outages. The five-mile discharges un-chlorinated advanced secondary treated wastewater on a daily basis. As part of the waste discharge requirements (WDRs) of Order No. R4-2010-0200, the City of Los Angeles must monitor influent and effluent concentrations, as well as 11 inshore stations and 21 offshore stations, each with four depths. Monitoring of inshore stations consists of annual (summer) sampling at a distance of 1,000 feet from the shoreline (or at the 30-foot depth contour, whichever is further from shore) of total coliform, fecal coliform, and enterococcus. The location of inshore monitoring sites within SMB EWMP Group Area is shown in **Figure A-3**.

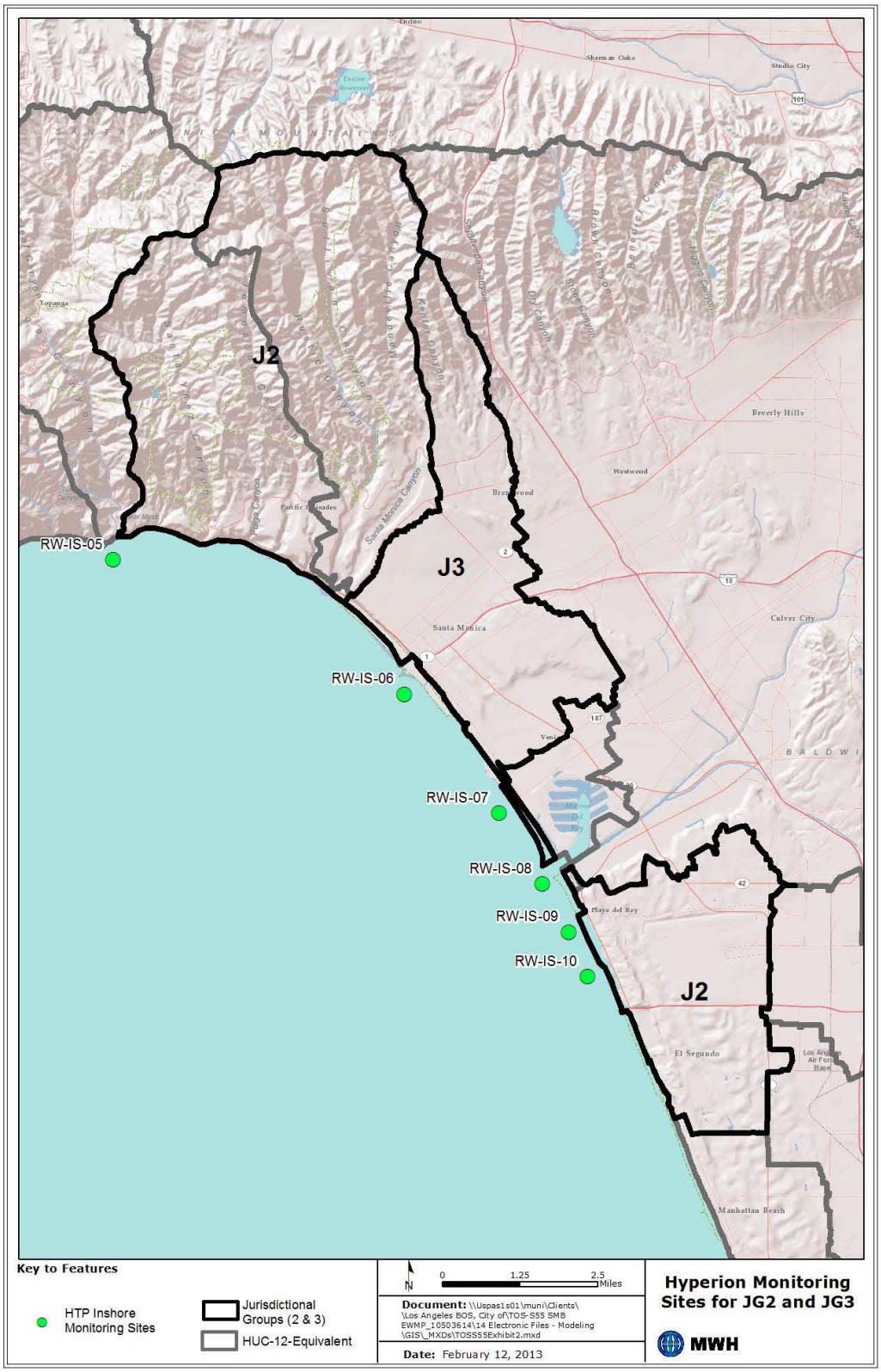


Figure A-3
Hyperion Monitoring Sites for JG2 and JG3

3.2.2 Surface Water Ambient Monitoring Program

The Surface Water Ambient Monitoring Program (SWAMP) is a statewide monitoring program, conducted by the State Water Resources Control Board (SWRCB) and Regional Boards in order to evaluate the quality of California's water resources. SWAMP monitoring was conducted by the Los Angeles Regional Board in 2003-2004 for the Santa Monica Bay WMA. Fifty-nine (59) sites within the Santa Monica Bay WMA and nine (9) within the SMB EWMP Group area were each sampled twice for a suite of parameters (one in March of 2003 and one in February of 2004). The weather conditions (wet or dry) at the time of sampling were not available from the data source. The samples were analyzed for the following constituents:

- Conductivity
- Dissolved Oxygen (DO)
- pH
- Salinity
- Temperature
- Turbidity
- Velocity
- Alkalinity
- Ammonia-N
- Boron
- Chloride
- Chlorophyll a
- Fluoride
- Hardness
- Nitrate-N
- Nitrite-N
- Orthophosphate
- Sulfate
- Total Dissolved Solids (TDS)
- Total Kjeldahl Nitrogen(TKN)
- Total Phosphorous (P)
- Bacteriology
- Orthophosphate
- Sulfate

SWAMP monitoring locations for 2003-2004 within the SMB EWMP Group area are shown on **Figure A-4**. Results from the data analysis show that constituents within the SMB EWMP Group area were below applicable WQOs, with the exception of one exceedance of RWL for pH.

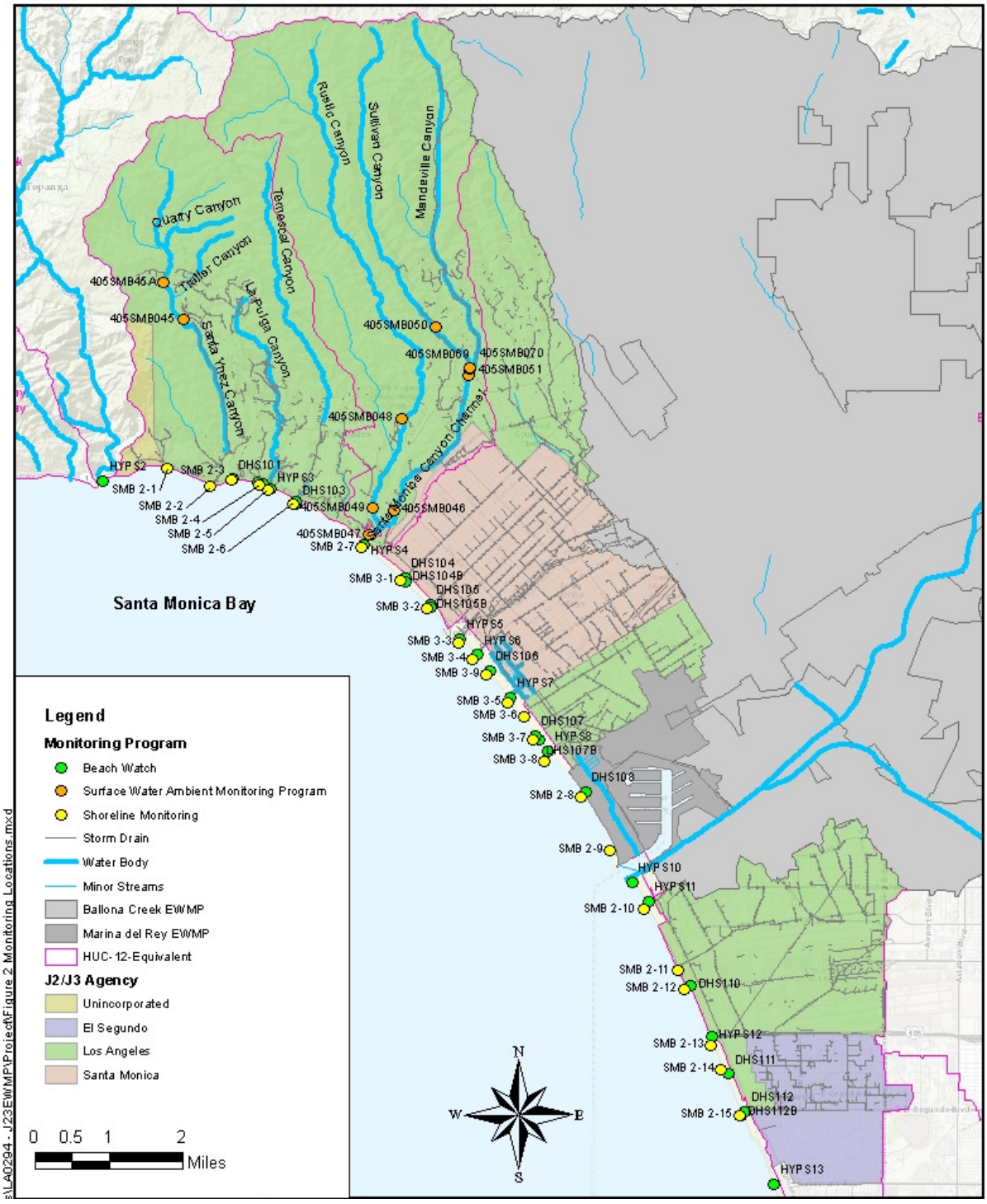


Figure A-4

Existing Monitoring Locations within Santa Monica Bay EWMP Group Area

3.2.3 Bight Regional Monitoring

A regional monitoring program to assess the health of the Southern California Bight has been coordinated through Southern California Coastal Water Research Project (SCCWRP) at five-year intervals including 1994, 1998, 2003, 2008, and 2013. The Bight Regional Monitoring programs include:

- Coastal Ecology
- Shoreline Microbiology
- Offshore Water Quality
- Rocky Reef
- Areas of Special Biological Significance (ASBS)
- Coastal Wetlands and Estuaries

Through these programs, the SCCWRP has been able to conduct a regional assessment of the cumulative impacts from multiple sources. Past sampling (1994 – 2008) was conducted at the sites shown in **Figure A-5** and the current sampling locations are shown in **Figure A-6**. The monitoring site were analyzed for trace metals, Polychlorinated biphenyls (PCBs), Polycyclic aromatic hydrocarbons (PAHs), Poly Brominated Diphenyl Ethers, chlorinated hydrocarbons, total organic carbon (TOC), nitrogen, phosphorus, and grain size.

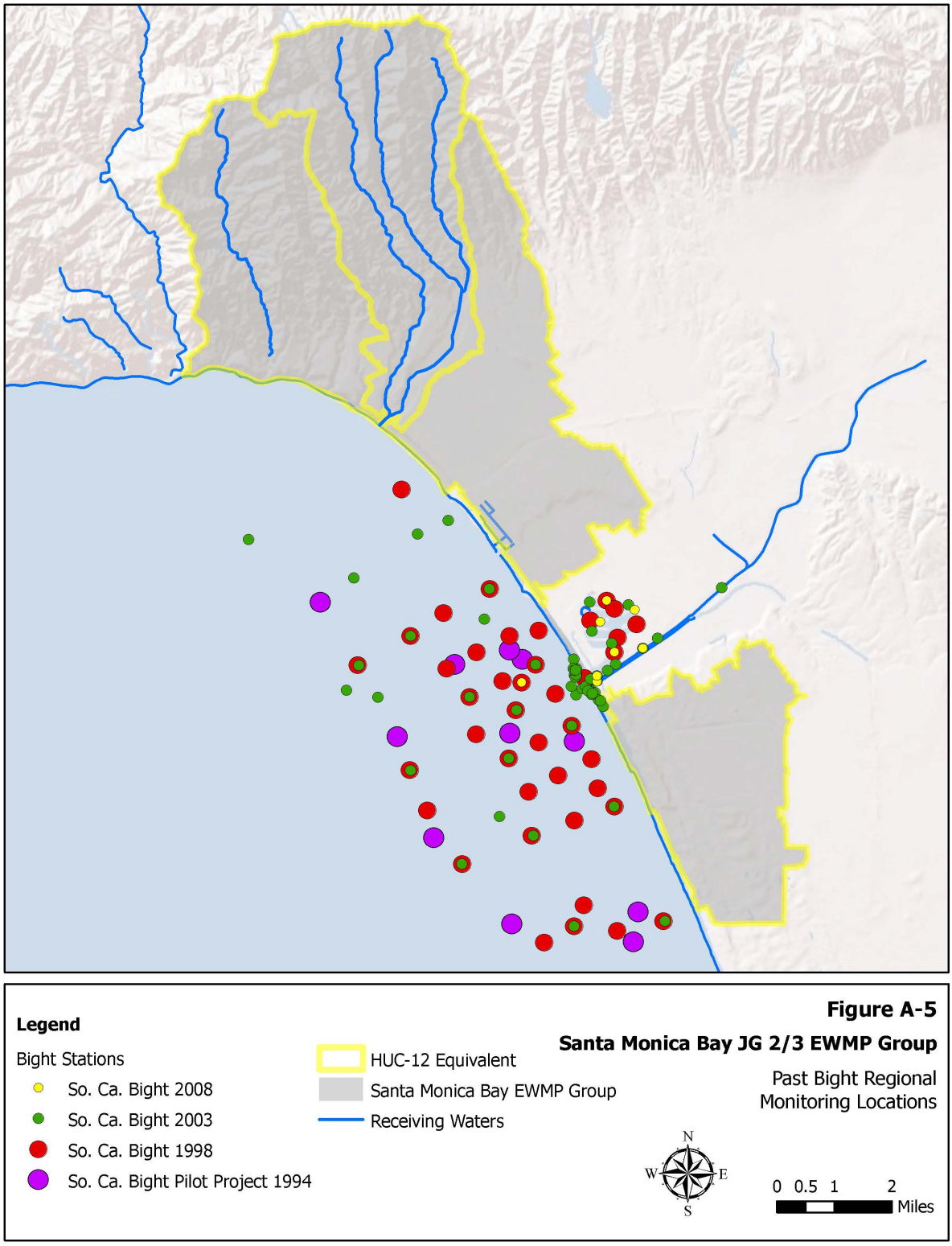


Figure A-5
Past Bight Regional Monitoring Locations

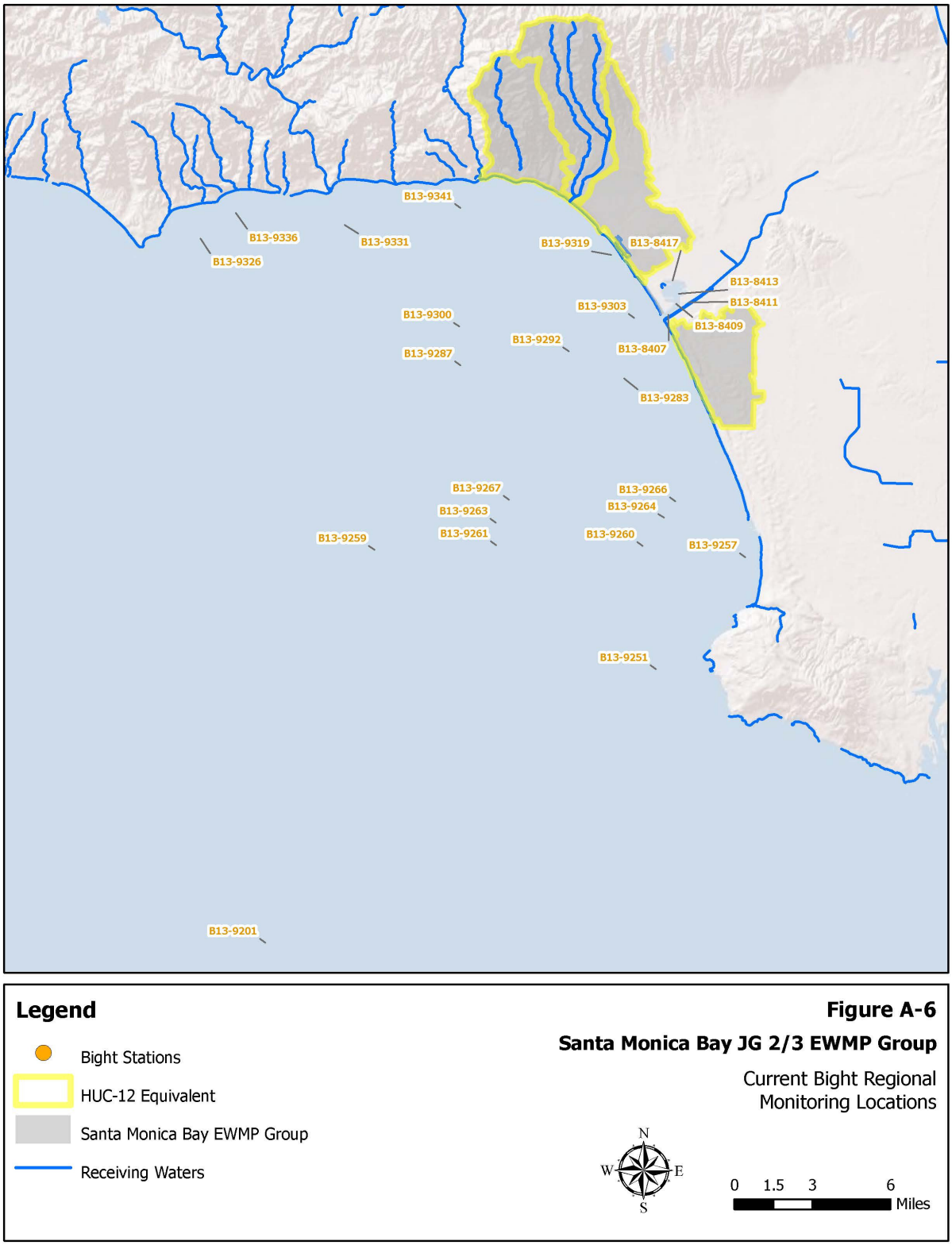


Figure A-6
Current Bight Regional Monitoring Locations

3.3 Existing Total Maximum Daily Load Monitoring Programs

The existing TMDL monitoring program within SMB EWMP Group that is currently being implemented is the Santa Monica Bay MS4 Coordinated Shoreline Monitoring. The monitoring program is detailed in the section below and presented in **Figure A-7**.

3.3.1 Santa Monica Bay MS4 Coordinated Shoreline Monitoring

The Santa Monica Bay beaches were designated as impaired and included on California's 1998 Clean Water ACT (CWA) §303(d) list of impaired waters due to excessive amounts of coliform bacteria. The presence of coliform bacteria in surface waters is an indicator that water quality may not be sufficient to maintain the beneficial use of these waters for human body contact recreation (REC-1). In 2003, the USEPA approved the SMBBB TMDL for dry- and wet-weather conditions. To comply with the requirements of the TMDL, the Jurisdictional Groups developed a Coordinated Shoreline Monitoring Plan (CSMP) and began monitoring compliance sites on November 1, 2004 subsequent to Regional Board approval.

The TMDL prescribed numeric limits for total coliform density, fecal coliform/*E. coli* density, and Enterococcus density, are shown in **Table A-2**. Within SMB EWMP Group, a total of 24 shoreline monitoring sites, as shown in **Figure A-7** and detailed in **Table A-11**, are monitored for bacteria. Results from the shoreline monitoring are shared with the Southern California Coastal Water Research Project's (SCCWRP's) Beach Watch program.

Table A-11

Santa Monica Bay Beaches Bacteria TMDL Monitoring Sites

Site ID	JG	Type	LFD	Description
SMB-2-1	2	Point Zero	Yes	Castlerock (Parker Mesa)storm drain
SMB-2-2	2	Point Zero	Yes	Santa Ynez storm drain
SMB-2-3	2	Open Beach	No	Will Rogers State Beach, ¼ mile east of Gladstone's restaurant (DHS101)
SMB-2-4	2	Point Zero	Yes	Pulga storm drain (S3)
SMB-2-5	2	Point Zero	Yes	Bay Club Storm drain in front of the Bel Air Bay Club (DHS102)
SMB-2-6	2	Point Zero	Yes	Temescal Canyon storm drain(DHS103)
SMB-2-7	2	Point Zero	Yes	Santa Monica Canyon
SMB-2-8	2	Open Beach	No	Venice Beach, 50 yards south of the pier (DHS108)
SMB-2-9	2	Open Beach	No	Venice Beach at Topsail Street(DHS109)
SMB-2-10	2	Point Zero	Yes	Culver storm drain (S11)
SMB-2-11	2	Point Zero	Yes	North Westchester storm drain
SMB-2-12	2	Open Beach	No	Dockweiler Beach at World Way (DHS110)
SMB-2-13	2	Point Zero	Yes	Imperial storm drain (S12)
SMB-2-14	2	Open Beach	No	Dockweiler Beach opposite the HTP (DHS111)
SMB-2-15	2	Point Zero	Yes	Dockweiler Beach, at the wav ewash of Grand Avenue storm drain outlet (DHS112)
SMB-3-1	3	Point Zero	Yes	Montana storm drain (DHS104)
SMB-3-2	3	Point Zero	Yes	Wilshire storm drain (DHS105)
SMB-3-3	3	Point Zero	Yes	Santa Monica Pier storm drain(S5)

Site ID	JG	Type	LFD	Description
SMB-3-4	3	Point Zero	Yes	Pico-Kenter storm drain (S6)
SMB-3-5	3	Point Zero	Yes	Ashland storm drain (S7)
SMB-3-6	3	Point Zero	Yes	Rose storm drain
SMB-3-7	3	Point Zero	Yes	Brooks storm drain (DHS107)
SMB-3-8	3	Point Zero	Yes	Windward storm drain (S8)
SMB-3-9	3	Open Beach	No	Santa Monica Beach at Strand Street (DHS106)

Previous Santa Monica Bay storm drain identification from the SMBBB TMDL monitoring have identified and provided an inventory of existing outfalls. These monitoring sites attribute a significant amount of historical bacteria data. Although, the SMB EWMP Group considers the shoreline monitoring sites provide a representative characterization of the surf zone area to assess the health risk for bathing, swimming and beach notification, the shoreline monitoring sites may not accurately represent the overall impact of the MS4 onto Santa Monica Bay due to the close proximity of the outfalls. Therefore, additional monitoring sites were considered for the CIMP's Santa Monica Bay receiving water monitoring.

3.3.3 Summary of TMDL Compliance Points

Within SMB EWMP Group area, TMDLs have only been identified in Santa Monica Bay. For TMDL monitoring compliance, the existing 24 shoreline monitoring sites for the SMBBB TMDL will continue to be sampled, and one new monitoring site will be sampled to comply with the SMB DDT and PCB TMDL, (shown as the triangle), as shown in **Figure A-7**.

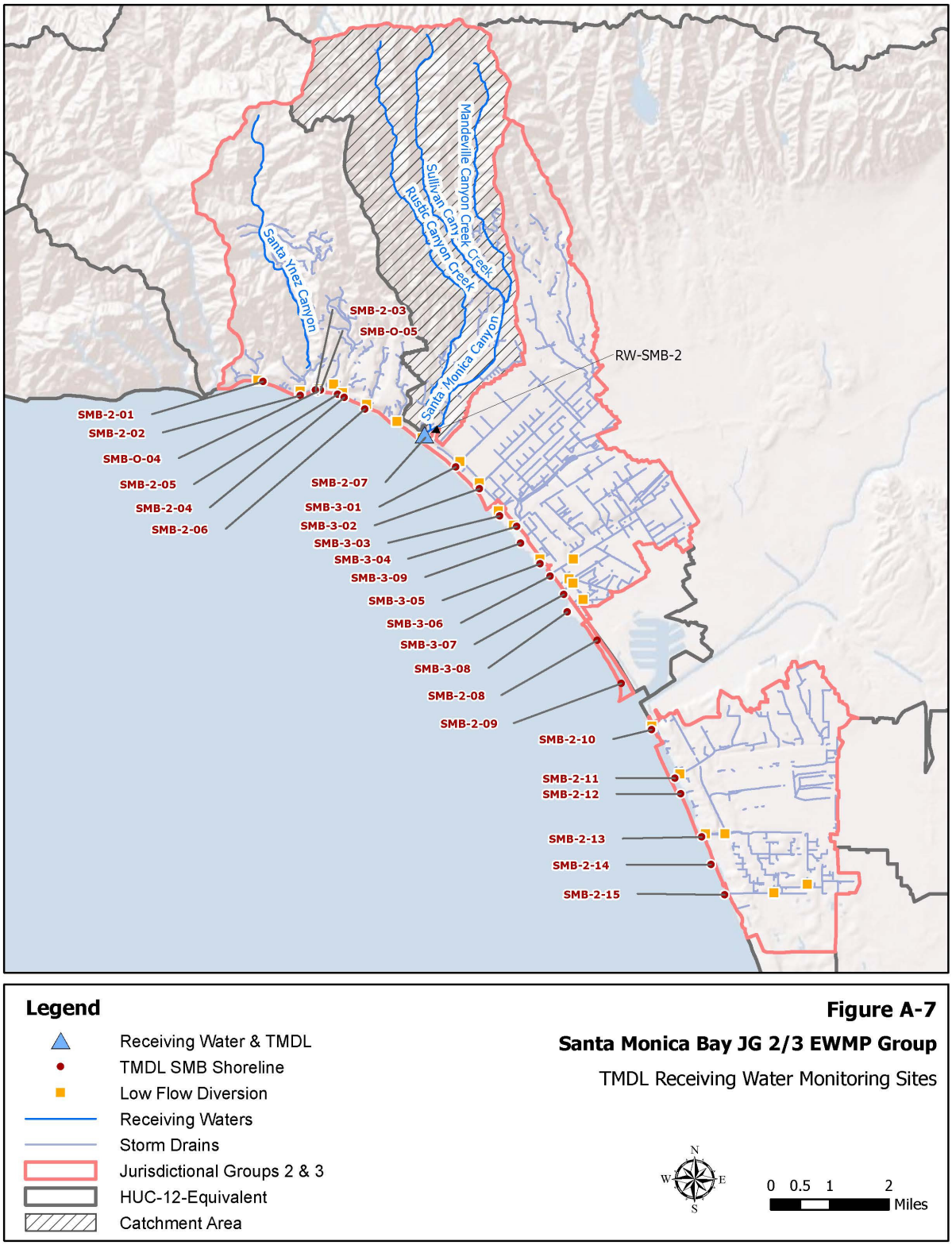


Figure A-7

TMDL Receiving Water Monitoring Sites

Section 4
Water Quality Priorities and Supporting Information for Monitoring to Address Priorities

In accordance with the Permit Section IV.C.5(a), water quality priorities have been established for the EWMP. The water quality priorities identified provide the basis for prioritizing project implementation; selecting and scheduling BMPs; and focusing monitoring activities developed in the CIMP. The identification of water quality priorities is an important first step in the EWMP process. Water quality priorities are defined for individual constituents within a specific water body, termed as water body-pollutant combinations (WBPCs). Categories of the WBPCs are defined in the Permit are the following and are summarized in the subsections below:

- Category 1 WBPC Subject to TMDL
- Category 2 WBPC on 2010 303(d) List
- Category 3 WBPC with RWL Exceedances

Priorities are assigned to the WBPCs based on the categorization. The water quality priorities will provide the basis for prioritizing implementation activities within the EWMP, and the selection and scheduling of BMPs in the RAA.

4.1 Category 1 Water Body-Pollutant Combinations Subject to TMDL

WBPCs under Category 1 (highest priority) are defined in the Permit as "water body-pollutant combinations for which water quality-based effluent limitations and/or receiving water limitations are established in Part VI.E and Attachments L through R *[*of *the Permit]*." **Table A-12** presents the Category 1 WBPCs for SMB EWMP Group.

Table A-12

Category 1 Water Body Pollutant Prioritization

Category	Water Body	Pollutant	Compliance Deadline
1	SMB Beaches	Summer dry weather bacteria	7/15/2006 (Final: Single sample summer AEDs)
	SMB Beaches	Wet weather bacteria	7/15/2009 (Interim: 10% single sample ED reduction)
			7/15/2013 (interim: 25% single sample ED reduction)
			7/15/2018 (Interim: 50% single sample ED reduction)
			7/15/2021 (Final: Single sample AED)
			7/15/2021 (Final: Geometric Mean [GM])
	SMB Beaches	Winter dry weather bacteria	11/1/2009 (Final: Single sample winter AEDs met)[1]
	SMB Offshore/ Nearshore	Debris	3/20/2016 (20% load reduction)
			3/20/2017 (40% load reduction)
			3/20/2018 (60% load reduction)
			3/20/2019 (80% load reduction)
			3/20/2020 (100% load reduction)
	SMB	DDTs	[Compliance schedule to be developed through the EWMP][2]
	SMB	PCBs	[Compliance schedule to be developed through the EWMP][2]

[1] Compliance date per 2013 reopened TMDL, which is not yet effective (i.e., USEPA and Office of Administrative Law approval is pending).

[2] Although the TMDL lacks a formal compliance schedule for the WQBEL, the TMDL Executive Summary does state, "The time frame for attainment of the TMDL targets for the rest of Santa Monica Bay (other than the Palos Verdes shelf) is 11 years for DDT and 22 years for PCBs."

4.2 Category 2 Water Body-Pollutant Combinations on 2010 303(d) List

Category 2 (high priority) WBPCs are defined as "pollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) and for which MS4 discharges may be causing or contributing to the impairment." **Table A-13** presents the Category 2 WBPCs for SMB EWMP Group.

Table A-13

Category 2 Water Body Pollutant Prioritization

Category	Water Body	Pollutant	Compliance Deadline
2	Santa Monica Canyon Channel	Lead	Not Applicable
	Santa Monica Canyon Channel	Indicator bacteria	Not Applicable

4.3 Category 3 Water Body-Pollutant Combinations with RWL Exceedances

Category 3 (Medium Priority) designations are to be applied to WBPCs that are not 303(d)-listed, but which exceed applicable receiving water limitations contained in the Permit, and for which MS4 discharges may be causing or contributing to the exceedance.

As part of the SWAMP, locations were each sampled twice for a suite of parameters (one in March of 2003 and one in February of 2004). The weather conditions (wet or dry) at the time of sampling were not available from the data source. An analysis of available freshwater monitoring data for the sites showed one exceedance of the receiving water limits for pH (value not between 6.5 and 8.5 pH units) at each of four monitoring locations between 2003 and 2004. Additionally, based on available data, exceedances of the *E. coli* freshwater daily maximum objective of 235 MPN/100mL at sites with an existing or intermittent REC-1 beneficial use were measured at three monitoring locations between 2003 and 2004 (SWAMP). Exceedances of the fecal coliform freshwater objective of 400 MPN/100mL applicable to sites with an existing or intermittent REC-1 beneficial use and 4,000 MPN/100mL applicable to sites with an existing or intermittent REC-2 beneficial use were measured at four monitoring locations between 2003 and 2004 (SWAMP).

Given both the limited amount of data available and the fact that such data was collected more than ten years ago, pH, E. coli, and fecal coliform will not be considered Category 3 pollutants. Furthermore, two samples are considered insufficient to characterize the water bodies. Future monitoring under the CIMP will help determine if the SMB EWMP will need to be revised to include these, or other parameters for specific water bodies. Category 3 WBPCs will be identified based on data collected as part of the approved CIMP.

4.4 Water Qualities Priorities Summary

The water quality prioritization process of the Permit determines the water body-pollutant combinations (WBPCs) that will be addressed within the EWMP area. The permit defines several categories of WBPCs to be used:

- **Category 1** are those subject to an established TMDL;
- **Category 2** are those on the State Water Resources Control Board (SWRCB) 2010 CWA Section 303(d) list or those constituents that have sufficient exceedances to be listed; and
- **Category 3** for those with observed exceedances but too infrequent to be listed. The outcome of the preliminary water quality prioritization is summarized in **Table A-14**. WBPCs are listed in order of compliance deadline with interim and final deadlines included.

Table A-14

Water Body-Pollutant Prioritization

Category	Water Body	Pollutant	Compliance Deadline
1	SMB Beaches	Summer dry weather bacteria	7/15/2006 (Final: Single sample summer AEDs met)
	SMB Beaches	Wet weather bacteria	7/15/2009 (Interim: 10% single sample ED reduction)
			7/15/2013 (interim: 25% single sample ED reduction)
			7/15/2018 (Interim: 50% single sample ED reduction)
			7/15/2021 (Final: Single sample AED)
			7/15/2021 (Final: Geometric Mean [GM])
	SMB Beaches	Winter dry weather bacteria	11/1/2009 (Final: Single sample winter AEDs)[1]
	SMB Offshore/ Nearshore	Debris	3/20/2016 (20% load reduction)
			3/20/2017 (40% load reduction)
			3/20/2018 (60% load reduction)
			3/20/2019 (80% load reduction)
			3/20/2020 (100% load reduction)
	SMB	DDTs	[Compliance schedule to be developed through the EWMP][2]
	SMB	PCBs	[Compliance schedule to be developed through the EWMP][2]
2	Santa Monica Canyon Channel	Lead	NA
	Santa Monica Canyon Channel	Indicator bacteria	NA
3	None	None	None

[1] Compliance date per 2013 reopened TMDL, which is not yet effective (i.e., USEPA and Office of Administrative Law approval is pending).

[2] Although the TMDL lacks a formal compliance schedule for the WQBEL, the TMDL Executive Summary does state, "The time frame for attainment of the TMDL targets for the rest of Santa Monica Bay (other than the Palos Verdes shelf) is 11 years for DDT and 22 years for PCBs."

Attachment B

Monitoring Location Fact Sheets

Section 1
Receiving Water Sites

As presented in **Section 3** of the CIMP, receiving water monitoring will be conducted in Santa Monica Bay and Santa Monica Canyon Channel.

1.1 Overview of Sites and Justification

Three receiving water monitoring sites are chosen, two within Santa Monica Bay and one within Santa Monica Canyon Channel. Previously monitored SMBBB TMDL monitoring sites will remain and utilized in accordance to the approved Coordinated Shoreline Monitoring Plan (CSMP).

1.1.1 Santa Monica Bay (RW-SMB-1)

RW-SMB-1 will be located at the point of initial mixing and will be dependent on the intensity of the qualifying storm event. Samples will be collected within plumes generated during the storm event, in the vicinity and across from Santa Monica Canyon Channel (SMBBB TMDL monitoring location SMB 2-7). A boat will be used to gather the sample from the plume. Receiving water monitoring site RW-SMB-1 will represent the drainage characteristics of JG2. **Section 1.2** below shows comparative analysis of the land use composition of JG2 and RW-SMB-1 drainage area.

1.1.2 Santa Monica Canyon Channel (RW-SMB-2)

Monitoring site RW-SMB-2 will be used to monitor the receiving water monitoring for Santa Monica Canyon Channel and SMB Toxics TMDL monitoring. Monitoring site RW-SMB-2 will be located immediately upstream of the low flow diversion (LFD) weir in Santa Monica Canyon Channel. RW-SMB-2 will monitor runoff from Santa Monica Canyon Channel, Rustic Canyon, Mandeville Canyon, and Sullivan Canyon Creeks. The catchment area of RW-SMB-2 will encompass 100% of the Santa Monica Canyon (180701040402) HUC-12 area of SMB EWMP Group.

Catchment areas for RW-SMB-1 and RW-SMB-2 are identical, but the representative samples will differ as RW-SMB-1 will characterize the mixing of Santa Monica Canyon Channel with Santa Monica Bay, and RW-SMB-2 will characterize the runoff from Santa Monica Canyon Channel and all upstream creeks.

1.1.3 Santa Monica Bay (RW-SMB-3)

RW-SMB-3 will be located at the point of initial mixing and will be dependent on the intensity of a qualifying storm event. Samples will be collected within plumes generated during a qualifying storm event, in the vicinity and across from Pico Kenter storm drain (SMBBB TMDL monitoring location SMB 3-4). This sampling site is critical to the SMB EWMP Group for demonstrating compliance and water quality data collected by the SMB EWMP Group would be valuable for assessing the impact of JG3's discharges on the receiving water. **Section 1.4** shows comparative analysis of the land use composition of JG3 and the RW-SMB-3 drainage area.

1.2 Summary Sheet for RW-SMB-1

Site ID: RW-SMB-1	**Monitoring Type:** Receiving Water			
Latitude: 34.025198	**Watershed:** Santa Monica Bay			
Longitude: -118.523621	**Represented Area:** Jurisdictional Group 2			
	Catchment Area		**JG2**	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**
Agricultural	12.82	0.13%	16.37	0.07%
Commercial	35.01	0.35%	529.39	2.12%
Industrial	60.92	0.61%	1,304.25	5.23%
Education	35.14	0.35%	294.1	1.18%
Single Family Residential	2,089.65	20.81%	5,160.31	20.71%
Multi-Family Residential	46.1	0.46%	597.68	2.40%
Open Space	7,764.02	77.30%	14,945.23	59.97%
Transportation	0%	0%	2,074.91	8.33%
Total	10,043.66	100%	24,922.24	100%
Jurisdictions				
City of Los Angeles	9,778	97.35%	22,087	88.62%
City of Santa Monica	266	2.65%	266	1.07%
City of El Segundo	0%	0%	2,180	8.75%
County of Los Angeles	0%	0%	389	1.56%

Site Description: RW-SMB-1 is a receiving water monitoring location in Santa Monica Bay located at the point of initial mixing, and across from Santa Monica Canyon Channel (SMBBB TMDL monitoring location SMB 2-7). This sampling location is selected to characterize the impact of the MS4 to Santa Monica Bay within Jurisdiction 2.

Site Location: Please see **Figure 7**

Site View:

1.3 Summary Sheet for RW-SMB-2

Site ID: RW-SMB-2	**Monitoring Type:** Receiving Water and TMDL			
Latitude: 34.028797	**Watershed:** Santa Monica Bay			
Longitude: -118.517841	**Represented Area:** Santa Monica Canyon Channel			
Land Use	**Catchment Area**		**HUC**	
	Acres	**% of Total**	**Acres**	**% of Total**
Agricultural	12.82	0.13%	12.82	0.13%
Commercial	35.01	0.35%	35.01	0.35%
Industrial	60.92	0.61%	60.92	0.61%
Education	35.14	0.35%	35.14	0.35%
Single Family Residential	2089.65	20.81%	2089.65	20.81%
Multi-Family Residential	46.1	0.46%	46.1	0.46%
Open Space	7764.02	77.30%	7764.02	77.30%
Transportation	0	0%	0	0%
Total	10043.66	100%	10043.66	100%
Jurisdictions				
City of Los Angeles	9778	97.35%	9778	97.35%
City of Santa Monica	266	2.65%	266	2.65%
City of El Segundo	0	0%	0	0%
County of Los Angeles	0	0%	0	0%

Site Description: RW-SMB-2 is a receiving water and TMDL monitoring site. RW-SMB-2 is located in Santa Monica Canyon Channel immediately upstream of the low flow diversion (LFD) weir. Access to the site of the LFD weir is located in a parking lot next to 148 W. Channel Road, Santa Monica, CA 90402.

Site Location: Please See **Figure 7**

Site View:

1.4 Summary Sheet for RW-SMB-3

Site ID: RW-SMB-3	**Monitoring Type:** Receiving Water			
Latitude: 34.003262	**Watershed:** Santa Monica Bay			
Longitude: -118.496438	**Represented Area:** Jurisdictional Group 3			
Land Use	**Catchment Area**		**JG3**	
	Acres	**% of Total**	**Acres**	**% of Total**
Agricultural	0	0%	0	0%
Commercial	602.74	13.02%	1123.12	12.40%
Industrial	219.94	4.75%	262.64	2.90%
Education	137.38	2.97%	274.21	3.03%
Single Family Residential	1,786.79	38.60%	3,487.38	38.50%
Multi-Family Residential	696.42	15.04%	2,172.03	23.98%
Open Space	1,106.71	23.91%	1,490.23	16.45%
Transportation	79.02	1.71%	247.38	2.73%
Total	4,629.00	100%	9,056.99	100%
Jurisdictions				
City of Los Angeles	2,760	59.62%	4,242	47.33%
City of Santa Monica	1,869	40.38%	4,721	52.67%
City of El Segundo	0	0%	0	0%
County of Los Angeles	0	0%	0	0%

Site Description: RW-SMB-3 is a receiving water monitoring location in Santa Monica Bay at the initial point of mixing, and across from the shoreline monitoring site SMB 3-4. This sampling location is selected to characterize the impact of the MS4 to Santa Monica Bay within Jurisdiction 3.

Site Location: Please See **Figure 8**

Site View:

Section 2
Stormwater Outfall Site

Compliance with municipal action limits (MALs), WQBELs derived from TMDL WLAs, as well as the potential to cause or contribute exceedances of RWLs derived from TMDL WLAs or receiving water quality objectives are assessed through stormwater outfall monitoring. The majority of SMB EWMP Group storm drains generally drain towards Santa Monica Bay through multiple jurisdictions. For each monitoring site a land use analysis for was conducted for each HUC-12, drainage area and SMB EWMP Group area.

2.1 Overview of Sites

Four stormwater outfall monitoring sites, as shown in **Figure 11**, were selected. The four monitoring sites comprise about 46% of the drainages area of the SMB EWMP Group. The selected sites are representative of a combination of the HUC-12s, jurisdictions, and/or land uses within each drainage area. A synopsis of each potential outfall drainage area, along with an analysis of its land use/zoning characteristics is summarized below.

2.1.1 OF-SMB-1

Stormwater outfall monitoring site OF-SMB-1 was selected to represent the Santa Monica Beach – Frontal Santa Monica Bay (180701040403) HUC-12 JG2 area. Catchment area from OF-SMB-1 will encompass approximately 4.55% of the HUC-12 area, which primarily drains the County of Los Angeles and the City of Los Angeles. **Section 2.2** below shows an analysis comparing the land use composition within OF-SMB-1 drainage area, HUC-12 and SMB EWMP Group area. OF-SMB-1 is representative of the drainage area of the County of Los Angeles, as well as open space and single family residential land uses. Based on this comparison, OF-SMB-1 would be an ideal outfall monitoring site to assess water quality for open space and single family residential land uses, City of Los Angeles and the County of Los Angeles.

2.1.2 OF-SMB-2

Stormwater outfall monitoring site OF-SMB-2 will be an outfall monitoring site for Santa Monica Canyon Channel. OF-SMB-2 will receive stormwater runoff from Sullivan Canyon storm drain and Mandeville Canyon storm drain as OF-SMB-2 will be located in Santa Monica Canyon Channel at the confluence of Sullivan Canyon and Mandeville Canyon storm drains. Drainage from OF-SMB-2 will encompass approximately 41.42% of the HUC-12 area, which primarily drains the City of Los Angeles. An analysis comparing the land use composition within OF-SMB-2 drainage area, HUC-12 and SMB EWMP Group area is not representative of the SMB EWMP Group areas land use. However the drainage from OF-SMB-2 is representative of open space and single family residential land use, and will characterize the upstream portion of Santa Monica Canyon Channel. Based on this comparison, OF-SMB-2 would be an ideal outfall monitoring site to represent the water quality assessment for open space and single family residential land use, and Santa Monica Canyon Channel.

2.1.3 OF-SMB-3

OF-SMB-3 was selected to represent the Santa Monica Beach – Frontal Santa Monica Bay (180701040403) HUC-12 JG3 area and the City of Santa Monica. Drainage from OF-SMB-3 will encompass approximately 51.11% of the HUC-12 area, which primarily drains the City of Santa Monica

and the City of Los Angeles. As shown in **Section 2.4** below, an analysis comparing the land use composition within OF-SMB-3 drainage area, HUC-12 and SMB EWMP Group area, indicates OF-SMB-3 is representative of the HUC-12 and the SMB EWMP Group area. OF-SMB-3 is also representative of commercial, mix residential, and open space land use. Based on this comparison, OF-SMB-3 would be an ideal outfall monitoring site.

2.1.4 OF-SMB-4

The stormwater outfall monitoring site OF-SMB-4 has been selected to represent the Manhattan Beach – Frontal Santa Monica Bay (180701040500) HUC-12 area and the City of El Segundo. Drainage from OF-SMB-4 will encompass approximately 6.58% of the HUC-12 area, which primarily drains the City of El Segundo and a small portion of the City of Los Angeles. As shown in **Section 2.5** below, an analysis comparing the land use composition within OF-SMB-4 drainage area, HUC-12 and SMB EWMP Group area, is representative of commercial, industrial, mix residential land use and the drainage of the City of El Segundo. Based on this comparison, OF-SMB-4 would be an ideal outfall monitoring site to represent the water quality assessment for commercial, industrial, mix residential land use area and the City of El Segundo.

2.2 Summary Sheet for OF-SMB-1

Site ID: OF-SMB-1	**Monitoring Type:** Stormwater Outfall		
Latitude: 34.041362	**Watershed:** Santa Monica Bay		
Longitude: -118.567045	**Represented Area:** County of Los Angeles and City of Los Angeles		
Thomas Guide Grid: pg 630 F6	**Drainage System:** Castlerock (Parker Mesa)		
Outfall Shape: 60" X 96"	**HUC-12:** Santa Monica Beach – Frontal Santa Monica Bay (180701040403)		
Outfall Type: Reinforced Concrete Box	**Nearest Street Address:** 17946 Pacific Coast Highway, Malibu, CA 90265		
	Catchment Area	**HUC**	**SWB EWMP Area**
Land Use	**% of Total**	**% of Total**	**% of Total**
Agricultural	0%	0.04%	0.05%
Commercial	4.67%	1.49%	4.86%
Industrial	0%	0%	4.61%
Education	0%	0.82%	1.67%
Single Family Residential	42.63%	20.36%	25.45%
Multi-Family Residential	1.82%	2.37%	8.15%
Open Space	50.88%	74.67%	48.37%
Transportation	0%	0.25%	6.83%
Total	100%	100%	100%
Jurisdictions			
City of Los Angeles	42.25%	95.26%	77.70%
City of Santa Monica	0%	0%	14.72%
City of El Segundo	0%	0%	6.43%
County of Los Angeles	57.75%	4.74%	1.15%

Site Description: Construction near sampling site OF-SMB-1 is currently blocking the outfall. The outfall is located near the intersection of Coastline Drive and Pacific Coast Highway. The outfall is known as the Castlerock storm drain as well as the Parker Mesa storm drain. The outfall currently has a LFD up gradient of the discharge point, which diverts all dry weather flows.

Site Location: Please See **Figure 12**

Site View:

2.3 Summary Sheet for OF-SMB-2

Site ID: OF-SMB-2	**Monitoring Type:** Stormwater Outfall		
Latitude: 34.060797	**Watershed:** Santa Monica Bay		
Longitude: -118.495236	**Represented Area:** City of Los Angeles		
Thomas Guide Grid: pg 631 E3	**Drainage System:** Sullivan and Mandeville Canyon Creek		
Outfall Shape: N/A	**HUC-12:** Santa Monica Canyon (180701040402)		
Outfall Type: Reinforced Concrete Channel	**Nearest Street Address:** 13125 W. Sunset Blvd., Los Angeles, CA 90049		
Land Use	**HUC % of Total**	**Catchment Area % of Total**	**SMB EWMP Area % of Total**
Agricultural	0.13%	0.31%	0.05%
Commercial	0.35%	0.07%	4.86%
Industrial	0.61%	1.46%	4.61%
Education	0.35%		1.67%
Single Family Residential	20.81%	15.40%	25.45%
Multi-Family Residential	0.46%	0.21%	8.15%
Open Space	77.30%	82.55%	48.37%
Transportation			6.83%
Total	100.00%	100.00%	100.00%
Jurisdictions			
City of Los Angeles	97.35%	100.00%	77.70%
City of Santa Monica	2.65%		14.72%
City of El Segundo			6.43%
County of Los Angeles			1.15%
Site Description: Sample location OF-SMB-2 is near the confluence of Sullivan Canyon Creek and Mandeville Canyon Creek.			
Site Location: Please See **Figure 13**			
Site View: 			

2.4 Summary Sheet for OF-SMB-3

Site ID: OF-SMB-3	**Monitoring Type:** Stormwater Outfall		
Latitude: 34.006370	**Watershed:** Santa Monica Bay		
Longitude: -118.491840	**Represented Area:** City of Santa Monica and City of Los Angeles		
Thomas Guide Grid: pg 671 E3	**Drainage System:** Pico-Kenter		
Outfall Shape: 48"X552"	**HUC-12:** Santa Monica Beach – Frontal Santa Monica Bay (180701040403)		
Outfall Type: Reinforced Concrete Channel	**Nearest Street Address:** 1 Pico Boulevard, Santa Monica, CA 90405		
Land Use	**Catchment Area % of Total**	**HUC % of Total**	**SWB EWMP Area % of Total**
Agricultural	0%	0%	0.05%
Commercial	13.02%	12.40%	4.86%
Industrial	4.75%	2.90%	4.61%
Education	2.97%	3.03%	1.67%
Single Family Residential	38.60%	38.50%	25.45%
Multi-Family Residential	15.04%	23.98%	8.15%
Open Space	23.91%	16.45%	48.37%
Transportation	1.71%	2.73%	6.83%
Total	100%	100%	100%
Jurisdictions			
City of Los Angeles	59.62%	47.33%	77.70%
City of Santa Monica	40.38%	52.67%	14.72%
City of El Segundo	0%	0%	6.43%
County of Los Angeles	0%	0%	1.15%

Site Description: Outfall monitoring location OF-SMB-3 is also known as the Pico-Kenter storm drain. The Pico-Kenter storm drain is generally blocked by sand from June to the first large storm event. All flow during dry-weather is diverted to the Santa Monica Urban Runoff Treatment Facility (SMURTF). The outfall is located south of Santa Monica Pier and can be found right at the end of Pico Boulevard.

Site Location: Please See **Figure 14**

Site View:

2.5 Summary Sheet for OF-SMB-4

Site ID: OF-SMB-4	**Monitoring Type:** Stormwater Outfall		
Latitude: 33.917430	**Watershed:** Santa Monica Bay		
Longitude: -118.428580	**Represented Area:** City of El Segundo and City of Los Angeles		
Thomas Guide Grid: pg 732 D2	**Drainage System:** Grand Avenue		
Outfall Shape: 34"	**HUC-12:** Manhattan Beach – Frontal Santa Monica Bay (180701040500)		
Outfall Type: Reinforced Concrete Pipe	**Nearest Street Address:** 12700 Vista Del Mar Boulevard, Playa del Rey, CA 90293		
	Catchment Area	**HUC**	**SWB EWMP Area**
Land Use	**% of Total**	**% of Total**	**% of Total**
Agricultural	0%	0%	0.05%
Commercial	27.71%	5.58%	4.86%
Industrial	27.57%	18.64%	4.61%
Education	1.50%	2.87%	1.67%
Single Family Residential	21.93%	20.97%	25.45%
Multi-Family Residential	11.77%	5.35%	8.15%
Open Space	6.81%	15.79%	48.37%
Transportation	2.71%	30.80%	6.83%
Total	100%	100%	100%
Jurisdictions			
City of Los Angeles	2.51%	67.36%	77.70%
City of Santa Monica	0%	0%	14.72%
City of El Segundo	97.49%	32.64%	6.43%
County of Los Angeles	0%	0%	1.15%
Site Description: OF-SMB-4 is located in the parking lot of Dockweiler State Beach near the intersection of W Grand Avenue and Vista Del Mar Boulevard. OF-SMB-4 drains from the Grand Avenue storm drain, which is a 34" diameter reinforce concrete pipe. At the time of field reconnaissance, no dry-weather flow was observed. OF-SMB-4 has a LFD up gradient, which diverts dry-weather flow.			
Site Location: Please See **Figure 14**			
Site View: 			

Section 3
Non-Stormwater Outfall Sites and Justification

At this time, non-stormwater outfall monitoring sites have not been identified. To determine the number of outfalls that are required to be monitored for the non-stormwater outfall monitoring, SMB EWMP Group has developed an outfall screening and monitoring program. Further details of the non-stormwater outfall monitoring and screening program are discussed in **Section 6** of the CIMP. Within 90 days of the approval of this CIMP the SMB EWMP Group will initiate the steps identified to identify, inventory, prioritize, and monitor the non-stormwater discharges.

Attachment C

Analytical and Monitoring Procedures

Section 1
Analytical Procedures

The sections below discuss the analytical procedures for data generated in the field and in the laboratory.

1.1 Field Parameters

Field meters will be calibrated in accordance to **Section 2.1.3**. Portable field meters will measure field parameters within specifications outlined in **Table C-1**.

Table C-1

Analytical Methods and Project Reporting Limits for Field Parameters

Parameter	Method	Range	Project RL
Current velocity	Electromagnetic	-0.5 to +20 ft/s	0.05 ft/s
pH	Electrometric	0 – 14 pH units	NA
Temperature	High stability thermistor	-5 – 50 oC	NA
Dissolved oxygen	Membrane or Optical	0 – 50 mg/L	0.5 mg/L
Turbidity	Nephelometric	0 – 3000 NTU	0.2 NTU
Conductivity	Graphite electrodes	0 – 10 mmhos/cm	2.5 umhos/cm
Salinity	Conductivity and Temperature	0 – 70 ppt	0.01 ppt

RL – Reporting Limit NA – Not applicable

1.2 Analytical Methods and Method Detection and Reporting Limits

Method detection limits (MDL) and reporting limits (RLs) must be distinguished for proper understanding and data use. The MDL is the minimum analyte concentration that can be measured and reported with a 99% confidence that the concentration is greater than zero. The RL represents the concentration of an analyte that can be routinely measured in the sampled matrix within stated limits and with confidence in both identification and quantitation.

Under this monitoring program, RLs must be verifiable by having the lowest non-zero calibration standard or calibration check sample concentration at or less than the RL. RLs have been established in this CIMP based on the verifiable levels and general measurement capabilities demonstrated for each method. These RLs should be considered as maximum allowable RLs to be used for laboratory data reporting. Note that samples diluted for analysis may have sample-specific RLs that exceed these RLs. This will be unavoidable on occasion. However, if samples are consistently diluted to overcome matrix interferences, the analytical laboratory will be required to notify the SMB EWMP Group regarding how the sample preparation or test procedure in question will be modified to reduce matrix interferences so that project RLs can be met consistently.

Analytical methods and RLs required for samples analyzed in the laboratory is summarized in

Table C-2. For organic constituents, environmentally relevant detection limits will be used to the extent practicable. The RLs listed in

Table C-2 are consistent with the requirements of the available minimum levels provided in the MRP, except for total dissolved solids, which was set equal to the minimum level identified in the California State Water Resources Control Board's Surface Water Ambient Monitoring Program's (SWAMP) Quality Assurance Project Plan. Alternative methods with RLs that are at or below those presented in

Table C-2 are considered equivalent and can be used in place of the methods presented in

Table C-2.

Prior to the analysis of any environmental samples, the laboratory must have demonstrated the ability to meet the minimum performance requirements for each analytical method presented in

Table C-2. The initial demonstration of capability includes the ability to meet the project RLs, the ability to generate acceptable precision and accuracy, and other analytical and quality control parameters documented in this CIMP. Data quality objectives for precision and accuracy are summarized in

Table C-3**.**

Table C-2

EPA Approved Analytical Methods and Project Reporting Limits (RL) for Laboratory Analysis of Water Samples

Parameter/Constituent	Method[(1)]	Units	Project RL	MRP Table E-2 ML
Toxicity				
Ceriodaphnia dubia	EPA-821-R-02-013 (1002.0) and EPA-821-R-02-012 (2002.0)	TUc	2	NA
Strongylocentrotus purpuratus	EPA-600-R-95-136 (1002.0)	TUc	2	NA
Haliotis rufescens	EPA-600-R-95-136	TUc	2	NA
Bacteria				
Total coliform (marine waters)	SM 9222 or 9223	CFU/100ml or MPN/100mL	1-67	10,000
Enterococcus (marine waters)	SM 9230	CFU/100ml or MPN/100mL	1-10	104
Fecal coliform/*E. coli* (marine and fresh waters)	SM 9222 or 9223	CFU/100ml or MPN/100mL	1-67	400
E. coli (fresh)	SM 9221 or 9223	MPN/100mL	2-67	235
Conventional Pollutants				
Oil and Grease	EPA 1664A	mg/L	5	5
Cyanide	SM 4500-CN E	mg/L	0.005	0.005
General				
Specific Conductance	EPA 120.1	µs/cm	1	1
Total Hardness	SM 2340C	mg/L	2	2
Dissolved Organic Carbon	SM 5310B	mg/L	0.6	NA
Total Organic Carbon	SM 5310B	mg/L	1	1
Total Petroleum Hydrocarbon	EPA 1664	mg/L	5	5
Biochemical Oxygen Demand	SMOL-5210	mg/L	5	2
Chemical Oxygen Demand	SM 5220D	mg/L	20	20-900
MBAS	SM 5540C	mg/L	0.5	0.5
Chloride	EPA 300.0	mg/L	1	2
Fluoride	EPA 300.0	mg/L	0.1	0.1
Perchlorate	EPA 314.0	µg/L	4	4
Dissolved Phosphorus	SM 4500-P E	mg/L	0.05	0.05
Total Phosphorus	SM 4500-P E	mg/L	0.05	0.05
Orthophosphate-P	EPA 300.0	mg/L	0.2	NA
Ammonia (as N)	SM 4500-NH3 C	mg/L	0.1	0.1
Nitrate + Nitrite (as N)	EPA 300.0	mg/L	0.1	0.1

Parameter/Constituent	Method[1]	Units	Project RL	MRP Table E-2 ML
Nitrate (as N)	EPA 300.0	mg/L	0.1	0.1
Nitrite (as N)	EPA 300.0	mg/L	0.1	0.1
Total Kjehdahl Nitrogen (TKN)	SM 4500-NH3 C	mg/L	0.1	0.1
Total Alkalinity	SM 2320B	mg/L	2	2
Solids				
Suspended Sediment Concentration (SSC)	ASTMD 3977-97	mg/L	3	NA
Total Suspended Solids (TSS)	SM 2540D	mg/L	2	2
Total Dissolved Solids (TDS)	SM 2540C	mg/L	10	2
Volatile Suspended Solids	EPA 1684	mg/L	1	2
Metals in Freshwater (dissolved and total)				
Aluminum	EPA 200.8	µg/L	100	100
Antimony	EPA 200.8	µg/L	0.5	0.5
Arsenic	EPA 200.8	µg/L	1	1
Beryllium	EPA 200.8	µg/L	0.5	0.5
Cadmium	EPA 200.8	µg/L	0.25	0.25
Chromium (total)	EPA 200.8	µg/L	0.5	0.5
Chromium (Hexavalent)	EPA 200.8	µg/L	5	5
Copper	EPA 200.8	µg/L	0.5	0.5
Iron	EPA 200.8	µg/L	100	100
Lead	EPA 200.8	µg/L	0.5	0.5
Mercury	EPA 1631	µg/L	0.5	0.5
Nickel	EPA 200.8	µg/L	1	1
Selenium	EPA 200.8	µg/L	1	1
Silver	EPA 200.8	µg/L	0.25	0.25
Thallium	EPA 200.8	µg/L	1	1
Zinc	EPA 200.8	µg/L	1	1
Metals in Seawater (dissolved and total)				
Copper	EPA 1640	µg/L	1	NA
Lead	EPA 1640	µg/L	1	NA
Mercury	EPA 1631	µg/L	1	NA
Nickel	EPA 1640	µg/L	1	NA
Selenium	EPA 1640	µg/L	1	NA
Silver	EPA 1640	µg/L	1	NA
Zinc	EPA 1640	µg/L	1	NA
Organochlorine Pesticides				
Aldrin	EPA 608	ng/L	5	5
alpha-BHC	EPA 608	ng/L	10	10
beta-BHC	EPA 608	ng/L	5	5
delta-BHC	EPA 608	ng/L	5	5

Parameter/Constituent	Method[(1)]	Units	Project RL	MRP Table E-2 ML
gamma-BHC (Lindane)	EPA 608	ng/L	20	20
Chlordane-alpha	EPA 608	ng/L	100	100
Chlordane-gamma	EPA 608	ng/L	100	100
Oxychlordane	EPA 608	ng/L	200	NA
Cis-nonachlor	EPA 608	ng/L	200	NA
Trans-nonachlor	EPA 608	ng/L	200	NA
2,4'-DDD	EPA 608	ng/L	2	NA
2,4'-DDE	EPA 608	ng/L	2	NA
2,4'-DDT	EPA 608	ng/L	2	NA
4,4'-DDD	EPA 608	ng/L	50	50
4,4'-DDE	EPA 608	ng/L	50	50
4,4'-DDT	EPA 608	ng/L	10	10
Dieldrin	EPA 608	ng/L	10	10
Endosulfan I	EPA 608	ng/L	20	20
Endosulfan II	EPA 608	ng/L	10	10
Endosulfan Sulfate	EPA 608	ng/L	50	50
Endrin	EPA 608	ng/L	10	10
Endrin Aldehyde	EPA 608	ng/L	10	10
Heptachlor	EPA 608	ng/L	10	10
Heptachlor Epoxide	EPA 608	ng/L	10	10
Toxaphene	EPA 608	ng/L	500	500
PCBs				
Aroclors (1016, 1221, 1232, 1242, 1248, 1254, 1260)	EPA 608	ng/L	500	500
Organophosphorus Pesticides				
Chlorpyrifos	EPA 614	ng/L	50	50
Diazinon	EPA 614	ng/L	10	10
Malathion	EPA 614	ng/L	1000	1000
Triazine				
Atrazine	EPA 530	µg/L	2	2
Cyanazine	EPA 530	µg/L	2	2
Prometryn	EPA 530	µg/L	2	2
Simazine	EPA 530	µg/L	2	2
Herbicides				
2,4-D	EPA 8151A	µg/L	10	10
Glyphosate	EPA 547	µg/L	5	5
2,4,5-TP-SILVEX	EPA 8151A	µg/L	0.5	0.5
Semivolatile Organic Compounds (SVOCs)				
1,2-Diphenylhydrazine	EPA 625	µg/L	1	1
2,4,6-Trichlorophenol	EPA 625	µg/L	10	10

Parameter/Constituent	Method[(1)]	Units	Project RL	MRP Table E-2 ML
2,4-Dichlorophenol	EPA 625	µg/L	1	1
2,4-Dimethylphenol	EPA 625	µg/L	2	2
2,4-Dinitrophenol	EPA 625	µg/L	5	5
2,4-Dinitrotoluene	EPA 625	µg/L	5	5
2,6-Dinitrotoluene	EPA 625	µg/L	5	5
2-Chloronaphthalene	EPA 625	µg/L	10	10
2-Chlorophenol	EPA 625	µg/L	2	2
2-Methyl-4,6-dinitrophenol	EPA 625	µg/L	5	5
2-Nitrophenol	EPA 625	µg/L	10	10
3,3'-Dichlorobenzidine	EPA 625	µg/L	5	5
4-Bromophenyl phenyl ether	EPA 625	µg/L	5	5
4-Chloro-3-methylphenol	EPA 625	µg/L	1	1
4-Chlorophenyl phenyl ether	EPA 625	µg/L	5	5
4-Nitrophenol	EPA 625	µg/L	5	5
Acenaphthene	EPA 625	µg/L	1	1
Acenaphthylene	EPA 625	µg/L	2	2
Anthracene	EPA 625	µg/L	2	2
Benzidine	EPA 625	µg/L	5	5
Benzo(a)anthracene	EPA 625	µg/L	5	5
Benzo(a)pyrene	EPA 625	µg/L	2	2
Benzo(b)fluoranthene	EPA 625	µg/L	10	10
Benzo(g,h,i)perylene	EPA 625	µg/L	5	5
Benzo(k)fluoranthene	EPA 625	µg/L	2	2
Benzyl butyl phthalate	EPA 625	µg/L	10	10
bis(2-Chloroethoxy) methane	EPA 625	µg/L	5	5
bis(2-Chloroisopropyl) ether	EPA 625	µg/L	2	2
bis(2-Chloroethyl) ether	EPA 625	µg/L	1	1
bis(2-Ethylhexyl) phthalate	EPA 625	µg/L	5	5
Chrysene	EPA 625	µg/L	5	5
Dibenzo(a,h)anthracene	EPA 625	µg/L	0.1	0.1
Diethyl phthalate	EPA 625	µg/L	2	2
Dimethyl phthalate	EPA 625	µg/L	2	2
Di-n-butylphthalate	EPA 625e	µg/L	10	10
Di-n-octylphthalate	EPA 625	µg/L	10	10
Fluoranthene	EPA 625	µg/L	0.05	0.05
Fluorene	EPA 625	µg/L	0.1	0.1
Hexachlorobenzene	EPA 625	µg/L	1	1
Hexachlorobutadiene	EPA 625	µg/L	1	1
Hexachloro-cyclo pentadiene	EPA 625	µg/L	5	5

Parameter/Constituent	Method[(1)]	Units	Project RL	MRP Table E-2 ML
Hexachloroethane	EPA 625	µg/L	1	1
Indeno(1,2,3-cd)pyrene	EPA 625	µg/L	0.05	0.05
Isophorone	EPA 625	µg/L	1	1
Naphthalene	EPA 625	µg/L	0.2	0.2
Nitrobenzene	EPA 625	µg/L	1	1
N-Nitroso-dimethyl amine	EPA 625	µg/L	5	5
N-Nitrosodiphenylamine	EPA 625	µg/L	1	1
N-Nitroso-di-n-propyl amine	EPA 625	µg/L	5	5
Pentachlorophenol	EPA 625	µg/L	2	2
Phenanthrene	EPA 625	µg/L	0.05	0.05
Total Phenols	EPA 625	mg/L	0.2	0.1
Phenol	EPA 625	µg/L	1	1
Pyrene	EPA 625	µg/L	0.05	0.05
Volatile Organic Compounds				
1,2,4-Trichlorobenzene	EPA 625	µg/L	1	1
1,2-Dichlorobenzene	EPA 625	µg/L	1	1
1,3-Dichlorobenzene	EPA 625	µg/L	1	1
1,4-Dichlorobenzene	EPA 625	µg/L	1	1
2-Chloroethyl vinyl ether	EPA 625	µg/L	1	1
Methyl tert-butyl ether (MTBE)	EPA 625	µg/L	1	1

RL – Reporting Limit NA – Not applicable

1. RLs are equal to those specified in the MRP of the Permit. Methods may be substituted by an equivalent method that is lower than or meets the project RL.

Table C-3

Data Quality Objectives

Parameter	Accuracy	Precision	Recovery	Completeness
Field Measurements				
Water Velocity (for Flow calc.)	2%	NA	NA	90%
pH	+ 0.2 pH units	+ 0.5 pH units	NA	90%
Temperature	+ 0.5 oC	+ 5%	NA	90%
Dissolved Oxygen	+ 0.5 mg/L	+ 10%	NA	90%
Turbidity	10%	10%	NA	90%
Conductivity	5%	5%	NA	90%
Laboratory Analyses – Water				
Conventionals and Solids	80 – 120%	0 – 25%	80 – 120%	90%
Aquatic Toxicity	(1)	(2)	NA	90%
Nutrients(3)	80 – 120%	0 – 25%	90 – 110%	90%
Metals(3)	75 – 125%	0 – 25%	75 – 125%	90%
Semi-Volatile Organics(3)	50 – 150%	0 – 25%	50 – 150%	90%
Volatile Organics(3)	50 – 150%	0 – 25%	50 – 150%	90%
Triazines(3)	50 – 150%	0 – 25%	50 – 150%	90%
Herbicides(3)	50 – 150%	0 – 25%	50 – 150%	90%
OC Pesticides(3)	50 – 150%	0 – 25%	50 – 150%	90%
PCB Congeners(3)	50 – 150%	0 – 25%	50 – 150%	90%
PCB Aroclors(3)	50 – 150%	0 – 25%	50 – 150%	90%
OP Pesticides(3)	50 – 150%	0 – 25%	50 – 150%	90%

1. Must meet all method performance criteria relative to the reference toxicant test.
2. Must meet all method performance criteria relative to sample replicates.
3. See
4. **Table** C-2 for a list of individual constituents in each suite for water.

1.2.1 Method Detection Limit Studies

Any laboratory performing analyses under this program must routinely conduct MDL studies to document that the MDLs are less than or equal to the project-specified RLs. If any analytes have MDLs that do not meet the project RLs, the following steps must be taken:

- Perform a new MDL study using concentrations sufficient to prove analyte quantitation at concentrations less than or equal to the project-specified RLs per the procedure for the Determination of the Method Detection Limit presented in Revision 1.1, 40 Code of Federal Regulations (CFR) 136, 1984.
- No samples may be analyzed until the issue has been resolved. MDL study results must be available for review during audits, data review, or as requested. Current MDL study results must be reported for review and inclusion in project files.

An MDL is developed from seven aliquots of a standard containing all analytes of interest spiked at five times the expected MDL. These aliquots are processed and analyzed in the same manner as environmental samples. The results are then used to calculate the MDL. If the calculated MDL is less than 0.33 times the spiked concentration, another MDL study should be performed using lower spiked concentrations.

1.2.2 Project Reporting Limits

Laboratories generally establish RLs that are reported with the analytical results—these may be called reporting limits, detection limits, reporting detection limits, or several other terms by the reporting laboratory. These laboratory limits must be less than or equal to the project RLs listed in

Table C-2. Wherever possible, project RLs are lower than the relevant numeric criteria or toxicity thresholds. Laboratories performing analyses for this project must have documentation to support quantitation at the required levels.

1.2.3 Laboratory Standards and Reagents

All stock standards and reagents used for standard solutions and extractions must be tracked through the laboratory. The preparation and use of all working standards must be documented according to procedures outlined in each laboratory's Quality Assurance (QA) Manual; standards must be traceable according to USEPA, A2LA or National Institute for Standards and Technology (NIST) criteria. Records must have sufficient detail to allow determination of the identity, concentration, and viability of the standards, including any dilutions performed to obtain the working standard. Date of preparation, analyte or mixture, concentration, name of preparer, lot or cylinder number, and expiration date, if applicable, must be recorded on each working standard.

1.2.4 Sample Containers, Storage, Preservation, and Holding Times

Sample containers must be pre-cleaned and certified free of contamination according to the USEPA specification for the appropriate methods. Sample container, storage and preservation, and holding time requirements are provided in **Table C-4**. The analytical laboratories will supply sample containers that already contain preservative (**Table C-4**), including ultra-pure hydrochloric and nitric acid, where applicable. After collection, samples will be stored at <8°C until arrival at the contract laboratory.

Table C-4

Sample Container, Sample Volume, Initial Preservation, and Holding Time Requirements for Parameters Analyzed at a Laboratory

Parameter	Sample Container	Sample Volume[(1)]	Immediate Processing and Storage	Holding Time
Water				
Toxicity				
Initial Screening	Glass or FLPE-lined jerrican	40 L	Store at 4°C	36 hours[(2)]
Follow-Up Testing				
Phase I TIE				
Total coliform, fecal coliform, and *Enterococcus* (marine waters)	Sterile, PE	120 mL	Store at 8ºC	6 hours
Fecal coliform, *E. coli* (fresh waters)	PE	120 mL	Na2S2O3 and Store at 4ºC	
Oil and Grease	PE	250 mL	HCl and Store at 4°C	28 days
Cyanide	PE	1 L	NaOH and Store at 4°C	14 days

Parameter	Sample Container	Sample Volume[1]	Immediate Processing and Storage	Holding Time
Dissolved Organic Carbon (DOC)	PE	250 mL	Store at 4°C	Filter/28 days
Total Organic Carbon (TOC)	PE	250 mL	H2SO4 and Store at 4°C	28 days
Total Petroleum Hydrocarbon	Glass	1 L	HCL or H2SO4 and Store at 4°C	7/40 days[3]
Biochemical Oxygen Demand	PE	1L	Store at 4°C	48 hours
Chemical Oxygen Demand	PE	500 mL	H2SO4 and Store at 4°C	28 days
MBAS	PE	1 L	Store at 4°C	48 hours
Fluoride	PE	500 mL	None required	28 days
Chloride	PE	250 mL	Store at 4°C	28 days
Perchlorate	PE	500 mL	Store at 4°C	28 days
Nitrate Nitrogen	PE	250 mL	Store at 4°C	48 hours
Nitrite Nitrogen				
Orthophosphate-P				
Ammonia Nitrogen	Glass	250-mL	H2SO4 and Store at 4°C	28 days
Total and Dissolved Phosphorus				
Organic Nitrogen				
Nitrate + Nitrite (as N)				
Total Kjehdahl Nitrogen (TKN)	PE	250 mL	H2SO4 and Store at 4°C	28 days
Total Alkalinity	PE	500 mL	Store at 4°C	14 days
Suspended Sediment Concentration (SSC)	PE	250 mL	Store at 4°C	120 days
Total Suspended Solids (TSS)	PE	250 mL	Store at 4°C	7 days
Total Dissolved Solids (TDS)	PE	250 mL	Store at 4°C	7 days
Volatile Suspended Solids	PE	250 mL	Store at 4°C	7 days
Hardness	PE	500 mL	HNO3 and Store at 4°C	180 days
Metals	PE	500 mL	HNO3 and Store at 4°C	6 months[4]
Mercury	Glass	500 mL	HCL and Store at 4°C	6 months
PCBs, OC Pesticides, OP Pesticides, Triazine Pesticides	Amber glass	4 x 1 L	Store at 4°C	7/40 days[3]
Suspended Solids Analysis for Organics and Metals	Amber glass	6 x 1 L	Store at 4°C	1 year[5]
Herbicides	Glass	2 x 40 mL	Thiosulfate and Store at 4°C	14 days
Semivolatile Organic Compounds	Glass	2 x 1 L	Store at 4°C	7 days
Volatile Organic Compounds	VOA	3 x 40 mL	HCl and Store at 4°C	14 days

PE – Polyethylene

1. Additional volume may be required for QC analyses.
2. Tests should be initiated within 36 hours of collection. The 36-hour hold time does not apply to subsequent analyses for TIEs. For interpretation of toxicity results, samples may be split from toxicity samples in the laboratory and analyzed for specific chemical parameters. All other sampling requirements for these samples are as specified in this document for the specific analytical method. Results of these analyses are not for any other use (e.g., characterization of ambient conditions) because of potential holding time exceedances and variance from sampling requirements.
3. 7/40 = 7 days to extract and 40 days from extraction to analysis.
4. 6 months after preservation.

Parameter	Sample Container	Sample Volume[1]	Immediate Processing and Storage	Holding Time

5. One year if frozen, otherwise 14 days to extract and 40 days from extraction to analysis.

1.3 Aquatic Toxicity Testing and Toxicity Identification Evaluations

The aquatic toxicity testing requirements outlines in the MS4 Permit, are intended to identify whether the water column toxicity is observed in targeted receiving waters and then assess which pollutant categories may potentially be causing the adverse aquatic effects. The results of aquatic toxicity testing are intended to guide future receiving and outfall water quality monitoring and contribute to the identification and control of toxicity causing pollutants in urban runoff through watershed control measures that may include: pollutant source controls, modified minimum control measures (MCMs) and BMPs. The following outlines the approach for conducting SMB J2/3 aquatic toxicity monitoring and evaluating results. Control measures and management actions to address confirmed toxicity caused by urban runoff are addressed by the EWMP, either via currently identified management actions or those that are identified via adaptive management of the EWMP.

The approach to conducting aquatic toxicity monitoring is presented in **Figure** C-1, which describes a general evaluation process for each sample collected as part of routine sampling conducted twice per year in wet weather and once per year in dry weather. Monitoring begins in the receiving water and the information gained is used to identify constituents for monitoring at outfalls to support the identification of pollutants that need to be addressed in the EWMP. The sub-sections below describe the detailed process and its technical and logistical rationale.

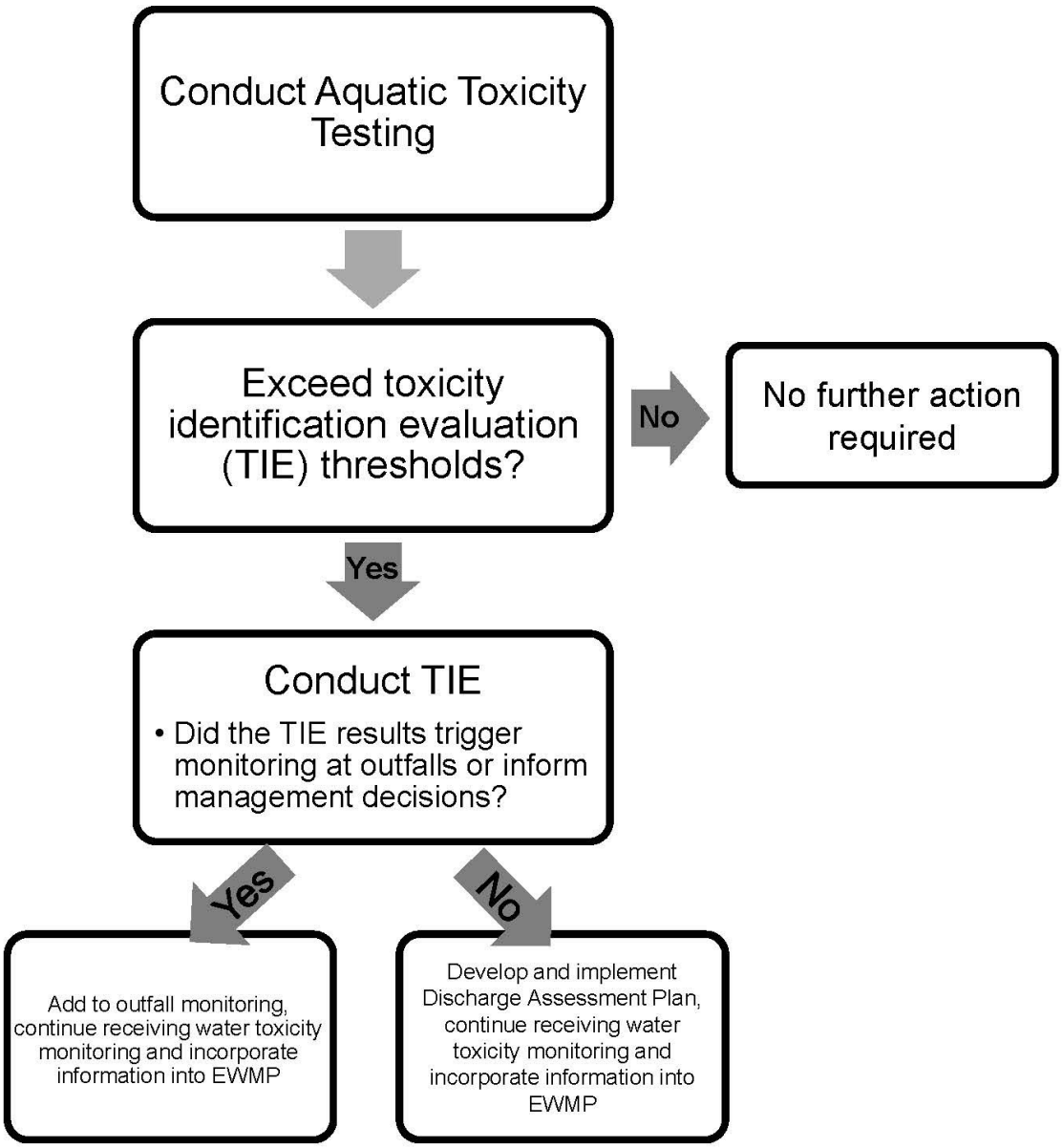


Figure C-1. Generalized Aquatic Toxicity Assessment Process

1.3.1 Sensitive Species Selection

The MRP (page E-32) states that a sensitivity screening to select the most sensitive test species should be conducted unless "a sensitive test species has already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s), then monitoring shall be conducted using only that test species." Previous relevant studies conducted in the watershed should be considered. Such studies may have been completed via previous MS4 sampling, wastewater NPDES sampling, or special studies conducted within the watershed. The following sub-sections discuss the species section process for assessing aquatic toxicity in receiving waters.

(i) Freshwater Sensitive Species Selection

As described in the MRP (page E-31), if samples are collected in receiving waters with salinity less than 1 part per thousand (ppt), or from outfalls discharging to receiving waters with salinity less than 1 ppt, toxicity tests should be conducted on the most sensitive test species in accordance with species and short-term test methods in Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA/821/R-02/013, 2002; Table IA, 40 CFR Part 136). Static renewal freshwater toxicity test species identified in the MRP are:

- Fathead minnow, Pimephales promelas (Larval Survival and Growth Test Method 1000.04).
- Daphnid, Ceriodaphnia dubia (Survival and Reproduction Test Method 1002.05).
- Non-static renewal Green alga, Selenastrum capricornutum (also named Raphidocelis subcapitata) (Growth Inhibition Test Method 1003.0).

Prior low salinity (fresh) receiving water toxicity testing studies, within the EWMP area, were not identified during CIMP preparation. Available toxicity data for the similar and adjacent Los Angeles River, Ballona Creek, and Dominguez Channel watersheds, suggest that organophosphate pesticides, pyrethroids, and metals are occasionally observed aquatic toxicants in regional urban runoff receiving waters. Based on the occasional presence of these toxicants in the EWMP area, the relative sensitivity of the three species to these pollutants was considered in evaluating which species would most likely be affected by local water samples.

Ceriodaphnia dubia (*C. dubia*) is often used locally and reported upon nationally, as a broad spectrum test species that is sensitive for historical and current use pesticides and metals, and studies indicate that it is more sensitive to the toxicants of concern than *Pimephales promelas* (*P. promelas*) or *Selenastrum capricornutum* (*S. capricornutum*). In *Aquatic Life Ambient Freshwater Quality Criteria - Copper*, the USEPA reports greater sensitivity of *C. dubia* to copper (species mean acute value of 5.93 µg/l) than for *P. promelas* (species mean acute value of 69.93 µg/l; EPA, 2007). *C. dubia*'s relative sensitivity to copper, extends to multiple metals. Additionally, researchers at the University of California (UC), Davis reviewed available reported species sensitivity values in developing pesticide criteria for the Central Valley Regional Water Quality Control Board. In developing pesticide criteria for the Central Valley Regional Water Quality Control Board (CVRWQCB), researchers at University of California at Davis, reported higher sensitivity of *C. dubia* to diazinon and bifenthrin (species mean acute value of 0.34 µg/l and 0.105 µg/l) compared to *P. promelas* (species mean acute value of 7804 µg/l and 0.405 µg/l; Palumbo et al., 2010a,b). Additionally, in a stormwater study for the City of Stockton, urban stormwater runoff found acute and chronic toxicity to *C. dubia*, with no toxicity to *S. capricornutum* or *P. promelas* (Lee and Lee, 2001). The toxicity was attributed to organophosphate pesticides, indicating a higher sensitivity of *C. dubia* compared to *S. capricornutum* or *P. promelas*. While *P. promelas* is generally less sensitive to metals and pesticides, this species can be more sensitive to ammonia than *C. dubia*. However, as ammonia is not typically a constituent of concern for urban runoff and ammonia is not consistently observed above the toxic thresholds in the watershed, *P. promelas* is not considered a particularly sensitive species for evaluating the impacts of urban runoff in freshwater receiving waters in this watershed.

S. capricornutum is a species sensitive to herbicides. However, while sometimes present in urban runoff, herbicides are not identified as a potential toxicant in the SMB watershed. Additionally, *S. capricornutum* is not considered the most sensitive species as it is not sensitive to pyrethroids or organophosphate pesticides and is not as sensitive to metals as *C. dubia*. Additionally, the *S. capricornutum* growth test can be affected by high concentrations of suspended and dissolved solids, color, and pH extremes, which can interfere with the determination of sample toxicity. As a result, it is

common to manipulate the sample by centrifugation and filtration to remove solids in order to conduct the toxicity test; however, this process may affect the toxicity of the sample. In a study of urban highway stormwater runoff (Kayhanian et. al, 2008), *S. capricornutum* response to the stormwater samples was more variable than the *C. dubia* and the *P. promelas* and in some cases the algal growth was possibly enhanced due to the presence of stimulatory nutrients. Also, in a study on the City of Stockton urban stormwater runoff (Lee and Lee, 2001) the *S. capricornutum* tests rarely detected toxicity where the *C. dubia* and *P. promelas* regularly detected toxicity.

Based on best professional judgment and local experience with the Permit identified fresh water species, *C. dubia* is most sensitive to the broadest range of potential toxicant(s) typically found in local fresh receiving waters impacted by urban runoff and will be selected for fresh water toxicity testing by the SMB EWMP Group. The species can be maintained in laboratory cultures making them generally available year round. The ease of interpreting results of the test and relatively small sample volume necessary to run the test, make the test a valuable screening tool. The ease of sample collection and higher sensitivity will support assessing the presence of ambient receiving water toxicity or long term effects of toxic stormwater over time. As such, toxicity testing in the freshwater portions of the watershed will be conducted using *C. dubia*. However, *C. dubia* test organisms are typically cultured in moderately hard waters (80-100 mg/L CaCO3) and can have increased sensitivity to elevated water hardness greater than 400 mg/L CaCO3), which is beyond their typical habitat range. Because of this, in instances where hardness in site waters exceeds 400 mg/L (CaCO3), an alternative test species may be used. Daphnia magna is more tolerant to high hardness levels and is a suitable substitution for *C. dubia* in these instances (Cowgill and Milazzo, 1990).

(ii) Saltwater Sensitive Species Selection

Samples collected in receiving waters with salinity equal to or greater than 1 ppt or from outfalls discharging to receiving waters with salinity that is equal to or greater than 1 ppt, should be tested using the most sensitive test species in accordance with *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136, 1995)*. The marine and estuarine test species identified in the MRP are:

- A static renewal toxicity test with the topsmelt, *Atherinops affinis* (Larval Survival and Growth Test Method 1006.015).
- A static non-renewal toxicity test with the purple sea urchin, *Strongylocentrotus purpuratus* (Fertilization Test Method 1008.0).
- A static non-renewal toxicity test with the giant kelp, *Macrocystis pyrifera* (Germination and Growth Test Method 1009.0).

In addition to the three species identified in the MRP, the red abalone, *Haliotis rufescens (H. rufescens*), larval development test was also considered given the extensive use in region.

Although all the species mentioned have been demonstrated as sensitive to a wide variety of toxicants and have been subject to numerous inter- and intra-laboratory testing using standardized toxicants, two species: *Macrocystis pyrifera* (*M. pyrifera*) and *Atherinops affinis* (*A. affinis*); have limitations when used to assess the toxicity of stormwater compared to the sea urchin *Strongylocentrotus purpuratus* (*S. purpuratus)* fertilization test and the red abalone larval *Haliotis rufescens (H. rufescens*) development test.

The method for *M. pyrifera* is a 48-hour chronic toxicity test that measures the percent zoospore germination and the length of the gametophyte germ tube. Although the test may be sensitive to herbicides, fungicides, and treatment plant effluent, the use of *M. pyrifera* as a test species for stormwater monitoring may not be ideal. Obtaining sporophylls for stormwater testing could also be a limiting factor

for selecting this test. Collection of *M. pyrifera* sporophylls from the field is necessary prior to initiating the test and the target holding time for any receiving water or stormwater sample is 36 hours; however, 72 hours is the maximum time a sample may be held prior to test initiation. During the dry season, meeting the 36-72 hour holding time will be achievable; however, field collection during wet weather may be delayed beyond the maximum holding time due to heavy seas and inaccessible collection sites. In addition, collection of *M. pyrifera* sporophylls during the storm season may include increased safety risks that can be avoided by selection of a different species.

The *A. affinis* test measures the survival and growth test of a larval fish over seven days. At the end of seven days of exposure to a suspected toxicant, the number of surviving fish are recorded, along with their weights, and compared to those exposed to non-contaminated seawater. Positive characteristics of the *A. affinis*s chronic test include the ability to purchase test organisms from commercial suppliers as well as being one of the few indigenous test species that may be used to test undiluted stormwater by the addition of artificial sea salts to within the range of marine receiving waters. Unfortunately, the tolerance of *A. affinis* to chemicals in artificial sea salts may also explain their lack of sensitivity to changes in water quality compared to other test organisms such as the sea urchin or red abalone. Further, there are concerns with the comparability of conducting a seven-day exposure test when most rain events do not occur over a seven-day period.

The *Strongylocentrotus purpuratus* (*S. purpuratus*) fertilization test measures the ability of *S. purpuratus* sperm to fertilize an egg when exposed to a suspected toxicant. The *S. purpuratus* fertilization has been selected as a chronic toxicity test organism in previous MS4 permits and has been used to assess ambient receiving water toxicity, sediment pore water toxicity, as well as stormwater toxicity. The *S. purpuratus* fertilization test is also among the most sensitive test species to metals. The adult test organisms may be purchased and held in the lab prior to fertilization, and the sample volume necessary to conduct the test is small with respect to the other suggested tests. The minimal exposure period (20 min) allows for a large number of tests to be conducted over a short period of time and permits the testing of toxicants that may lose their potency over long periods of time.

The *H. rufescens* red abalone larval development test measures the percent of abnormal shell development in larvae exposed to toxic samples for 48 hours. The *H. rufescens* red abalone is commonly used to test treatment plant effluent, but has had limited use in stormwater compared to the *S. purpuratus* fertilization test. The advantages of the red abalone test include a sensitive endpoint, the ability to purchase abalone from commercial suppliers and hold test organisms prior to spawning, and low variability in results compared to other species (e.g., *S. purpuratus* fertilization test). Thus, though not listed as a potential test species for use in stormwater monitoring in the MS4 permit, it was considered as a potentially sensitive species for the purposes of selecting the most sensitive species.

Due to the limitations of the giant kelp germination and growth test and the topsmelt survival and growth test, in addition to not being particularly sensitive to the constituents identified as problematic in stormwater water runoff from this watershed, these tests are not considered particularly helpful in supporting the identification of pollutants of concern. Based on the sensitivity, smaller test volume requirements, their ability to be housed in the lab prior to testing, and shorter exposure times, the *S. purpuratus* fertilization test and the red abalone development test will be considered during sensitive species selection to measure toxicity in marine and estuarine environments. Based on historical data of the sensitivity of the *S. purpuratus* and *H. rufescens* tests, and the limiting factors associated with the *A. affinis* and *M. pyrifera* tests, the sensitive species test for marine and estuarine species will be conducted with the *S. purpuratus* (sea urchin) and *H. rufescens* (red abalone) tests. Species screening was determined to be appropriate for these two species (as opposed to selecting just one) as testing

conducted within the region with both species have shown varying sensitivity. Thus, it is appropriate to test both to determine sensitivity at a given site. After the screening testing is completed, monitoring will be conducted with the most-sensitive species for the duration of the permit (4 years).

1.3.2 Testing Period

The following subsections characterize the toxicity testing periods for samples collected during dry and wet weather conditions.

(i) Freshwater Testing Periods

As wet weather conditions in the region generally persist for less than the acute and chronic testing periods (typically 48 hours and 7 days, respectively), the shorter of the two testing methods, in the case of *C. dubia* acute testing measuring survival, will be used for wet weather toxicity testing. Utilization of chronic tests to assess wet weather samples generates results that are not representative of receiving water conditions. Acute toxicity tests will be utilized to be consistent with the relatively shorter exposure periods of watershed species to potential urban stormwater toxicants. Acute testing to assess survival endpoints will be conducted in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (EPA, 2002b).

Chronic toxicity tests will be used to assess survival for *C. dubia* in dry weather samples. Chronic testing will be conducted on undiluted grab samples in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (USEPA, 2002a).

(ii) Saltwater Testing Period

Two marine and estuarine toxicity species tests utilize methods that have short durations (20 minutes for the *S. purpuratus* fertilization test and 48 hours for the *H. rufescens* development test), the end points are sub-lethal and can be considered representative of acute or chronic effects. Both test species and test methods are suitable for wet weather and dry weather monitoring.

1.3.3 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

As directed by the Permit MRP, acute and chronic toxicity test endpoints will be analyzed using the Test of Significant Toxicity (TST) t-test approach specified by the USEPA (USEPA, 2010). The Permit specifies that the chronic in-stream waste concentration (IWC) be set at 100% receiving water for receiving water samples and 100% discharge for outfall samples. Follow-up triggers are generally based on the Permit specified statistical assessment as described below.

For acute *C. dubia* toxicity testing, follow up toxicity identification evaluation (TIE) testing is warranted if a statistically significant 50% difference in mortality is observed between the sample and laboratory control, a toxicity identification evaluation (TIE) will be performed. TIE procedures are further discussed in detail in the following subsection. Experience conducting TIEs in regional receiving waters supports using a 50% mortality trigger to provide a reasonable opportunity for a successful TIE. During 2003 and 2004 TMDL monitoring in the Calleguas Creek Watershed (CCW), TIEs were initiated for samples exceeding the 50% threshold, the majority of which displayed 100% mortality. In that study, toxicity had degraded in approximately 40% of the samples on which the procedures were initiated making the effort unsuccessful in pinpointing specific toxicants. The Regional Board approved monitoring program for the CCW Toxicity, Chlorpyrifos and Diazinon TMDL utilizes a 50% threshold for TIE initiation. Additionally, a 50% mortality threshold is utilized in the Ventura County MS4 Permit.

For chronic *C. dubia* toxicity testing, if a statistically significant 50% difference in mortality is observed between the sample and laboratory control, a TIE will be performed. If a statistically significant 50% difference in a sub-lethal endpoint is observed between the sample and laboratory control, a confirmatory sample will be collected from the receiving water within two weeks of obtaining the results of the initial sample. If a statistically significant 50% difference in mortality or sub-lethal endpoint is observed between the sample and laboratory control on the confirmatory sample, a TIE will be performed.

For the chronic marine and estuarine tests, the percent effect will be calculated. The percent effect is defined as the difference between the mean control response and the mean IWC response divided by the control response, multiplied by 100. A TIE will be performed if the percent effect value is equal to or greater than 50 percent. The TIE procedures will be initiated as soon as possible after the toxicity trigger threshold is observed to reduce the potential for loss of toxicity during sample storage. If the cause of toxicity is readily apparent or is caused by pathogen related mortality (PRM) or epibiont interference, the result will be rejected. In cases where significant endpoint toxicity effects greater than 50% are observed in the original sample, but the follow-up TIE positive control "signal" is not statistically significant, the cause of toxicity will be considered non-persistent and no sample follow-up testing is required. Future test results should be evaluated to determine if parallel TIE treatments are necessary to provide an opportunity to identify the cause of toxicity.

1.3.4 Toxicity Identification Evaluation Approach

The results of toxicity testing will be used to trigger further investigations to determine the cause of observed laboratory toxicity. The primary purpose of conducting TIEs is to support the identification of management actions that will remove toxicants from the receiving waters. Successful TIEs will guide adaptive outfall monitoring strategies to identify and analyze for suspect pollutant(s) and guide source control efforts

The TIE approach is divided into three phases as described in USEPA's 1991 Methods for Aquatic Toxicity Identification Evaluations – Phase I Toxicity Characterization Procedures – Second Edition (EPA/600/6-9/003) and briefly summarized as follows:

- Phase I utilizes methods to characterize the physical/chemical nature of the constituents which cause toxicity. Such characteristics as solubility, volatility and filterability are determined without specifically identifying the toxicants. Phase I results are intended as a first step in specifically identifying the toxicants but the data generated can also be used to develop treatment methods that remove the toxicity without specifically identifying the toxicants.
- Phase II utilizes methods to specifically identify toxicants, or toxicant pollutant class.
- Phase III utilizes methods to confirm the identity of suspected toxicant(s).

TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b). Phase I testing will be conducted on samples that exceed the TIE thresholds. Water quality data will be reviewed to support future evaluation of potential toxicants. TIEs will perform the manipulations described in **Table C-5**.

Table C-5

Aquatic Toxicity Identification Evaluation Sample Manipulations

TIE Sample Manipulation	Expected Response
Adjust to between pH 7 and 8.5	Alters toxicity in pH sensitive compounds (i.e., ammonia and some trace metals)

Filtration or centrifugation	Removes particulates and associated toxicants
Ethylene Diamine Tetra Acetic Acid (EDTA)	Chelates trace metals, particularly divalent cationic metals
Sodium thiosulfate (STS) addition	Reduces toxicants attributable to oxidants (i.e., chlorine) and some trace metals
Piperonyl Butoxide (PBO)	Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity
Carboxylesterase addition[(1)]	Hydrolyzes pyrethroids
Solid Phase Extraction (SPE) with C18 column	Removes non-polar organics (including pesticides) and some relatively non-polar metal chelates
Sequential Solvent Extraction of C18 column	Further resolution of SPE-extracted compounds for chemical analyses
No Manipulation	Baseline test for comparing the relative effectiveness of other manipulations

(1) Carboxylesterase addition has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al., 2004; Weston and Amweg, 2007). However, this treatment is experimental in nature and should be used along with other pyrethroid-targeted TIE treatments (e.g., PBO addition).

As the primary goals of conducting TIEs is to identify pollutants for incorporation into outfall monitoring, narrowing the list of toxicants following Phase I TIEs via Phase II or III TIEs is not necessary if the toxicant class determined during the Phase I TIE is sufficient for: (1) identifying additional pollutants for outfall monitoring; and/or (2) identifying control measures. Thus, if the specific pollutant(s) or the analytical class of pollutant (e.g., metals that are analyzed via USEPA Method 200.8) are identified then sufficient information is available to inform the addition of pollutants to outfall monitoring.

Phase II TIEs may be utilized to identify specific toxicants in a sample if information beyond that gained via the Phase I TIE and review of chemistry data is needed to identify monitoring or management actions. Phase III TIEs will be conducted following any Phase II TIEs.

TIEs will be considered inconclusive if:

- The toxicity is persistent (i.e., observed in the positive control), and
- The cause of toxicity cannot be attributed to a class of constituents (e.g., insecticides, metals, etc.) that can be targeted for monitoring or additional source controls.

If (1) a combination of causes act in a synergistic or additive manner are identified; (2) the toxicity can be removed with a treatment or combination of the TIE treatments; or (3) the analysis of water quality data collected during the same event identifies the pollutant or analytical class of pollutants, the result of a TIE is considered conclusive.

Note that the MRP (page E-33) allows a TIE Prioritization Metric to be used in ranking sites for TIEs, As the extent to which TIEs will be conducted is unknown, prioritization cannot be assessed at this time, but may be utilized in the future based on the results of toxicity monitoring and the CIMP adaptive management.

1.3.5 Discharge Assessment

The SMB EWMP Group will prepare a Discharge Assessment Plan (DAP) if TIEs conducted on consecutive sampling events are inconclusive. The Discharge Assessment will only be initiated after consecutive inconclusive TIEs, because of the inherit variability associated with the toxicity and TIE testing methods.

The DAP will consider the observed potential receiving and outfall toxicants, above known species effect levels and the relevant exposure periods compared to the duration of the observed toxicity. The DAP will identify:

1. Additional potential receiving water toxicity monitoring to further evaluate the spatial extent of toxicity.
2. The toxicity test species to be utilized. If a different species is proposed, justification for the substitution will be provided.
3. The number and location of monitoring sites and their spatial relation to the observed receiving water toxicity.
4. The number of monitoring events that will be conducted, a schedule for conducting the monitoring, and a process for evaluating the completion of the assessment monitoring.

The DAP will be submitted to Regional Board staff for comment within 60 days of receipt of notification of the second consecutive inconclusive result. If no comments are received within 30 days, it will be assumed that the approach is appropriate for the given situation and the DAP will be implemented within 90-days of submittal. If comments are received within 30 days, the Plan will be resubmitted to Regional Board staff and the DAP will be implemented within 90-days of submittal of a version of the Plan that does not receive comments from Regional Board staff.

1.3.6 Follow Up on Toxicity Testing Results

The MRP (page E-33) indicates the following actions should be taken when a toxicant or class of toxicants is identified through a TIE:

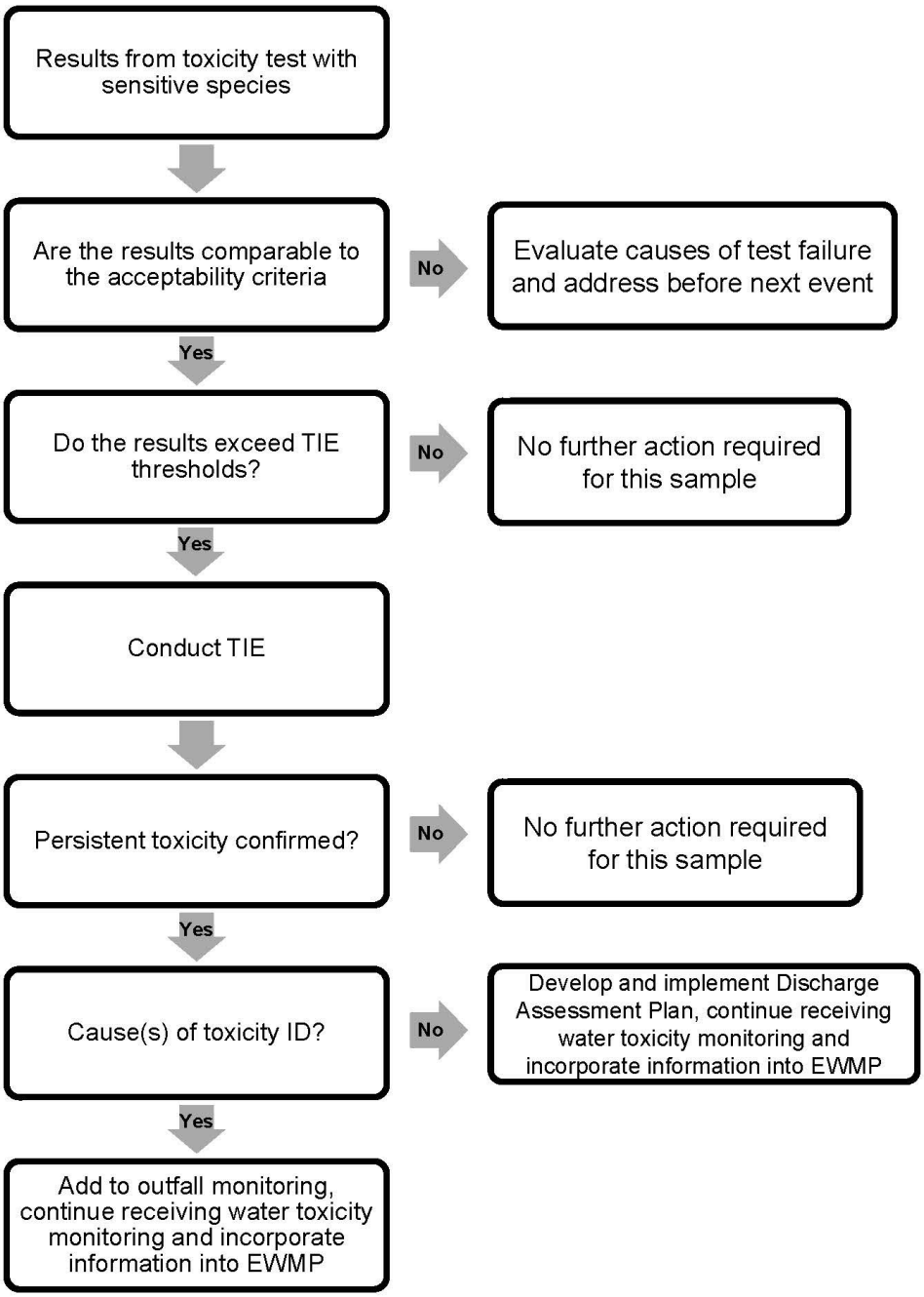
- SMB EWMP Group Members shall analyze for the toxicant(s) during the next scheduled sampling event in the discharge from the outfall(s) upstream of the receiving water location.
- If the toxicant is present in the discharge from the outfall at levels above the applicable receiving water limitation, a toxicity reduction evaluation (TRE) will be performed for that toxicant.
- The list of constituents monitored at outfalls identified in the CIMP will be modified based on the results of the TIEs.

Monitoring for constituents identified based on the results of a TIE will occur as soon as feasible following the completion of a successful TIE (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a successful TIE).

The identification and implementation of control measures to address the causes of toxicity are tied to management of the stormwater program, not the CIMP. It is expected that the requirements of TREs will only be conducted for toxicants that are not already addressed by an existing Permit requirement (i.e., TMDLs) or existing or planned management actions.

1.3.7 Summary of Aquatic Toxicity Monitoring

The approach to conducting aquatic toxicity monitoring as described in the previous sections is summarized in detail in **Figure C-2**. The intent of the approach is to identify the cause of toxicity observed in receiving water to the extent possible with the toxicity testing tools available, thereby directing outfall monitoring for the pollutants causing toxicity with the ultimate goal of supporting the development and implementation of management actions.



Test failure includes pathogen or epibont interference, which should be addressed prior to the next toxicity sampling event.

For freshwater, the TIE threshold is equal to or greater than 50% (≥50%) or 2 chronic toxic unit (TUc) mortality in an acute (wet weather) or chronic (dry weather) test. If a ≥50% effect in a sub-lethal endpoint for chronic test is observed during dry weather,

a follow up sample will be collected within two weeks of the completion of the initial sample collection. If the follow up sample exhibits a ≥50% effect, a TIE will be initiated.

For marine waters and estuarine waters, the TIE threshold is the percent effect value ≥50%. If a ≥50% or greater effect is observed during dry weather a follow up sample will be collected within two weeks of the initial sample collection and if the follow up sample exhibits a ≥50% effect, a TIE will be initiated.

The goal of conducting Phase I TIEs is to identify the cause of toxicity so that outfall monitoring can incorporate the toxicant(s) into the list of constituents monitored during outfall monitoring. Thus, if specific toxicant(s) or the analytical class of toxicants (i.e., metals that are analyzed via EPA Method 200.8) are identified, sufficient information is available to inform the addition of pollutants to the list of pollutants monitored during outfall monitoring.

Figure C-2. Detailed Aquatic Toxicity Assessment Process

1.4 List of Laboratories Conducting Analysis

The chosen laboratories will be able to meet the measurement quality objectives set forth in

Table C-2. Sample container and volumes, as listed in **Table C-4**, will vary based on the chosen laboratories. The chosen laboratories will meet California Environmental Laboratory Accreditation Program (ELAP) and/or National Environmental Laboratory Accreditation Program (NELAP) certifications and any data quality requirements specified in this document. Due to contracting procedures and solicitation requirements, qualified laboratories have not yet been selected to carry out the analytical responsibilities described in this CIMP. Selected laboratories will be listed, per the example shown in **Table C-6,** along with lab certification information. Following the completion of the first monitoring year, the pertinent laboratory specific information will be included in the Integrated Monitoring Compliance Report Section of the Annual Report. At the end of all future monitoring years the SMB EWMP Group will assess the laboratories performance and at that time a new laboratory may be chosen.

Table C-6

Summary of Laboratories Conducting Analysis for the SMB EWMP Group CIMP

Laboratory[1]	General Category of Analysis	Lab Certification No. & Expiration Date[2]

1. Information for all laboratories will be added to this table following their selection and upon CIMP update.
2. Lab certifications are renewed on an annual basis.

1.6.1 Alternate Laboratories

In the event that the laboratories selected to perform analyses for the CIMP are unable to fulfill data quality requirements outlined herein (e.g., due to instrument malfunction), alternate laboratories need to meet the same requirements that the primary labs have met. The original laboratory selected may recommend a qualified laboratory to act as a substitute. However, the final decision regarding alternate laboratory selection rests with the SMB EWMP Group.

Section 2
Sampling Methods and Sample Handling

The sections below discuss the steps to be taken to properly prepare for and initiate water quality sampling for the CIMP. SMBBB TMDL monitoring will continue per the CSMP.

2.1.1 Monitoring Event Preparation

Monitoring event preparation includes preparation of field equipment, placing bottle orders, and contacting the necessary personnel regarding site access and schedule. The following steps will be completed two weeks prior to each sampling event (a condensed timeline may be appropriate in storm events, which may need to be completed on short notice):

1. Contact laboratories to order sample containers and to coordinate sample transportation details.
2. Confirm scheduled monitoring date with field crew(s), and set-up sampling day itinerary including sample drop-off.
3. Prepare equipment.
4. Prepare sample container labels and apply to bottles.
5. Prepare the monitoring event summary and field log sheets to indicate the type of field measurements, field observations and samples to be collected at each of the monitoring sites.
6. Verify that field measurement equipment is operating properly (i.e., check batteries, calibrate, etc.)

Table C-7 provides a checklist of field equipment to prepare prior to each monitoring event.

Table C-7

Field Equipment Checklist

☐	Monitoring Plan
☐	Sample Containers plus Extras with Extra Lids
☐	Pre-Printed, Waterproof Labels (extra blank sheets)
☐	Event Summary Sheets
☐	Field Log Sheets
☐	Chain of Custody Forms
☐	Bubble Wrap
☐	Coolers with Ice
☐	Tape Measure
☐	Paper Towels or “Rags in a Box”
☐	Safety Equipment
☐	First Aid Kit
☐	Cellular Telephone
☐	Gate Keys
☐	Hip Waders
☐	Plastic Trash Bags
☐	Sealable Plastic Bags
☐	Grab Pole
☐	Clean Secondary Container(s)
☐	Field Measurement Equipment
☐	New Powder-Free Nitrile Gloves
☐	Writing Utensils
☐	Stop Watch
☐	Camera
☐	Blank Water

2.1.1 Bottle Order/Preparation

Sample container orders will be placed with the appropriate analytical laboratory at least two weeks prior to each sampling event. Containers will be ordered for all water samples, including quality control samples, as well as extra containers in case the need arises for intermediate containers or a replacement. The containers must be the proper type and size and contain preservative as appropriate for the specified laboratory analytical methods.

Table C-4 presents the proper container type, volume, and immediate processing and storage needs. The field crew must inventory sample containers upon receipt from the laboratory to ensure that adequate containers have been provided to meet analytical requirements for each monitoring event. After each event, any bottles used to collect water samples will be cleaned by the laboratory and either picked up by or shipped to the field crew.

2.1.2 Container Labeling and Sample Identification Scheme

Samples will be identified with a unique identification code to ensure that results are properly reported and interpreted. The following scheme will be used by the SMB EWMP Group, but alternative methods may be utilized in the future. Samples will be identified such that the site, sampling location, matrix, sampling equipment and sample type (i.e., environmental sample or QC sample) can be distinguished by a data reviewer or user. Sample identification codes will consist of a site identification code, a matrix code, and a unique sample identification code. The format for sample identification codes is AAA-SMB-AA-### - XXX, where:

- AAAA indicates the unique site ID for each site.
- SMB indicates that the sample was collected as part of the SMB EWMP Group CIMP.
- ###- identifies the sequentially numbered monitoring event, and the # is an optional indicator for re-samples collected for the same event. Sample events are numbered from 001 to 999 and will not be repeated. XXX identifies the sample number unique to a sample bottle collected for a single event. Sample bottles are numbered sequentially from 001 to 999 and will not be repeated within a single event.

Custom bottle labels should be produced using blank waterproof labels and labeling software. This approach will allow the site and analytical constituent information to be entered in advance and printed as needed prior to each monitoring event. Labels will be placed on the appropriate bottles in a dry environment; applying labels to wet sample bottles should be avoided. Labels should be placed on sides of bottles rather than on bottle caps. All sample containers will be pre-labeled before each sampling event to the extent practicable. Pre-labeling sample containers simplifies field activities, leaving only sample collection time and date and field crew initials to be filled out in the field. Labels should include the following information:

Program Name	Date	Analytical Requirements
Station ID	Collection Time	Preservative Requirements
Sample ID	Sampling Personnel	Analytical Laboratory

2.1.3 Field Meter Calibration

Calibration of field measurement equipment is performed as described in the owner's manuals for each individual instrument. Each individual field crew will be responsible for calibrating their field measurement equipment. Field monitoring equipment must meet the requirements outlined in **Table C-1** and be calibrated before field events based on manufacturer guidance, but at a minimum prior to each event. **Table C-8** outlines the typical field instrument calibration procedures for each piece of equipment requiring calibration. Each calibration will be documented on each event's calibration log sheet (presented in **Appendix A**).

If calibration results do not meet manufacturer specifications, the field crew should first try to recalibrate using fresh aliquots of calibration solution. If recalibration is unsuccessful, new calibration solution should be used and/or maintenance should be performed. Each attempt should be recorded on the equipment calibration log. If the calibration results cannot meet manufacturer's specifications, the field crew should use a spare field measuring device that can be successfully calibrated. If a spare field measuring device that can be successfully calibrated is unavailable, field crews shall note the use of unsuccessfully calibrated equipment on each appropriate field log sheet. Additionally, the SMB EWMP Group should be notified.

Calibration should be verified using at least one calibration fluid within the expected range of field measurements, both immediately following calibration and at the end of each monitoring day. Individual parameters should be recalibrated if the field meters do not measure a calibration fluid within the range of accuracy presented in **Table C-1**. Calibration verification documentation will be retained in the event's calibration verification log.

Table C-8

Calibration of Field Measurement Equipment

Equipment / Instrument	Calibration and Verification Description	Frequency of Calibration	Frequency of Calibration Verification	Responsible Party
pH Probe	Calibration using standard buffer solutions. Use of mid-range buffer to verify successful calibration.	Day prior to or 1st day of sampling event	After calibration and at the end of each sampling day	Individual Sampling Crews
Temperature	Requires no subsequent calibration.			
Dissolved Oxygen Probe	Calibrated using water saturated air environment. DO measurement of water-saturated air will be performed and compared to a standard table of DO concentrations in water as a function of temperature and barometric pressure to verify successful calibration.			
Conductivity	Follow manufacturer's specifications. Use of mid-range conductivity standard to verify successful calibration.			
Turbidity	Follow manufacturer's specifications. Use of mid-range turbidity standard to verify successful calibration.			

2.1.4 Weather Conditions

Monitoring will occur during dry and wet conditions. Dry weather will occur on days with less than 0.1 inch of rain and not within three days after a rain event of 0.1 inch or greater within the watershed, as measured from at least 50 percent of Los Angeles County controlled rain gauges within the watershed. Wet weather, other than the first event, will be defined as a storm event of greater than or equal to 0.1 inch of precipitation, as measured from at least 50 percent of the Los Angeles County controlled rain gauges within the watershed.

Note that if rainfall begins after dry weather monitoring has been initiated, then dry weather monitoring will be suspended and continued on a subsequent day when weather conditions meet the dry weather conditions. Generally, grab samples will be collected during dry weather and composite samples will be collected during wet weather. Grab samples may be utilized to collect wet weather sampling in certain situations, which may include, but are not limited to, when the constituent of interest requires the use of grab samples (e.g., *E. coli* and oil and grease), situations where it is unsafe to collect composite samples, or to perform investigative monitoring where composite sampling or installation of an automatic sample compositor (autosampler) may not be warranted.

The MRP includes specific criteria for the time of monitoring events. With the exception of bacteria, most constituents will be monitored during dry weather monitoring events. For dry weather toxicity monitoring, sampling must take place during the historically driest month.

The first significant rain event of the storm year (first flush) will be monitored. The targeted storm events for wet weather sampling will be selected based on a reasonable probability that the events will result in substantially increased flows over at least 12 hours. Sufficient precipitation is needed to produce runoff and increase flow. The decision to sample a storm event will be made in consultation with weather forecasting information services after a quantitative precipitation forecast (QPF) has been determined. All efforts will be made to collect wet weather samples from all sites during a single targeted storm event. However, safety or other factors may make it infeasible to collect samples from a given storm event. For example, storm events that will require field crews to collect wet weather samples during holidays and/or weekends may not be sampled due to sample collection or laboratory staffing constraints.

For the first storm to be tracked, the event will have a predicted rainfall of at least 0.25 inches with at least a 70 percent probability of rainfall 24 hours prior to the forecasted time of initial rainfall. Because a significant storm event is based on predicted rainfall, it is recognized that this monitoring may be triggered without 0.25 inches of rainfall actually occurring. In this case, the monitoring event will still qualify as meeting this requirement provided that sufficient sample volume is collected to do all required laboratory analysis. Documentation will be provided showing the predicted rainfall amount. Subsequent storm events must meet the tracking requirements per Attachment E of the MS4 Permit, flow objectives, as well as be separated by a minimum of three days of dry weather. Antecedent conditions will be based on the LACDPW rain gage listed in **Table C-9**. Data can be obtained at http://dpw.lacounty.gov/wrd/Precip/index.cfm by clicking the 'See Data' link in the "Near Real-Time Precipitation Map" section. The web page displays a map showing real-time rainfall totals (in inches) for different rain gages. Although the default precipitation period is 24 hours, the user can view rainfall totals over different durations. Data from the rain gages is updated every 10 minutes.

Table C-9

Real-Time Rain Gage Used to Define Weather Conditions for CIMP Monitoring[1]

Rainfall Gage	Operator	Latitude	Longitude
Electric Ave Pump Plant (461)	Los Angeles County Department of Public Works	33°59'35.15"N	118°28'22.15"W

1. Information for the gage can be found at http://dpw.lacounty.gov/wrd/Precip/alertlist.cfm.

For the purpose of triggering wet weather sampling preparation, a predicted rainfall of 0.1-0.5 inches in a 6- to 12-hour period would be sufficient to mobilize for wet weather sampling. The National Weather Service's weather forecast for the SMB EWMP Group EWMP area can be accessed on-line at http://www.wrh.noaa.gov/lox/ then click on the location of the SMB EWMP Group EWMP area on the area map. From the forecast page, the link to "Quantitative Precipitation Forecast" provides forecasted precipitation in inches for the next 24 hours, in 3-hour increments for the first 12 hours and in 6-hour increments for the last 12 hours.

2.2 Sample Handling

Proper sample handling ensures the samples will comply with the monitoring methods and analytical hold time and provides traceable documentation throughout the history of the sample.

2.2.1 Documentation Procedures

The SMB EWMP Group is responsible for ensuring that each field sampling team adheres to proper custody and documentation procedures. Field log sheets documenting sample collection and other monitoring activities for each site will be bound in a separate master logbook for each event and/or scanned and stored electronically. Field personnel have the following responsibilities:

1. Keep an accurate written record of sample collection activities on the field log sheets.
2. Ensure that all field log sheet entries are legible and contain accurate and inclusive documentation of all field activities.
3. Note errors or changes using a single line to cross out the entry and date and initial the change.
4. Ensure that a label is affixed to each sample collected and that the labels uniquely identify samples with a sample ID, site ID, date and time of sample collection and the sampling crew initials.
5. Complete the chain of custody forms accurately and legibly.

2.2.2 Field Documentation/Field Log

Field crews will keep a field log book, and/or filed electronically, for each sampling event that contains a calibration log sheet, a field log sheet for each site, and appropriate contact information. The following items should be recorded on the field log sheet for each sampling event:

- Monitoring station location (Station ID);
- Date and time(s) of sample collection;
- Name(s) of sampling personnel;
- Sample collection depth;
- Sample ID numbers and unique IDs for any replicate or blank samples;
- QC sample type (if appropriate);
- Requested analyses (specific parameters or method references);
- Sample type (e.g., grab or composite);
- The results of field measurements (e.g., flow, temperature, dissolved oxygen, pH, conductivity, turbidity) and the time that measurements were made;
- Qualitative descriptions of relevant water conditions (e.g., water color, flow level, clarity) or weather (e.g., wind, rain) at the time of sample collection;
- Trash observations (presence/absence);
- A description of any unusual occurrences associated with the sampling event, particularly those that may affect sample or data quality.

The field log will be scanned into a PDF within one week of the conclusion of each sampling event. Alternatively, all measurements could be collected on an electronic device such as laptop or tablet computer. **Appendix A** contains an example of the field log sheet.

2.2.3 Chain-of Custody Forms

Sample custody procedures provide a mechanism for documenting information related to sample collection and handling. Sample custody must be traceable from the time of sample collection until results are reported. A sample is considered under custody if:

- It is in actual possession.
- It is in view after in physical possession.
- It is placed in a secure area (accessible by or under the scrutiny of authorized personnel only after

in possession).

A COC form must be completed after sample collection and prior to sample shipment or release. The COC form, sample labels, and field documentation will be cross-checked to verify sample identification, type of analyses, number of containers, sample volume, preservatives, and type of containers. A complete COC form is to accompany the transfer of samples to the analyzing laboratory. A typical COC form is presented in **Appendix A**.

2.2.4 Sample Handling and Shipment

The field crews will maintain custody of samples during each monitoring event. Chain-of-custody (COC) forms will accompany all samples during shipment to contract laboratories to identify the shipment contents. All water quality samples will be transported to the analytical laboratory by the field crew or by courier. The original COC form will accompany the shipment, and a signed copy of the COC form will be sent, typically via email or fax, by the laboratory to the field crew to be retained in the project file.

While in the field, samples will be stored on ice in an insulated container. Samples that must be shipped to the laboratory must be examined to ensure that container lids are tight and placed on ice to maintain the appropriate temperature. The ice packed with samples must be approximately 2 inches deep at the top and bottom of the cooler, and must contact each sample to maintain temperature. The original COC form(s) will be double-bagged in re-sealable plastic bags and either taped to the outside of the cooler or to the inside lid. Samples must be shipped to the contract laboratory according to transportation standards. The method(s) of shipment, courier name, and other pertinent information should be entered in the "Received By" or "Remarks" section of the COC form.

Coolers must be sealed with packing tape before shipping, unless transported by field or lab personnel, and must not leak. It is assumed that samples in tape-sealed ice chests are secure whether being transported by common carrier or by commercial package delivery. The laboratory's sample receiving department will examine the shipment of samples for correct documentation, proper preservation and compliance with holding times.

The following procedures are used to prevent bottle breakage and cross-contamination:

- Bubble wrap or foam pouches are used to keep glass bottles from contacting one another to prevent breakage, re-sealable bags will be used if available.
- All samples are transported inside hard plastic coolers or other contamination-free shipping containers.
- If arrangements are not made in advance, the laboratory's sample receiving personnel must be notified prior to sample shipment.

All samples remaining after successful completion of analyses will be disposed of properly. It is the responsibility of the personnel of each analytical laboratory to ensure that all applicable regulations are followed in the disposal of samples or related chemicals. Samples will be stored and transported as noted in **Table C-4**. Samples not analyzed locally will be sent on the same day that the sample collection process is completed, if possible. Samples will be delivered to the appropriate laboratory as will be indicated in **Table C-10**. Note that due to procurement procedures, the analytical laboratories have not been identified at this time. Information for all laboratories will be added to this table following their selection. All appropriate contacts will be listed along with lab certification information in **Table C-10**.

Table C-10

Information on Laboratories Conducting Analysis for the SMB EWMP Group CIMP

Laboratory[1]	General Category of Analysis	Shipping Method	Contact	Phone	Address	Lab Certification No. & Expiration Date[2]

1. Information for all laboratories will be added to this table following their selection and upon CIMP update.
2. Lab certifications are renewed on an annual basis.

2.2.5 Laboratory Custody Procedures

Laboratories will follow sample custody procedures as outlined in the laboratory's Quality Assurance (QA) Manual. A copy of each contract laboratory's QA Manual should be available at the laboratory upon request. Laboratories shall maintain custody logs sufficient to track each sample submitted and to analyze or preserve each sample within specified holding times. The following sample control activities must be conducted at the laboratory:

- Initial sample login and verification of samples received with the COC form;
- Document any discrepancies noted during login on the COC;
- Initiate internal laboratory custody procedures;
- Verify sample preservation (e.g., temperature);
- Notify the SMB EWMP Group if any problems or discrepancies are identified; and,
- Perform proper sample storage protocols, including daily refrigerator temperature monitoring and sample security.

Laboratories shall maintain records to document that the above procedures are followed. Once samples have been analyzed, samples will be stored at the laboratory for at least 60 days. After this period, samples may be disposed of properly.

2.3 Field Protocols

Briefly, the key aspects of quality control associated with field protocols for sample collection for eventual chemical and toxicological analyses are as follows:

1. Field personnel will be thoroughly trained in the proper use of sample collection gear and will be able to distinguish acceptable versus unacceptable water samples in accordance with pre-established criteria.
2. Field personnel will be thoroughly trained to recognize and avoid potential sources of sample contamination (e.g., engine exhaust, ice used for cooling).
3. Sampling gear and utensils which come in direct contact with the sample will be made of non-contaminating materials (e.g., borosilicate glass, high-quality stainless steel and/or Teflon™, according to protocol) and will be thoroughly cleaned between sampling stations according to appropriate cleaning protocol (rinsing thoroughly at minimum).
4. Sample containers will be of the recommended type and will be free of contaminants (i.e., pre-cleaned).
5. Conditions for sample collection, preservation, and holding times will be followed.

Field crews will comprise of a minimum of two persons per crew. To ensure safety, field crews will have the necessary Personal Protective Equipment (PPE). Other constraints on sampling events include, but are not limited to, lab closures and toxicity testing organism availability. Sampling events should proceed in the following manner:

1. Before leaving the sampling crew base of operations, confirm number and type of sample containers as well as the complete equipment list.
2. Proceed to the first sampling site.
3. Fill-out the general information on the field log sheet.
4. Collect the environmental and quality assurance/quality control (QA/QC) samples indicated on the event summary sheet and store samples appropriately. Using the field log sheet, confirm that all appropriate containers were filled.
5. Collect field measurements and observations, and record these on the field log sheet.
6. Repeat the procedures in steps 3, 4, and 5 for each of the remaining sampling sites.
7. Complete the COC forms using the information on the field log sheets.
8. After sample collection is completed, deliver and/or ship samples to appropriate laboratory.

2.4 Sample Collection

All samples will be collected in a manner appropriate for the specific analytical methods to be used. The proper sampling techniques, outlined in this section, will ensure that the collected samples are representative of the waterbodies sampled. Should field crews feel that it is unsafe to collect samples for any reason, the field crews **SHOULD NOT COLLECT** a sample and note on the field log that the sample was not collected, why the sample was not collected, and provide photo documentation, if feasible.

2.4.1 Overview of Sampling Techniques

As described below, the method used to collect water samples is dependent on the depth, flow, and sampling location (receiving water, outfall). Nonetheless, in all cases:

1. Throughout each sample collection event, the sampler should exercise aseptic techniques (i.e., do not touch the inner surfaces or lip edges of the sample bottle or cap).
2. The sampler should use clean, powder-free, nitrile gloves for each site to prevent contamination.
3. When collecting the sample, the sampler should not breathe, sneeze, or cough in the direction of the container.
4. Gloves should be changed if they are soiled, or if the potential for cross-contamination exists from handling sampling materials or samples.
5. While the sample is collected, the bottle lid shall not be placed on the ground.
6. The sampler should not eat or drink during sample collection.
7. The sampler should not smoke during sample collection.
8. Each person on the field crew should wear clean clothing that is free of dirt, grease, or other substances that could contaminate the sampling apparatus or sample bottles.
9. Sampling should not occur near a running vehicle. Vehicles should not be parked within the immediate sample collection area.
10. When the sample is collected, ample air space should be left in the bottle to facilitate mixing by shaking for lab analysis, unless otherwise required by the method.
11. After the sample is collected and the cap is tightly screwed back on the bottle, the time of sampling should be recorded on the field log sheet.
12. Any QA/QC samples that are collected should be also be noted on the field log sheet and labeled according the convention described in **Section 2.1.1** of this Attachment.

13. Samples should be stored as previously described.
14. COC forms should be filled out as described in **Section 2.2** of this Attachment and delivered to the appropriate laboratory as soon as feasible to ensure hold times are met.

To prevent contamination of samples, clean metal sampling techniques using USEPA protocols outlined in USEPA Method 1669[1] will be used throughout all phases of the water sample collection. The protocol for clean metal sampling, based on USEPA Method 1669, is summarized below:

1. Samples are collected in rigorously pre-cleaned sample bottles with any tubing specially processed to clean sampling standards.
2. At least two persons, wearing clean, powder-free nitrile or latex gloves at all times, are required on a sampling crew.
3. One person, referred to as "dirty hands", opens only the outer bag of all double-bagged sample bottles.
4. The other person, referred to as "clean hands", reaches into the outer bag, opens the inner bag and removes the clean sample bottle.
5. Clean hands rinses the bottle at least two times by submerging the bottle, removing the bottle lid, filling the bottle approximately one-third full, replacing the bottle lid, gently shaking and then emptying the bottle. Clean hands then collects the sample by submerging the bottle, removing the lid, filling the bottle and replacing the bottle cap while the bottle is still submerged.
6. After the sample is collected, the sample bottle is double-bagged in the opposite order from which it was removed from the same double-bagging.
7. Clean, powder-free gloves are changed whenever something not known to be clean has been touched.

2.4.2 Field Measurements and Observations

Field measurements will be collected and observations made at each sampling site before sample collection to avoid compromising sample integrity. Field measurements will include the parameters identified in the CIMP for which a laboratory analysis is not being conducted. Field monitoring equipment must meet the requirements outlined in

1 USEPA. April 1995. *Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels.* EPA 821-R-95-034.

Table C-3. All field measurement results and field observations will be recorded on a field log sheet similar to the one presented in **Appendix A** and as described in **Section 2.2** of this Attachment.

Measurements (except for flow) will be collected at approximately mid-stream, mid-depth at the location of greatest flow (if feasible) with a Hydrolab DS4 multi-probe meter, or comparable instrument(s). If at any time the collection of field measurements by wading appears to be unsafe, field crews will not attempt to collect mid-stream, mid-depth measurements. Rather, field measurements will be made either directly from a stable, unobstructed area at the channel edge, or by using a telescoping pole and intermediate container to obtain a sample for field measurements and for filling sample containers. For situations where flows are not sufficiently deep to submerge the probes, an intermediate container will be utilized. The location of field measurements will be documented on the field log sheet.

Flow measurements will be collected as outlined in the following subsections at freshwater receiving water and non-stormwater outfall monitoring sites. Regardless of measurement technique used, if a staff gage is present the gage height will be noted. Field crews may not be able to measure flow at several sites during wet weather because of inaccessibility of the site. If this is the case, site inaccessibility will be documented on the field log sheet.

The field sampling crew has the primary responsibility for responding to failures in the sampling or measurement systems. Deviations from established monitoring protocols will be documented in the comment section of the field log sheet and noted in the post event summaries. If monitoring equipment fails, monitoring personnel will report the problem in the notes section of the field log sheet and will not record data values for the variables in question. Broken equipment will be replaced or repaired prior to the next field use. Data collected using faulty equipment will not be used.

(i) Velocity Meter Flow Measurements

For sampling sites where water is deep enough (>0.1-foot) a velocity meter will be utilized. For these cases, velocity will be measured at approximately equal increments across the width of the flowing water using a Marsh-McBirney Flo-Mate® velocity meter2 or equivalent, which uses an electromagnetic velocity sensor. A "flow pole" will be used to measure the water depth at each measurement point and to properly align the sensor so that the depth of each velocity measurement is approximately equal to 0.6 * total depth, which is representative of the average velocity. The distance between velocity measurements taken across the stream is dependent on the total width. No more than 10% of the flow will pass through any one cross section.

(ii) Shallow Sheet Flow Measurements

If the depth of flow does not allow for the measurement of flow with a velocity meter (<0.1-foot) a "float" will be used to measure the velocity of the flowing water. The width, depth, velocity, cross section, and corresponding flow rate will be estimated as follows:

- **Sheet flow width:** The width (W) of the flowing water (not the entire part of the channel that is damp) is measured at the "top", "middle", and "bottom" of a marked-off distance – generally 10 feet (e.g., for a 10-foot marked-off section, W_{Top} is measured at 0-feet, W_{Mid} is measured at 5 feet, and W_{Bottom} is measured at 10 feet).

2 For more information, see http://marsh-mcbirney.com/Products/2000.htm

- **Sheet flow depth:** The depth of the sheet flow is measured at the top, middle, and bottom of the marked-off distance. Specifically, the depth (D) of the sheet flow is measured at 25%, 50%, and 75% of the flowing width (e.g., $D_{50\%}^{Mid}$ is the depth of the water at middle of the section in the middle of the sheet flow) at each of the width measurement locations. It is assumed that the depth at the edge of the sheet flow (i.e., at 0% and 100% of the flowing width) is zero.
- **Representative cross-section:** Based on the collected depth and width measurements, the representative cross-sectional area across the marked-off sheet flow is approximated as follows:

$$\text{Re}presentative\ Cross\ Section =$$

$$Average\ \{[\frac{W_{Top}}{4}\times(\frac{D_{25\%}^{Top}}{2}+\frac{\left(D_{50\%}^{Top}+D_{25\%}^{Top}\right)}{2}+\frac{\left(D_{75\%}^{Top}+D_{50\%}^{Top}\right)}{2}+\frac{D_{75\%}^{Top}}{2})],$$
$$[\frac{W_{Mid}}{4}\times(\frac{D_{25\%}^{Mid}}{2}+\frac{\left(D_{50\%}^{Mid}+D_{25\%}^{Mid}\right)}{2}+\frac{\left(D_{75\%}^{Mid}+D_{50\%}^{Mid}\right)}{2}+\frac{D_{75\%}^{Mid}}{2})],$$
$$[\frac{W_{Bottom}}{4}\times(\frac{D_{25\%}^{Bottom}}{2}+\frac{\left(D_{50\%}^{Bottom}+D_{25\%}^{Bottom}\right)}{2}+\frac{\left(D_{75\%}^{Bottom}+D_{50\%}^{Bottom}\right)}{2}+\frac{D_{75\%}^{Bottom}}{2})]\}$$

- **Sheet flow velocity:** Velocity is calculated based on the amount of time it took a float to travel the marked-off distance (typically 10-feet or more). Floats are normally pieces of leaves, litter, or floatables (suds, etc.). The time it takes the float to travel the marked-off distance is measured at least three times. Then average velocity is calculated as follows:

$$Average\ Surface\ Velocity = \frac{Distance\ Marked\ off\ for\ Float\ Measurement}{Average\ Time\ for\ Float\ to\ Travel\ Marked\ off\ Distance}$$

- **Flow Rate calculation:** For sheet flows, based on the above measurements/estimates, the estimated flow rate, Q, is calculated by:

$$Q = f\ x\ (Representative\ Cross\ Section)\ x\ (Average\ Surface\ Velocity)$$

The coefficient f is used to account for friction effects of the channel bottom. That is, the float travels on the water surface, which is the most rapidly-traveling portion of the water column. The average velocity, not the surface velocity, determines the flow rate, and thus f is used to "convert" surface velocity to average velocity. In general, the value of f typically ranges from 0.60 – 0.90 (USGS 1982). Based on flow rate measurements taken during the LA River Bacteria Source Identification Study (CREST 2008) a value of 0.75 will be used for f.

(iii) Free-flowing outfalls

Some storm drain outfalls are free-flowing, meaning the runoff falls from an elevated outfall into the channel, which allows for collection of the entire flowing stream of water into a container of known volume (e.g., graduated bucket or graduated Ziploc bag). The time it takes to fill the known volume is measured using a stopwatch, and recorded on the field log. The time it takes to fill the container will be measured three times and averaged to ensure that the calculated discharge is representative. In some cases, a small portion of the runoff may flow around or under the container. For each measurement, "percent capture", or the proportion of flow estimated to enter the bucket, will be recorded. For free-flowing outfalls, the estimated flow rate, Q, is calculated by:

$$Q = Average\ [\frac{Filled\ \ container\ \ Volume}{(Time\ \ to\ \ Fill\ \ Container) \times (Estimated\ \ \ Capture)}]$$

Based on measurements of free-flowing outfalls during the LA River Bacteria Source Identification Study (CREST, 2008), estimated capture typically ranges from 0.75 – 1.0.

2.4.3 Sampling Techniques for the Collection of Water

The following subsections provide details on the various techniques that can be utilized to collect water quality samples. Should field crews feel that it is unsafe to collect samples for any reason, the field crews **SHOULD NOT COLLECT** a sample and note on the field log that the sample was not collected, why the sample was not collected, and provide photo documentation, if feasible.

(i) Direct Submersion: Hand Technique

Where practical, all grab samples will be collected by direct submersion at mid-stream, mid-depth using the following procedures:

1. Follow the standard sampling procedures described in **Section 2.4.1** of this Attachment.
2. Remove the lid, submerge the container to mid-stream/mid-depth, let the container fill and secure the lid. In the case of mercury samples, remove the lid underwater to reduce the potential for contamination from the air.
3. Place the sample on ice.
4. Collect the remaining samples including quality control samples, if required, using the same protocols described above.
5. Follow the sample handling procedures described in **Section 2.2** of this Attachment.

(ii) Intermediate Container Technique

Samples may be collected with the use of a clean intermediate container, if necessary, following the steps listed below. An intermediate container may include a container that is similar in composition to the sample container, a pre-cleaned pitcher made of the same material as the sample container, or a Ziploc bag. An intermediate container should not be reused at a different site without appropriate cleaning.

1. Follow the standard sampling procedures described in **Section 2.4.1** of this Attachment.
2. Submerge the intermediate container to mid-stream/mid-depth (if possible), let the container fill, and quickly transfer the sample into the individual sample container(s) and secure the lid(s).
3. Place the sample(s) on ice.
4. Collect remaining samples including quality control samples, if required, using the same protocols described above.
5. Follow the sample handling procedures described in **Section 2.2** of this Attachment.

Some flows may be too shallow to fill a container without using an intermediate container. When collecting samples from shallow sheet flows it is very important to not scoop up algae, sediment, or other particulate matter on the bottom because such debris is not representative of flowing water. To prevent scooping up such debris either: (1) find a spot where the bottom is relatively clean and allow the sterile intermediate container to fill without scooping; or (2) lay a clean sterile Ziploc® bag on the bottom and collect the water sample from on top of the bag. A fresh Ziploc® bag must be used at each site.

(iii) Pumping

Samples may be collected with the use of a peristaltic pump and specially cleaned tubing following the steps listed below. Sample tubing should not be reused at a different site without appropriate cleaning.

1. Follow the standard sampling procedures described in **Section 2.4.1** of this Attachment.
2. Attach pre-cleaned tubing into the pump, exercising caution to avoid allowing tubing ends to touch any surface known not to be clean. A separate length of clean tubing must be used at each sample location for which the pump is used.
3. Place one end of the tubing below the surface of the water. To the extent possible, avoid placing the tubing near the bottom so that settled solids are not pumped into the sample container.
4. Hold the other end of the tubing over the opening of the sample container, exercising care not to touch the tubing to the sample container.
5. Pump the necessary sample volume into the sample container and secure the lid.
6. Place the sample on ice.
7. Collect remaining samples including quality control samples, if required, using the same protocols described above.
8. Follow the sample handling procedures described in **Section 2.2** of this Attachment.

(iv) Autosamplers

Automatic sample compositors (autosamplers) are used to characterize the entire flow of a storm in one analysis. They can be programmed to take aliquots at either time- or flow-based specified intervals. Before beginning setup in the field, it is recommended to read the manufacturer's instructions. The general steps to set up the autosampler are described below:

1. Install pre-cleaned tubing into the pump. Clean tubing will be used at each site and for each event, in order to minimize contamination.
2. Attach strainer to intake end of the tubing and install in sampling channel.
3. If running flow based composite samples; install flow sensor in sampling channel and connect it to the automatic compositor.
4. Label and install composite bottle(s). If sampler is not refrigerated, then add enough ice to the composite bottle chamber to keep sample cold for the duration of sampling or until such time as ice can be refreshed. Make sure not to contaminate the inside of the composite bottle with any of the ice.
5. Program the autosampler as per the manufacturer's instructions and make sure the autosampler is powered and running before leaving the site.

After the sample collection is completed the following steps must be taken to ensure proper sample handling:

1. Upon returning to the site, check the status of the autosampler and record any errors or missed samples. Note on the field log the time of the last sample, as this will be used for filling out the COCs.
2. Remove the composite bottle and store on ice. If dissolved metals are required, then begin the sample filtration process outlined in the following subsection, within 15 minutes of the last composite sample, unless compositing must occur at another location, in which case the filtration process should occur as soon as possible upon sample compositing.
3. Power down autosampler and leave sampling site.
4. The composite sample will need to be split into the separate analysis bottles either before being shipped to the laboratory or at the laboratory. This is best done in a clean and weatherproof

environment, using clean sampling technique.

(v) Dissolved Metals Field Filtration

Samples for dissolved metals can be filtered in the laboratory or the field. In the event samples for dissolved metals are filtered in the field, the following method for dissolved field filtration will be conducted. A 50mL plastic syringe or peristaltic pump with a 0.45µm filter attached will be used to collect and filter the dissolved metals sample in the field. The apparatus will either come certified pre-cleaned from the manufacturer and confirmed by the analytical laboratory or be pre-cleaned by and confirmed by the analytical laboratory at least once per year. The apparatus will be double bagged in Ziploc plastic bags. Alternative an equivalent method may be utilized, if necessary.

To collect the sample for dissolved metals, first collect the total metals sample using clean sampling techniques. The dissolved sample will be taken from this container. Immediately prior to collecting the dissolved sample, shake the total metals sample. To collect the dissolved metals sample using clean sampling techniques, remove the syringe from the bag and place the tip of the syringe into the bottle containing the total metals sample and draw up 50 mL of sample into the syringe. Next, remove the filter from the zip-lock bag and screw it tightly into the tip of the syringe. Then put the tip of the syringe with the filter into the clean dissolved metals container and push the sample through the filter taking care not to touch the inside surface of the sample container with the apparatus. The sample volume needs to be a minimum of 20 mL. If the filter becomes clogged prior to generating 20 mL of sample, remove and dispose of the used filter and replace it with a new clean filter (using the clean sampling techniques). Continue to filter the sample. When 20 mL has been collected, cap the sample bottle tightly and store on ice for delivery to the laboratory.

2.4.4 Receiving Water Sample Collection

A grab sample is a discrete individual sample. A composite sample is a mixture of samples collected over a period of time either as time or flow weighted. A time-weighted composite is created by mixing multiple aliquots collected at specified time intervals. A flow-weighted composite is created by mixing multiple aliquots collected at equal time intervals but where the volume of the aliquot is based on flow rate. Generally, grab samples will be collected during dry weather and composite samples will be collected during wet weather. Should field crews feel that it is unsafe to collect samples for any reason, the field crews **SHOULD NOT COLLECT** a sample and note on the field log that the sample was not collected, why the sample was not collected, and provide photo documentation, if feasible.

Grab samples will be used for dry weather sampling events, because the composition of the receiving water will change less over time; and thus, the grab sample can sufficiently characterize the receiving water. Grab samples will be collected as described in **Section 2.4.3** of this Attachment. Monitoring site configuration and consideration of safety will dictate grab sample collection technique. The potential exists for monitoring sites to lack discernable flow. The lack of discernable flow may generate unrepresentative data. To address the potential confounding interference that can occur under such conditions, sites sampled should be assessed for the following conditions and sampled or not sampled accordingly:

- Pools of water with no flow or no visible connection to another surface water body should not be sampled. The field log should be completed for non-water quality data (including date and time of visit) and the site condition should be photo-documented.
- Flowing water (i.e., based on visual observations, flow measurements, and a photo-documented assessment of conditions immediately upstream and downstream of the sampling site) site should be sampled.

Wet weather samples will generally be collected as either time- or flow-weighted composites. Grab samples may be utilized to collect wet weather sampling in certain situations, which may include, but are not limited to, situations where it is unsafe to collect composite samples or to perform investigative monitoring where composite sampling or installation of an autosampler may not be warranted.

It is the combined responsibility of all members of the sampling crew to determine if the performance requirements of the specific sampling method have been met, and to collect additional samples if required. If the performance requirements outlined above or documented in sampling protocols are not met, the sample will be re-collected. If contamination of the sample container is suspected, a fresh sample container will be used. The SMB EWMP Group will be contacted if at any time the sampling crew has questions about procedures or issues based on site-specific conditions.

2.4.5 Stormwater Outfall Sample Collection

Stormwater outfalls will be monitored with similar methods as discussed in **Section 2.4.4** of this Attachment. Sampling will not be undertaken if the outfalls are not flowing or if conditions exist where the receiving water is back-flowing into the outfall. It is the combined responsibility of all members of the sampling crew to determine if the performance requirements of the specific sampling method have been met, and to collect additional samples if required. If the performance requirements outlined above or documented in sampling protocols are not met, the sample will be re-collected. If contamination of the sample container is suspected, a fresh sample container will be used. The SMB EWMP Group will be contacted if at any time the sampling crew has questions about procedures or issues based on site-specific conditions.

2.4.6 Non-Stormwater Outfall Screening Surveys and Sample Collection

The outfall screening process is designed to identify outfalls that have significant non-stormwater (NSW) discharges. The collection of water quality data will support the determination of significant NSW discharges as well as to characterize dry weather loading.

(i) Preparation for Outfall Surveys

Preparation for outfall surveys includes preparation of field equipment, placing bottle orders, and contacting the necessary personnel regarding site access and schedule. The following steps should be completed two weeks prior to each outfall survey:

1. Check weather reports and LACDPW rain gage to ensure that antecedent dry weather conditions are suitable.
2. Contact appropriate Flood Maintenance Division personnel from LACDPW to notify them of dates and times of any activities in flood control channels.
3. Contact laboratories to order bottles and to coordinate sample pick-ups.
4. Confirm scheduled sampling date with field crews.
5. Set-up sampling day itinerary including sample drop-offs and pick-ups.
6. Compile field equipment.
7. Prepare sample labels.
8. Prepare event summaries to indicate the type of field measurements, field observations, and samples to be taken at each of the outfalls.
9. Prepare COCs.
10. Charge the batteries of field tablets (if used).

(ii) Non-Stormwater Sample Collection

Water quality samples will be collected consistent with the dry weather requirements outlined in the receiving water monitoring section using the direct submersion, intermediate container, shallow sheet flow, or pumping methods described in **Section 2.4.3** of this Attachment.

2.4.7 Stormborne Sediment Collection

The Santa Monica Total DDT and PCB TMDL include requirements for sediment analysis to assess the WLA contribution of Total DDT and PCB into Santa Monica Bay. Use of filtration methods in combination with conventional analytical methods requires collection of extremely large volumes of stormwater and challenging filtration processes. Use of conventional analytical methods for analysis of the filtered sediment is then expected to require at least 5 grams of sediment (typically 10 grams is preferred by laboratories) for each analyte (Total DDT and PAHs) in order to achieve detection limits necessary to quantify loads. In addition, the direct impacts of filtering samples with high sediment content are not well understood. Sediment analyses within the SMB EWMP Group area have not been conducted, however, efforts by the City of Los Angeles and Los Angeles County in the Ballona Creek and Marina del Rey watersheds, respectively, have demonstrated the challenges associated with collecting and analyzing suspended sediments. Assuming samples contain sediment at an average TSS concentration of 100 mg/L and that all sediment could be recovered, analyses might require as much as 50 liters for each test method (total of 200 liters). An ongoing special study is underway in Marina del Rey to evaluate various methods for capturing sufficient sediment to conduct analysis. In Ballona Creek, the City of Los Angeles has been successful in collecting sufficient volumes of sediment over the course of a year to conduct the analysis. This allows for the quantification of annual loading; however, it does not allow for an evaluation of concentrations and loads under various storm conditions. Although use of lower sediment volumes may be possible, both detection limits and quality control measures might be impacted. In Ballona Creek, duplicate and quality control analysis have been limited to the available sediment, resulting in situations where either certain target constituents or quality control analysis are not completed.

An alternative approach for assessing the loads of the constituents of interest will be utilized in this CIMP to substantially reduce the amount of sample needing to be handled and potential for introduction of error. This approach will utilize High Resolution Mass Spectrometry (HRMS) to analyze for OC pesticides (USEPA 1699), PCBs (USEPA 1668) and PAHs (CARB). HRMS analyses are quantified by isotope dilution techniques. Analytical performance is measured by analysis of Ongoing Precision and Recovery (OPR) analyses and labeled compound recovery. Conventional methods for analyzing for metals of interest are sufficiently sensitive to assess concentrations on suspended sediments. During the first three years, analyses will be conducted on whole water samples. These test methods provide detection limits that are roughly 100 times more sensitive than conventional analytical methods. In addition, these extremely low detection limits can be achieved with as little as 3-6 liters of stormwater.

Use of this approach is expected to greatly enhance the ability to consistently obtain appropriate samples for measuring and comparing loads of constituents of interest associated with each sampling event. This will assure that all key toxics can be quantified at levels suitable for estimation of mass loads. Due to relatively low levels of sediment in stormwater, efforts in Los Angeles County related to TMDL monitoring of suspended sediments have often led to the need to composite sediments collected over multiple storm events. The approach contained herein provides the opportunity to quantify concentrations, and therefore loads, for each stormwater sampling event.

For purposes of load calculations, it would be assumed that 100% of DDT and PCBs were associated with suspended solids. Separate analyses of TSS/SSC would be used to normalize the data. After the first year of monitoring (three storm events) the data will be reevaluated to assess whether continued use of the HRMS approach remains to be beneficial. If deemed necessary, a modified approach will be evaluated for analysis of filtered suspended sediments.

(i) Sampling Procedures

Stormwater samples will be collected using autosamplers. Based on TSS measurements at the monitoring site RW-SMB-2, in Santa Monica Canyon Channel, use of a TSS concentration of 100 mg/L is expected to provide a conservative basis for estimating reporting limits for DDT and PCBs in suspended sediments based upon 1-liter samples. However, two liters of storm water will be provided for each organic analytical suite for a total of four liters. An accurate measure of suspended sediments is critical to this sampling approach. TSS will be analyzed; however, SSC will be used as the standard for calculating the concentrations of target constituents in suspended sediments and total loads.

Since detection limits will depend upon the concentration of suspended sediment in the sample, the laboratory analyzing the suspended sediment concentrations will be asked to provide a rush analysis to provide information that can be used to direct processing of the samples for the organic compounds. If TSS/SSC are less than 150 mg/L, two liters will be extracted for subsequent HRMS analysis. If TSS concentrations are greater than 200 mg/L, the additional liter may be used as a field duplicate for each analysis. A field duplicate from the site will be analyzed if adequate sample volumes are obtained.

2.4.8 Bioaccumulation Sample Collection

No Bioaccumulation sampling will be conducted under this program.

2.4.9 Trash Monitoring

The SMB EWMP Group members are implementing the Santa Monica Marine Debris TMDLs through the installation of full capture devices. As such, no specific monitoring is required or will be conducted for the Marine Debris TMDLs for these jurisdictions.

2.4.10 Plastic Pellet Monitoring

See Attachment A for details on plastic pellet monitoring and reporting requirements.

2.4.11 Quality Control Sample Collection

Quality control samples will be collected in conjunction with representative samples to verify data quality. Quality control samples collected in the field will generally be collected in the same manner as environmental samples. Detailed descriptions of quality control samples are presented in **Section 3** of this Attachment.

Section 3
Quality Assurance/Quality Control

This section describes the quality assurance and quality control requirements and processes. Quality control samples will be collected in conjunction with environmental samples to verify data quality. Quality control samples collected in the field will generally be collected in the same manner as environmental samples. There are no requirements for quality control for field analysis of general parameters (e.g., temperature, pH, conductivity, dissolved oxygen, and pH) outlined in the SWAMP. However, field crews will be required to calibrate equipment as outlined in **Section 2** of this Attachment. **Table C-11** presents the quality assurance parameter addressed by each quality assurance requirement as well as the appropriate corrective action if the acceptance limit is exceeded. Decisions to reject or qualify data will be made by the SMB EWMP Group, based on the evaluation of field and laboratory quality control data, in accordance to procedures outlined in Section 13 of Caltrans document No. CTSW-RT-03-105, *Guidance Manual: Stormwater Monitoring Protocols* included in **Attachment E**.

Table C-11

Quality Control Requirements

Quality Control Sample Type	QA Parameter	Frequency[1]	Acceptance Limits	Corrective Action
Quality Control Requirements – Field				
Equipment Blanks	Contamination	5% of all samples[2]	< MDL	Identify equipment contamination source. Qualify data as needed.
Field Blank	Contamination	1 per Sampling Event	< MDL	Examine field log. Identify contamination source. Qualify data as needed.
Field Duplicate	Precision	5% of all samples	RPD < 25% if |Difference| > RL	Reanalyze both samples if possible. Identify variability source. Qualify data as needed.
Quality Control Requirements – Laboratory				
Method Blank	Contamination	1 per analytical batch	< MDL	Identify contamination source. Reanalyze method blank and all samples in batch. Qualify data as needed.
Lab Duplicate	Precision	1 per analytical batch	RPD < 25% if |Difference| > RL	Recalibrate and reanalyze.
Matrix Spike	Accuracy	1 per analytical batch	80-120% Recovery for GWQC	Check LCS/CRM recovery. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed.
			75-125% for Metals	
			50-150% Recovery for Pesticides [3]	
Matrix Spike	Precision	1 per analytical	RPD < 30% if	Check lab duplicate RPD. Attempt

Quality Control Sample Type	QA Parameter	Frequency[1]	Acceptance Limits	Corrective Action
Duplicate		batch	|Difference| > RL	to correct matrix problem and reanalyze samples. Qualify data as needed.
Laboratory Control Sample (or CRM or Blank Spike)	Accuracy	1 per analytical batch	80-120% Recovery for GWQC	Recalibrate and reanalyze LCS/ CRM and samples.
			75-125% for Metals	
			50-150% Recovery for Pesticides [3]	
Blank Spike Duplicate	Precision	1 per analytical batch	RPD < 25% if |Difference| > RL	Check lab duplicate RPD. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed.
Surrogate Spike (Organics Only)	Accuracy	Each environmental and lab QC sample	30-150% Recovery3	Check surrogate recovery in LCS. Attempt to correct matrix problem and reanalyze sample. Qualify data as needed.

MDL = Method Detection Limit RL = Reporting Limit RPD = Relative Percent Difference
LCS = Laboratory Control Sample/Standard CRM = Certified/ Standard Reference Material
GWQC = General Water Quality Constituents

1. "Analytical batch" refers to a number of samples (not to exceed 20 environmental samples plus the associated quality control samples) that are similar in matrix type and processed/prepared together under the same conditions and same reagents (equivalent to preparation batch).
2. Equipment blanks will be collected by the field crew before using the equipment to collect sample.
3. Or control limits set at + 3 standard deviations based on actual laboratory data.

3.1 QA/QC Requirements and Objectives

3.1.1 Comparability

Comparability of the data can be defined as the similarity of data generated by different monitoring programs. For this monitoring program, this objective will be ensured mainly through use of standardized procedures for field measurements, sample collection, sample preparation, laboratory analysis, and site selection; adherence to quality assurance protocols and holding times; and reporting in standard units. Additionally, comparability of analytical data will be addressed through the use of standard operating procedures and extensive analyst training at the analyzing laboratory.

3.1.2 Representativeness

Representativeness can be defined as the degree to which the environmental data generated by the monitoring program accurately and precisely represent actual environmental conditions. For the CIMP, this objective will be addressed by the overall design of the program. Representativeness is attained through the selection of sampling locations, methods, and frequencies for each parameter of interest, and by maintaining the integrity of each sample after collection. Sampling locations were chosen that are representative of various areas within the watershed and discharges from the MS4, which will allow for the characterization of the watershed and impacts MS4 discharges may have on water quality.

3.1.3 Completeness

Data completeness is a measure of the amount of successfully collected and validated data relative to the amount of data planned to be collected for the project. It is usually expressed as a percentage value. A project objective for percent completeness is typically based on the percentage of the data needed for the program or study to reach valid conclusions.

Because the CIMP is intended to be a long term monitoring program, data that are not successfully collected during a specific sample event will not be recollected at a later date. Rather subsequent events conducted over the course of the monitoring will provide robust data sets to appropriately characterize conditions at individual sampling sites and the watershed in general. For this reason, most of the data planned for collection cannot be considered absolutely critical, and it is difficult to set a meaningful objective for data completeness.

However, some reasonable objectives for data are desirable, if only to measure the effectiveness of the program when conditions allow for the collection of samples (i.e., flow is present). The program goals for data completeness, shown in

Table C-3, are based on the planned sampling frequency, SWAMP recommendations, and a subjective determination of the relative importance of the monitoring element within the CIMP. If, however, sampling sites do not allow for the collection of enough samples to provide representative data due to conditions (i.e., no flow) alternate sites will be considered. Data completeness will be evaluated on a yearly basis.

3.2 QA/QC Field Procedures

Quality control samples to be prepared in the field will consist of equipment blanks, field blanks, and field duplicates as described below.

3.2.1 Equipment Blanks

The purpose of analyzing equipment blanks is to demonstrate that sampling equipment is free from contamination. Equipment blanks will be collected by the analytical laboratory responsible for cleaning equipment and analyzed for relevant pollutants before sending the equipment to the field crew. Equipment blanks will consist of laboratory-prepared blank water (certified to be contaminant-free by the laboratory) processed through the sampling equipment that will be used to collect environmental samples.

The equipment blanks will be analyzed using the same analytical methods specified for environmental samples. If any analytes of interest are detected at levels greater than the MDL, the source(s) of contamination will be identified and eliminated (if possible), the affected batch of equipment will be re-cleaned, and new equipment blanks will be prepared and analyzed before the equipment is returned to the field crew for use.

3.2.2 Field Blanks

The purpose of analyzing field blanks is to demonstrate that sampling procedures do not result in contamination of the environmental samples. Per the Quality Assurance Management Plan for SWAMP (SWRCB, 2008) field blanks are to be collected as follows:

- At a frequency of one per sampling event for the following constituents: trace metals in water (including mercury), VOC samples in water and sediment, DOC samples in water, and bacteria samples.
- Field blanks for other media and analytes should be conducted upon initiation of sampling, and if field blank performance is acceptable (as described in **Table C-11**), further collection and analysis of field blanks for these other media and analytes need only be performed on an as-needed basis, or during field performance audits. An as-needed basis for the SMB EWMP Group CIMP will be annually.

Field blanks will consist of laboratory-prepared blank water (certified to be contaminant-free by the laboratory) processed through the sampling equipment using the same procedures used for environmental samples.

If any analytes of interest are detected at levels greater than the MDL, the source(s) of contamination should be identified and eliminated, if possible. The sampling crew should be notified so that the source of contamination can be identified (if possible) and corrective measures taken prior to the next sampling event.

3.2.3 Field Duplicates

The purpose of analyzing field duplicates is to demonstrate the precision of sampling and analytical processes. Field duplicates will be prepared at the rate of 5% of all samples, and analyzed along with the associated environmental samples. Field duplicates will consist of two samples collected simultaneously, to the extent practicable. If the Relative Percent Difference (RPD) of field duplicate results is greater than the percentage stated in **Table C-11** and the absolute difference is greater than the RL, both samples should be reanalyzed, if possible. The sampling crew should be notified so that the source of sampling variability can be identified (if possible) and corrective measures taken prior to the next sampling event.

3.3 QA/QC Laboratory Analyses

Quality control samples prepared in the laboratory will consist of method blanks, laboratory duplicates, matrix spikes/duplicates, laboratory control samples (standard reference materials), and toxicity quality controls.

3.3.1 Method Blanks

The purpose of analyzing method blanks is to demonstrate that sample preparation and analytical procedures do not result in sample contamination. Method blanks will be prepared and analyzed by the contract laboratory at a rate of at least one for each analytical batch. Method blanks will consist of laboratory-prepared blank water processed along with the batch of environmental samples. If the result for a single method blank is greater than the MDL, or if the average blank concentration plus two standard deviations of three or more blanks is greater than the RL, the source(s) of contamination should be corrected, and the associated samples should be reanalyzed.

3.3.2 Laboratory Duplicates

The purpose of analyzing laboratory duplicates is to demonstrate the precision of the sample preparation and analytical methods. Laboratory duplicates will be analyzed at the rate of one pair per sample batch. Laboratory duplicates will consist of duplicate laboratory fortified method blanks. If the RPD for any analyte is greater than the percentage stated in **Table C-11** and the absolute difference between duplicates is greater than the RL, the analytical process is not being performed adequately for that analyte. In this case, the sample batch should be prepared again, and laboratory duplicates should be reanalyzed.

3.3.3 Matrix Spikes and Matrix Spike Duplicates

The purpose of analyzing matrix spikes and matrix spike duplicates is to demonstrate the performance of the sample preparation and analytical methods in a particular sample matrix. Matrix spikes and matrix spike duplicates will be analyzed at the rate of one pair per sample batch. Each matrix spike and matrix spike duplicate will consist of an aliquot of laboratory-fortified environmental sample. Spike concentrations should be added at five to ten times the reporting limit for the analyte of interest.

If the matrix spike recovery of any analyte is outside the acceptable range, the results for that analyte have failed to meet acceptance criteria. If recovery of laboratory control samples is acceptable, the analytical process is being performed adequately for that analyte, and the problem is attributable to the sample matrix. An attempt will be made to correct the problem (e.g., by dilution, concentration, etc.), and the samples and matrix spikes will be re-analyzed.

If the matrix spike duplicate RPD for any analyte is outside the acceptable range, the results for that analyte have failed to meet acceptance criteria. If the RPD for laboratory duplicates is acceptable, the analytical process is being performed adequately for that analyte, and the problem is attributable to the

sample matrix. An attempt will be made to correct the problem (e.g., by dilution, concentration, etc.), and the samples and matrix spikes will be re-analyzed.

3.3.4 Laboratory Control Samples

The purpose of analyzing laboratory control samples (or a standard reference material) is to demonstrate the accuracy of the sample preparation and analytical methods. Laboratory control samples will be analyzed at the rate of one per sample batch. Laboratory control samples will consist of laboratory fortified method blanks or a standard reference material. If recovery of any analyte is outside the acceptable range, the analytical process is not being performed adequately for that analyte. In this case, the sample batch should be prepared again, and the laboratory control sample should be reanalyzed.

3.3.5 Surrogate Spikes

Surrogate recovery results are used to evaluate the accuracy of analytical measurements for organics analyses on a sample-specific basis. A surrogate is a compound (or compounds) added by the laboratory to method blanks, samples, matrix spikes, and matrix spike duplicates prior to sample preparation, as specified in the analytical methodology. Surrogates are generally brominated, fluorinated or isotopically labeled compounds that are not usually present in environmental media. Results are expressed as percent recovery of the surrogate spike. Surrogate spikes are applicable for analysis of PCBs and pesticides.

3.3.6 Toxicity Quality Control

For aquatic toxicity tests, the acceptability of test results is determined primarily by performance-based criteria for test organisms, culture and test conditions, and the results of control bioassays. Control bioassays include monthly reference toxicant testing. Test acceptability requirements are documented in the method documents for each bioassay method.

Section 4
Instrument/Equipment Calibration and Frequency

Frequencies and procedures for calibration of analytical equipment used by each contract laboratory are documented in the QA Manual for each laboratory. Any deficiencies in analytical equipment calibration should be managed in accordance with the QA Manual for each contract laboratory. Any deficiencies that affect analysis of samples submitted through this program must be reported to the SMB EWMP Group. Laboratory QA Manuals are available for review at the analyzing laboratory.

Attachment D

Photographic Log

Photo: 1 **Site ID:** Santa Ynez Canyon **Description:** Runs parallel to storm drain.	

Photo: 2 **Site ID:** Santa Ynez Canyon **Description:** Catch basin.	

Photo: 3 **Site ID:** Sullivan Canyon Creek **Description:** Natural portion of Sullivan Canyon Creek.	

Photo: 4 **Site ID:** Sullivan Canyon Creek **Description:** Natural portion of Sullivan Canyon Creek.	

Photo: 5

Site ID:

Sullivan Canyon Creek

Description:

Natural portion of Sullivan Canyon Creek. Flows to underground storm drain.

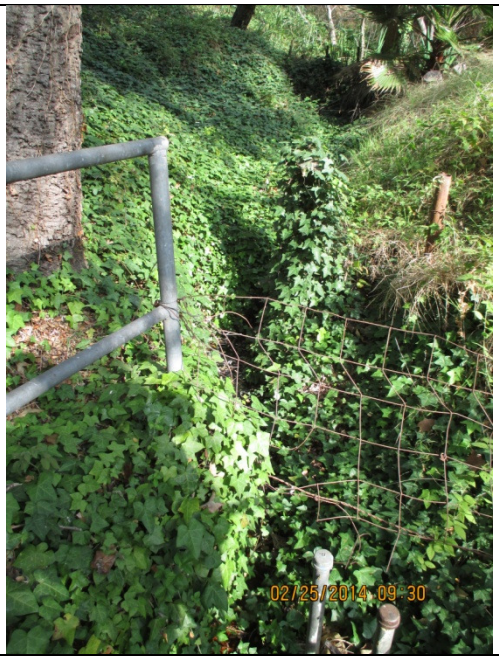


Photo: 6

Site ID:

Sullivan Canyon Creek

Description:

Drain at the end of Sullivan Canyon Creek. Flows to underground storm drain.

Photo: 7 **Site ID:** Mandeville Canyon (Storm drain) **Description:** Natural ditch that run parallel to underground storm drain (Mandeville Canyon).	

Photo: 8 **Site ID:** Mandeville Canyon (Storm drain) **Description:** Catch basin in natural ditch.	

Photo: 9 **Site ID:** Mandeville Canyon (Storm drain) **Description:** Upper most area of Mandeville Canyon storm drain entry. Natural flow up gradient.	

Photo: 10 **Site ID:** Mandeville Canyon (Storm drain) **Description:** Upper most area of Mandeville Canyon storm drain.	

Photo: 11 **Site ID:** Mandeville Canyon Storm Drain **Description:** Outlet of Mandeville Canyon Storm Drain to Santa Monica Canyon Channel.	

Photo: 12 **Site ID:** Sullivan Canyon Storm Drain **Description:** Outlet of Sullivan Canyon Storm Drain to Santa Monica Canyon Channel.	

Photo: 13 **Site ID:** OF-SMB-2 **Description:** Confluence at Sullivan Canyon and Mandeville Canyon.	

Photo: 14 **Site ID:** Santa Monica Canyon Channel **Description:** Inlet to Santa Monica Canyon Channel near Riviera Country Club.	

Photo: 15 **Site ID:** Rustic Canyon Creek **Description:** Area of Rustic Canyon that goes from concrete bottom to soft bottom.	

Attachment E

Section 13 of Caltrans document No. CTSW-RT-03-105, *Guidance Manual: Stormwater Monitoring Protocols*

SECTION 13
QA/QC DATA EVALUATION

All data reported by the analytical laboratory must be carefully reviewed to determine whether the project's data quality acceptability limits or objectives (DQOs) have been met. This section describes a process for evaluation of all laboratory data, including the results of all QA/QC sample analysis.

Before any results are reported by the laboratory, the deliverable requirements should be clearly communicated to the laboratory, as described in the "Laboratory Data Package Deliverables" discussion in ***Section 12***.

The current section discusses QA/QC data evaluation in the following two parts:

KEY TOPICS

- **Initial Data Quality Screening**
- **Data Quality Evaluation**

The initial data quality screening identifies problems with laboratory reporting while they may still be corrected. When the data reports are received, they should be immediately checked for conformity to chain of custody requests to ensure that all requested analyses have been reported. The data are then evaluated for conformity to holding time requirements, conformity to reporting limit requests, analytical precision, analytical accuracy, and possible contamination during sampling and analysis. The data evaluation results in rejection, qualification, and narrative discussion of data points or the data as a whole. Qualification of data, other than rejection, does not necessary exclude use of the data for all applications. It is the decision of the data user, based on specifics of the data application, whether or not to include qualified data points.

➢ INITIAL DATA QUALITY SCREENING

The initial screening process identifies and corrects, when possible, inadvertent documentation or process errors introduced by the field crew or the laboratory. The initial data quality control screening should be applied using the following three-step process:

1. *Verification check between sampling and analysis plan (SAP), chain of custody forms, and laboratory data reports*: Chain of custody records should be compared with field logbooks and laboratory data reports to verify the accuracy of all sample identification and to ensure that all samples submitted for analysis have a value reported for each parameter requested. Any deviation from the SAP that has not yet been documented in the field notes or project records should be recorded and corrected if possible.

Sample representativeness should also be assessed in this step. The minimum acceptable storm capture parameters (number of aliquots and percent storm capture) per amount of rainfall are specified in ***Section 10***. Samples not meeting these criteria are generally not analyzed; however, selected analyses can be run at the Caltrans task manager's discretion. If samples not meeting the minimum sample representativeness criteria are analyzed, the resulting data should be rejected ("R") or qualified as estimated ("J"), depending upon whether the analyses were approved by Caltrans. Grab samples should be taken according to the timing protocols specified in the SAP. Deviations from the protocols will result in the rejection of the data for these samples or qualification of the data as estimated. The decision to reject a sample based on sample representativeness should be made prior to the submission of the sample to the laboratory, to avoid unnecessary analytical costs.

2. *Check of laboratory data report completeness*: As discussed in ***Section 12***, the end product of the laboratory analysis is a data report that should include a number of QA/QC results along with the environmental results. QA/QC sample results reported by the lab should include both analyses requested by the field crew (field blanks, field duplicates, lab duplicates and MS/MSD analysis), as well as internal laboratory QA/QC results (method blanks and laboratory control samples).

There are often differences among laboratories in terms of style and format of reporting. Therefore, it is prudent to request in advance that the laboratory conform to the style and format approved by Caltrans as shown in ***Section 14***. The Caltrans data reviewer should verify that the laboratory data package includes the following items:

- A narrative which outlines any problems, corrections, anomalies, and conclusions.
- Sample identification numbers.
- Sample extraction and analysis dates.
- Reporting limits for all analyses reported.
- Results of method blanks.
- Results of matrix spike and matrix spike duplicate analyses, including calculation of percent recovered and relative percent differences.
- Results of laboratory control sample analyses.
- Results of external reference standard analyses.
- Surrogate spike and blank spike analysis results for organic constituents.
- A summary of acceptable QA/QC criteria (RPD, spike recovery) used by the laboratory.

Items missing from this list should be requested from the laboratory.

3. *Check for typographical errors and apparent incongruities*: The laboratory reports should be reviewed to identify results that are outside the range of normally observed values. Any type of suspect result or apparent typographical error should be verified with the laboratory. An example of a unique value would be if a dissolved iron concentration has been reported lower than 500 μg/L for every storm event monitored at one location and then a value of 2500 μg/L is reported in a later event. This reported concentration of 2500 μg/L should be verified with the laboratory for correctness.

   Besides apparent out-of-range values, the indicators of potential laboratory reporting problems include:

   - Significant lack of agreement between analytical results reported for laboratory duplicates or field duplicates.
   - Consistent reporting of dissolved metals results higher than total or total recoverable metals.
   - Unusual numbers of detected values reported for blank sample analyses.
   - Inconsistency in sample identification/labeling.

   If the laboratory confirms a problem with the reported concentration, the corrected or recalculated result should be issued in an amended report, or if necessary the sample should be re-analyzed. If laboratory results are changed or other corrections are made by the laboratory, an amended laboratory report should be issued to update the project records.

➢ DATA QUALITY EVALUATION

The data quality evaluation process is structured to provide systematic checks to ensure that the reported data accurately represent the concentrations of constituents actually present in stormwater. Data evaluation can often identify sources of contamination in the sampling and analytical processes, as well as detect deficiencies in the laboratory analyses or errors in data reporting. Data quality evaluation allows monitoring data to be used in the proper context with the appropriate level of confidence.

QA/QC parameters that should be reviewed are classified into the following categories:

- ➢ Reporting limits
- ➢ Holding times
- ➢ Contamination check results (method, field, trip, and equipment blanks)
- ➢ Precision analysis results (laboratory, field, and matrix spike duplicates)
- ➢ Accuracy analysis results (matrix spikes, surrogate spikes, laboratory control samples, and external reference standards)

Each of these QA/QC parameters should be compared to data quality acceptability criteria, also known as the project's data quality objectives (DQOs). The key steps that should be adhered to in the analysis of each of these QA/QC parameters are:

1. Compile a complete set of the QA/QC results for the parameter being analyzed.
2. Compare the laboratory QA/QC results to accepted criteria (DQOs).
3. Compile any out-of-range values and report them to the laboratory for verification.
4. Prepare a report that tabulates the success rate for each QA/QC parameter analyzed.

This process should be applied to each of the QA/QC parameters as discussed below.

Reporting Limits

Stormwater quality monitoring program DQOs should contain a list of acceptable reporting limits that the lab is contractually obligated to adhere to, except in special cases of insufficient sample volume or matrix interference problems. The reporting limits used should ensure a high probability of detection. Table 12-1 provides recommended reporting limits for selected parameters.

Holding Times

Holding time represents the elapsed time between sample collection time and sample analysis time. Calculate the elapsed time between the sampling time and start of analysis, and compare this to the required holding time. For composite samples that are collected within 24-hours or less, the time of the final sample aliquot is considered the "sample collection time" for determining sample holding time. For analytes with critical holding times (≤48 hours), composite samples lasting longer than 24-hours require multiple bottle composite samples. Each of these composite samples should represent less than 24 hours of monitored flow, and subsamples from the composites should have been poured off and analyzed by the laboratory for those constituents with critical holding times (***see Section 12***). It is important to review sample holding times to ensure that analyses occurred within the time period that is generally accepted to maintain stable parameter concentrations. Table 12-1 contains the holding times for selected parameters. If holding times are exceeded, inaccurate concentrations or false negative results may be reported. Samples that exceed their holding time prior to analysis are qualified as "estimated", or may be rejected depending on the circumstances.

Contamination

Blank samples are used to identify the presence and potential source of sample contamination and are typically one of four types:

1. ***Method blanks*** are prepared and analyzed by the laboratory to identify laboratory contamination.

2. ***Field blanks*** are prepared by the field crew during sampling events and submitted to the laboratory to identify contamination occurring during the collection or the transport of environmental samples.
3. ***Equipment blanks*** are prepared by the field crew or laboratory prior to the monitoring season and used to identify contamination coming from sampling equipment (tubing, pumps, bailers, etc.).
4. ***Trip blanks*** are prepared by the laboratory, carried in the field, and then submitted to the laboratory to identify contamination in the transport and handling of volatile organics samples.
5. ***Filter blanks*** are prepared by field crew or lab technicians performing the sample filtration. Blank water is filtered in the same manner and at the same time as other environmental samples. Filter blanks are used to identify contamination from the filter or filtering process.

If no contamination is present, all blanks should be reported as "not detected" or "non-detect" (e.g., constituent concentrations should not be detected above the reporting limit). Blanks reporting detected concentrations ("hits") should be noted in the written QA/QC data summary prepared by the data reviewer. In the case that the laboratory reports hits on method blanks, a detailed review of raw laboratory data and procedures should be requested from the laboratory to identify any data reporting errors or contamination sources. When other types of blanks are reported above the reporting limit, a similar review should be requested along with a complete review of field procedures and sample handling. Often times it will also be necessary to refer to historical equipment blank results, corresponding method blank results, and field notes to identify contamination sources. This is a corrective and documentative step that should be done as soon as the hits are reported.

If the blank concentration exceeds the laboratory reporting limit, values reported for each associated environmental sample must be evaluated according to USEPA guidelines for data evaluations of organics and metals (USEPA, 1991; USEPA, 1995) as indicated in Table 13-1.

Table 13-1. USEPA Guidelines for Data Evaluation

Step	*Environmental Sample*	*Phthalates and other common contaminants*	*Other Organics*	*Metals*
1.	Sample > 10X blank concentration	No action	No action	No action
2.	Sample < 10X blank concentration	Report associated environmental results as "non-detect" at the reported environmental concentration.	No action	Results considered an "upper limit" of the true concentration (note contamination in data quality evaluation narrative).
3.	Sample < 5X blank concentration	Report associated environmental results as "non-detect" at the reported environmental concentration.	Report associated environmental results as "non-detect" at the reported environmental concentration.	Report associated environmental results as "non-detect" at the reported environmental concentration.

Specifically, if the concentration in the environmental sample is less than five times the concentration in the associated blank, the environmental sample result is considered, for reporting purposes, "not-detected" *at the environmental sample result concentration* (phthalate and other common contaminant results are considered non-detect if the environmental sample result is less than ten times the blank concentration). The laboratory reports are not altered in any way. The qualifications resulting from the data evaluation are made to the evaluator's data set for reporting and analysis purposes to account for the apparent contamination problem. For example, if dissolved copper is reported by the laboratory at 4 µg/L and an associated blank concentration for dissolved copper is reported at 1 µg/L, data qualification would be necessary. In the data reporting field of the database (see ***Section 14***), the dissolved copper result would be reported as 4 µg/L***)***, the numerical qualifier would be reported as "<", the reporting limit would be left as reported by the laboratory, and the value qualifier would be reported as "U" ("not detected above the reported environmental concentration").

When reported environmental concentrations are greater than five times (ten times for phthalates) the reported blank "hit" concentration, the environmental result is reported unqualified at the laboratory-reported concentration. For example, if dissolved copper is reported at 11 µg/L and an associated blank concentration for dissolved copper is reported at 1 µg/L, the dissolved copper result would still be reported as 11 µg/L.

Precision

Duplicate samples provide a measure of the data precision (reproducibility) attributable to sampling and analytical procedures. Precision can be calculated as the relative percent difference (RPD) in the following manner:

$$RPD_i = \frac{2*|O_i - D_i|}{(O_i + D_i)} *100\%$$

where:

RPD_i = Relative percent difference for compound i

O_i = Value of compound i in original sample

D_i = Value of compound i in duplicate sample

The resultant RPDs should be compared to the criteria specified in the project's DQOs. The DQO criteria shown in Table 13-2 below are based on the analytical method specifications and laboratory-supplied values. Project-specific DQOs should be developed with consideration to the analytical laboratory, the analytical method specifications, and the project objective. Table 13-2 should be used as a reference point as the least stringent set of DQO criteria for Caltrans monitoring projects.

Laboratory and Field Duplicates

Laboratory duplicates are samples that are split by the laboratory. Each half of the split sample is then analyzed and reported by the laboratory. A pair of field duplicates is two samples taken at the same time, in the same manner into two unique containers. Subsampling duplicates are two unique, ostensibly identical, samples taken from one composite bottle (see ***Section 10***). Laboratory duplicate results provide information regarding the variability inherent in the analytical process, and the reproducibility of analytical results. Field duplicate analysis measures both field and laboratory precision, therefore, it is expected that field duplicate results would exhibit greater variability than lab duplicate results. Subsampling duplicates are used as a substitute for field duplicates in some situations and are also an indicator of the variability introduced by the splitting process.

The RPDs resulting from analysis of both laboratory and field duplicates should be reviewed during data evaluation. Deviations from the specified limits, and the effect on reported data, should be noted and commented upon by the data reviewer. Laboratories typically have their own set of maximum allowable RPDs for laboratory duplicates based on their analytical history. In most cases these values are more stringent than those listed in Table 13-2. Note that the laboratory will only apply these maximum allowable RPDs to laboratory duplicates. In most cases field duplicates are submitted "blind" (with pseudonyms) to the laboratory.

Environmental samples associated with laboratory duplicate results greater than the maximum allowable RPD (when the numerical difference is greater than the reporting limit) are qualified as "J" (estimated). When the numerical difference is less than the RL, no qualification is necessary. Field duplicate RPDs are compared against the maximum

allowable RPDs used for laboratory duplicates to identify any pattern of problems with reproducibility of results. Any significant pattern of RPD exceedances for field duplicates should be noted in the data report narrative.

Corrective action should be taken to address field or laboratory procedures that are introducing the imprecision of results. The data reviewer can apply "J" (estimated) qualifiers to any data points if there is clear evidence of a field or laboratory bias issue that is not related to contamination. (Qualification based on contamination is assessed with blank samples.)

Laboratories should provide justification for any laboratory duplicate samples with RPDs greater than the maximum allowable value. In some cases, the laboratory will track and document such exceedances, however; in most cases it is the job of the data reviewer to locate these out-of-range RPDs. When asked to justify excessive RPD values for field duplicates, laboratories most often will cite sample splitting problems in the field. Irregularities should be included in the data reviewer's summary, and the laboratory's response should be retained to document laboratory performance, and to track potential chronic problems with laboratory analysis and reporting.

Accuracy

Accuracy is defined as the degree of agreement of a measurement to an accepted reference or true value. Accuracy is measured as the percent recovery (%R) of spike compound(s). Percent recovery of spikes is calculated in the following manner:

$$\%R = 100\% * [(C_s - C) / S]$$

where:

- %R = percent recovery
- C_s = spiked sample concentration
- C = sample concentration for spiked matrices
- S = concentration equivalent of spike added

Accuracy (%R) criteria for spike recoveries should be compared with the limits specified in the project DQOs. A list of typical acceptable recoveries is shown in Table 13-2. As in the case of maximum allowable RPDs, laboratories develop acceptable criteria for an allowable range of recovery percentages that may differ from the values listed in Table 13-2.

Percent recoveries should be reviewed during data evaluation, and deviations from the specified limits should be noted in the data reviewer's summary. Justification for out of range recoveries should be provided by the laboratory along with the laboratory reports, or in response to the data reviewer's summary.

<u>Laboratory Matrix Spike and Matrix Spike Duplicate Samples</u>

Evaluation of analytical accuracy and precision in environmental sample matrices is obtained through the analysis of laboratory matrix spike (MS) and matrix spike duplicate

(MSD) samples. A matrix spike is an environmental sample that is spiked with a known amount of the constituent being analyzed. A percent recovery can be calculated from the results of the spike analysis. A MSD is a duplicate of this analysis that is performed as a check on matrix recovery precision. MS and MSD results are used together to calculate RPD as with the duplicate samples. When MS/MSD results (%R and RPD) are outside the project specifications, as listed in Table 13-2, the associated environmental samples are qualified as "estimates due to matrix interference". Surrogate standards are added to all environmental and QC samples tested by gas chromatograph (GC) or gas chromatography-mass spectrometer (GC-MS). Surrogates are non-target compounds that are analytically similar to the analytes of interest. The surrogate compounds are spiked into the sample prior to the extraction or analysis. Surrogate recoveries will be evaluated with respect to the laboratory acceptance criteria to provide information on the extraction efficiency of every sample.

External Reference Standards

External reference standards (ERS) are artificial certified standards prepared by an external agency and added to a batch of samples. ERS's are not required for every batch of samples, and are often only run quarterly by laboratories. Some laboratories use ERS's in place of laboratory control spikes with every batch of samples. ERS results are assessed the same as laboratory control spikes for qualification purposes (see below). The external reference standards are evaluated in terms of accuracy, expressed as the percent recovery (comparison of the laboratory results with the certified concentrations). The laboratory should report all out-of-range values along with the environmental sample results. ERS values are qualified as biased high" when the ERS recovery exceeds the acceptable recovery range and "biased low" when the ERS recovery is smaller than the recovery range.

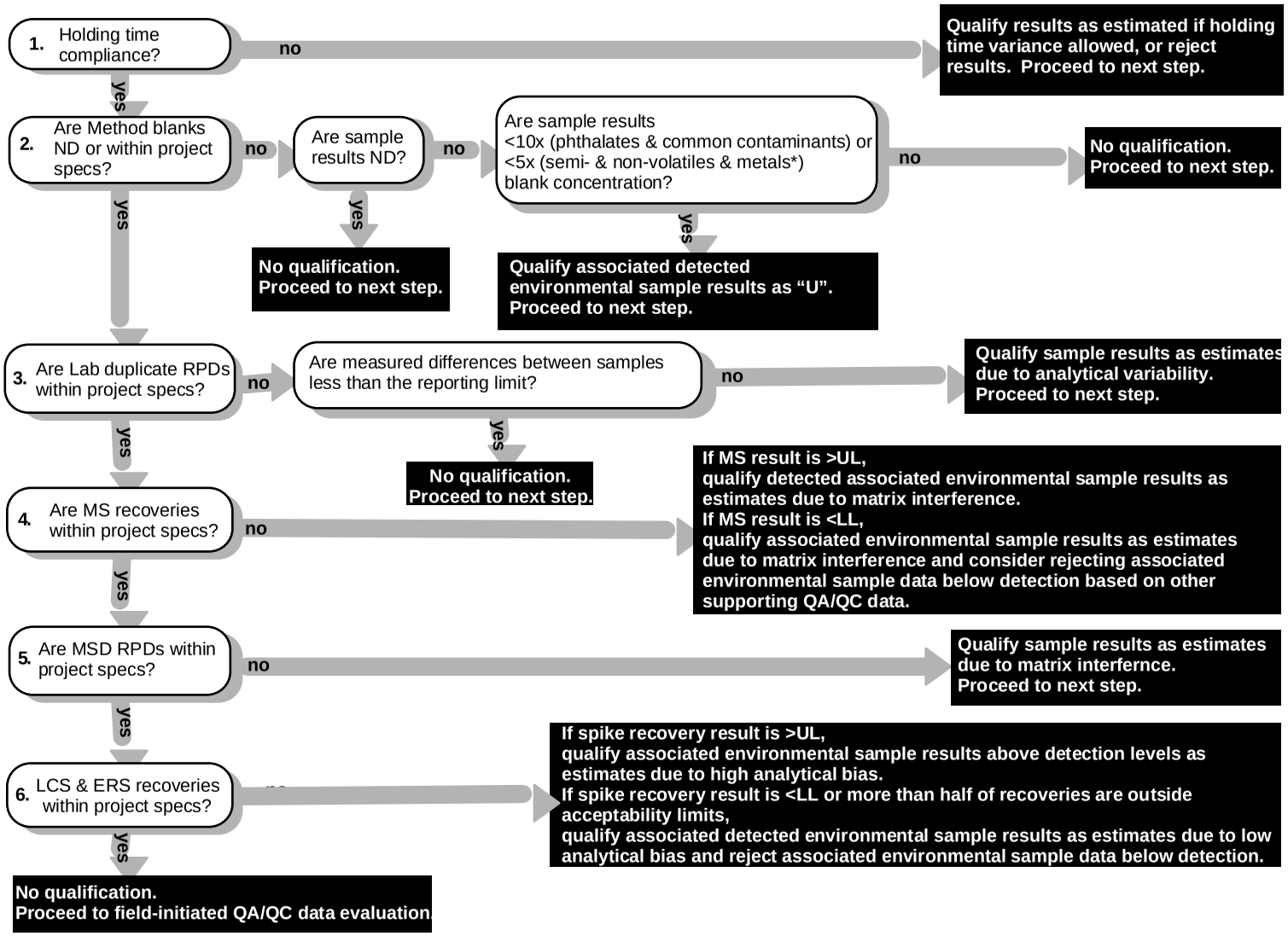
Laboratory Control Samples

LCS analysis is another batch check of recovery of a known standard solution that is used to assess the accuracy of the entire recovery process. LCSs are much like ERS's except that a certified standard is not necessarily used with LCSs, and the sample is prepared internally by the laboratory so the cost associated with preparing a LCS sample is much lower than the cost of ERS preparation. LCSs are reviewed for percent recovery within control limits provided by the laboratory. LCS out-of-range values are treated in the same manner as ERS out-of-range values. Because LCS and ERS analysis both check the entire recovery process, any irregularity in these results supersedes other accuracy-related qualification. Data are rejected due to low LCS recoveries when the associated environmental result is below the reporting limit.

A flow chart of the data evaluation process, presented on the following page as Figures 13-1 (lab-initiated QA/QC samples) and 13-2 (field initiated QA/QC), can be used as a general guideline for data evaluation. Boxes shaded black in Figures 13-1 and 13-2 designate final results of the QA/QC evaluation.

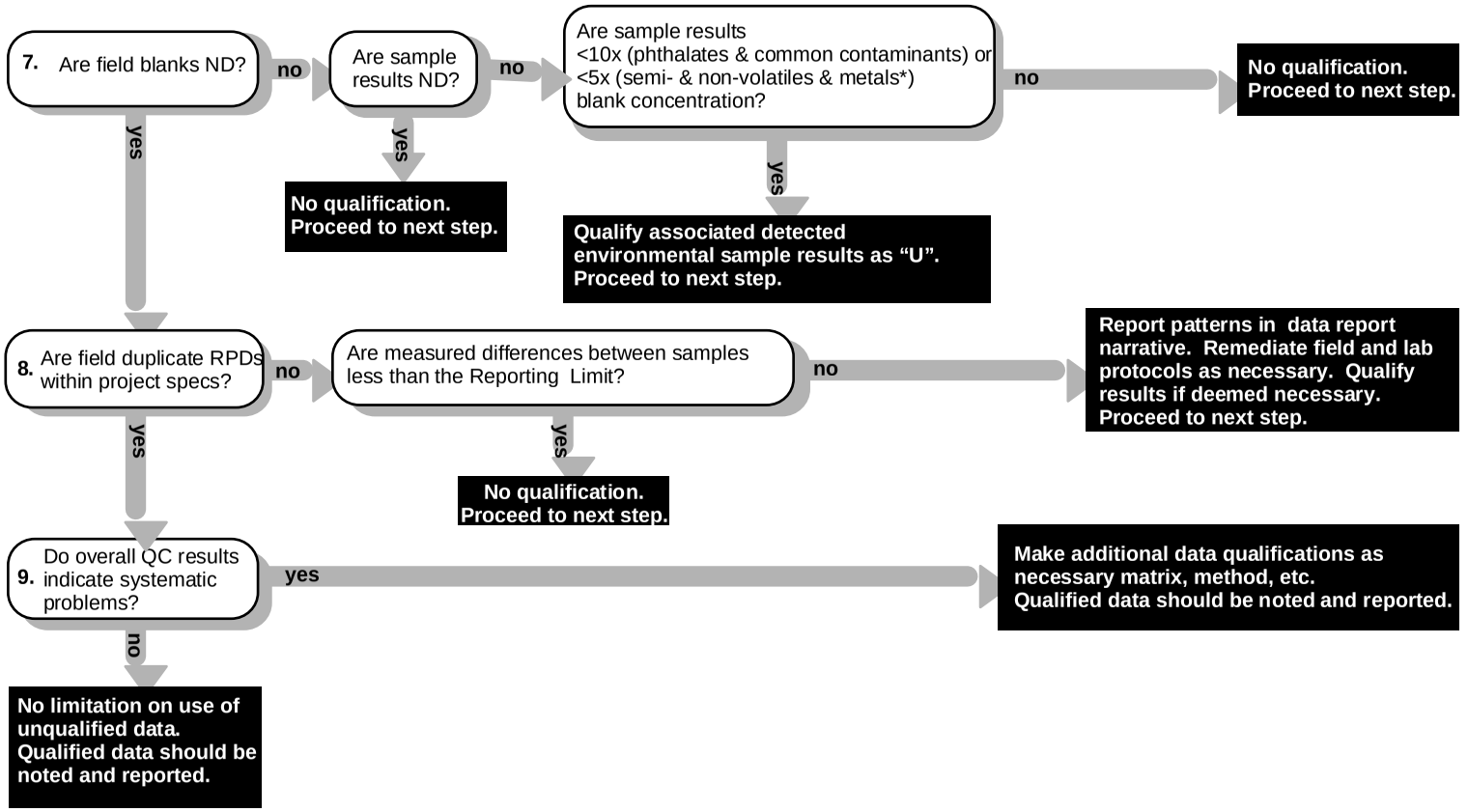
Table 13-2. Typical Control Limits for Precision and Accuracy for Analytical Constituents

Analyte	*EPA Method Number or Standard Method*	*Maximum Allowable RPD*	*Recovery Upper Limit*	*Recovery Lower Limit*
Conventionals				
BOD	405.1; SM 5210B	20%	80%	120%
COD	410.1; 410.4; SM 5220C; SM 5220D	20%	80%	120%
Hardness	130.2; 130.1; SM 2340B	20%	80%	120%
pH	150.1	20%	NA	NA
TOC/DOC	415.1	15%	85%	115%
TDS	160.1	20%	80%	120%
TSS	160.2	20%	80%	120%
Turbidity	180.1	20%	NA	NA
Nutrients				
NH3-N	350.2; 350.3	20%	80%	120%
NO3-N	300.0	20%	80%	120%
NO2-N	300.0	20%	80%	120%
NO3/NO2-N	353.2	20%	80%	120%
P	365.2	20%	80%	120%
Ortho-P	365.2; 365.3	20%	80%	120%
TKN	351.3	20%	80%	120%
Metals				
Ag	272.2; 200.8	20%	75%	125%
Al	200.9; 200.8	20%	75%	125%
Cd	213.2; 200.8	20%	75%	125%
Cr	218.2; 200.8	20%	75%	125%
Cu	220.2; 200.8	20%	75%	125%
Ni	249.2; 200.8	20%	75%	125%
Pb	239.2; 200.8	20%	75%	125%
Zn	289.2; 200.8	20%	75%	125%
As	206.3; 200.8	20%	75%	125%
Fe	200.9; SM 3500-Fe B	20%	75%	125%
Se	200.9; 270.3; 200.8	20%	75%	125%
Hg	1631	21%	79%	121%
Total Petroleum Hydrocarbons				
TPH (gasoline)	8015b	21%	45%	129%
TPH (diesel)		21%	45%	129%
TPH (motor oil)		21%	45%	129%
Oil & Grease	1664	18%	79%	114%
Pesticides and Herbicides				
Glyphosate	547	30%	70%	130%
OP Pesticides (esp. diazinon and chlorpyrifos)	8141; ELISA	25%	see method for constituent specific	
OC Pesticides	8081	25%		
Chlorinated Herbicides	8150; 8151	25%		
Carbamate Pesticides	8321	25%		
Miscellaneous Organic Constituents				
Base/Neutrals and Acids	625; 8270	30% to 50% (analyte dependent)	see method for constituent specific	
PAHs	8310			
Purgeables	624; 8260	20%		
Purgeable Halocarbons	601	30%	see method, Table 2	
Purgeable Aromatics	602	20%	see method for constituent specific	
Miscellaneous Constituents				
Cyanide	335.2	20%	75	125
Bacteriological				
Fecal Coliform	SM 9221E	-	-	-
Total Coliform	SM 9221B	-	-	-



*Environmental results between 5x and 10x the blank concentration are qualified as "an upper limit on the true concentration" and the data user should be cautioned.

Figure 13-1. Technical Data Evaluation for Lab-Initiated QA/QC Samples



*Environmental results between 5x and 10x the blank concentration are qualified as "an upper limit on the true concentration" and the data user should be cautioned.

Figure 13-2. Technical Data Evaluation for Field-Initiated QA/QC Samples

Appendix A

Additional Watershed Information

Santa Monica Bay Beach Bacteria TMDL Monitoring Exceedance Frequency Summary Table (2008-2013)

Appendix A Table 1

Exceedance Frequency for Santa Monica Bay Beaches Bacteria TMDL Monitoring

Location	2008			2009			2010			2011			2012			2013		
	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM
Dry - Summer																		
SMB-2-1	24	6	4	23	1	7	26	6	1	30	0	0	32	2	2	11	1	0
SMB-2-2	17	2	2	23	0	19	14	9	1	18	2	4	15	2	0	8	0	0
SMB-2-3	30	3	0	28	0	0	28	0	2	31	2	0	28	1	0	24	0	0
SMB-2-4	32	1	0	31	1	7	27	2	0	29	1	0	30	1	0	24	0	0
SMB-2-5	32	1	0	30	1	5	31	4	12	32	3	2	32	1	0	25	2	1
SMB-2-6	30	4	0	28	0	0	30	2	12	33	3	1	32	2	1	24	2	0
SMB-2-7	154	10	6	147	6	0	134	5	4	143	11	26	142	7	2	122	6	0
SMB-2-8	33	2	0	28	2	0	26	0	0	32	1	0	30	1	0	24	0	0
SMB-2-9	34	4	16	28	4	0	27	0	2	33	2	0	31	2	1	24	1	0
SMB-2-10	31	0	7	29	0	1	25	0	3	31	1	0	30	1	0	25	0	0
SMB-2-11	31	0	0	29	0	0	25	0	0	29	0	0	30	0	0	25	0	0
SMB-2-12	30	0	0	28	0	0	26	0	0	31	1	0	30	0	1	24	0	0
SMB-2-13	31	0	0	29	0	0	26	1	4	32	0	1	31	3	0	25	0	0
SMB-2-14	30	0	0	28	0	0	26	0	0	32	0	0	30	2	0	24	0	0
SMB-2-15	30	0	0	28	0	0	28	2	1	31	0	0	31	0	0	24	1	1
SMB-3-1	36	4	15	28	7	0	27	0	0	31	1	0	31	0	0	24	1	0
SMB-3-2	41	5	19	29	6	0	27	0	3	36	1	8	33	7	1	26	2	0
SMB-3-3	154	81	99	147	56	115	134	35	5	143	12	4	143	23	15	121	34	75
SMB-3-4	154	10	0	147	10	2	131	5	4	141	10	3	142	12	0	121	7	11
SMB-3-5	154	3	0	147	1	0	134	1	1	143	4	0	143	1	0	122	1	0
SMB-3-6	33	1	0	29	1	0	27	0	3	30	3	0	30	1	0	24	0	0
SMB-3-7	31	1	0	29	1	0	26	1	0	31	0	0	32	0	1	25	2	0
SMB-3-8	31	3	0	31	0	2	30	3	3	29	4	0	30	0	0	24	0	0
SMB-3-9	34	0	1	28	2	0	25	0	0	32	0	1	30	1	0	24	0	0
Dry - Winter																		
SMB-2-1	25	15	24	14	9	13	12	0	0	9	0	0	16	1	0	14	0	0
SMB-2-2	17	8	16	12	4	9	10	1	5	3	1	2	8	2	3	9	5	7
SMB-2-3	14	0	1	17	0	0	15	0	1	9	0	0	14	0	0	14	0	0
SMB-2-4	16	1	5	17	1	2	15	0	1	9	0	0	16	1	1	14	0	0
SMB-2-5	14	0	0	18	1	6	16	1	0	10	1	3	14	1	0	14	0	0
SMB-2-6	15	1	6	20	3	11	15	0	0	9	0	0	15	1	0	14	0	0
SMB-2-7	79	55	73	70	41	69	73	8	17	62	19	45	86	5	0	79	10	6
SMB-2-8	15	1	3	18	1	1	15	0	1	9	0	0	14	0	0	14	1	2
SMB-2-9	14	0	0	19	1	1	15	0	0	9	0	0	14	0	0	14	0	2

Appendix A Table 1

Exceedance Frequency for Santa Monica Bay Beaches Bacteria TMDL Monitoring

Location	2008			2009			2010			2011			2012			2013		
	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM
SMB-2-10	15	0	0	16	0	1	15	0	3	9	0	0	15	0	0	15	1	2
SMB-2-11	15	0	0	16	0	1	15	0	1	9	0	0	15	0	0	14	0	0
SMB-2-12	14	0	0	17	1	5	16	2	3	9	0	0	15	1	2	15	1	4
SMB-2-13	16	2	4	16	0	1	15	0	0	11	2	7	16	1	0	15	2	1
SMB-2-14	15	1	0	17	1	6	16	1	0	9	0	0	16	0	0	15	1	1
SMB-2-15	15	1	2	17	1	5	16	1	2	10	1	2	14	0	0	14	0	0
SMB-3-1	14	0	6	19	2	6	15	0	0	9	0	0	14	0	0	14	1	3
SMB-3-2	18	5	10	19	4	7	15	0	0	11	3	6	15	1	0	14	1	2
SMB-3-3	79	32	66	70	36	69	73	19	39	62	10	18	86	17	48	79	35	60
SMB-3-4	79	9	18	70	12	20	73	6	2	62	13	22	86	17	33	79	18	51
SMB-3-5	79	2	0	70	2	2	73	2	0	62	5	6	86	5	0	79	9	11
SMB-3-6	15	0	3	17	1	5	16	1	5	10	1	1	16	1	0	16	2	2
SMB-3-7	15	2	5	19	2	3	16	2	4	9	0	0	14	0	1	14	0	0
SMB-3-8	16	1	2	17	1	3	17	2	7	9	0	0	17	3	4	15	1	2
SMB-3-9	14	0	2	19	2	4	15	0	0	9	0	0	14	0	0	14	0	0
Wet																		
SMB-2-1	4	4	4	5	3	4	10	1	4	14	3	3	8	2	2	8	1	1
SMB-2-2	5	4	5	8	5	8	11	3	10	11	5	10	4	2	3	5	3	3
SMB-2-3	7	2	4	7	4	5	10	5	8	13	2	5	8	3	3	7	2	3
SMB-2-4	6	1	4	7	3	6	12	1	7	14	3	7	8	0	1	8	2	5
SMB-2-5	7	2	4	6	2	2	11	4	9	13	6	8	9	4	6	8	3	4
SMB-2-6	7	3	7	7	3	4	10	3	6	14	5	10	8	4	5	8	3	4
SMB-2-7	29	29	29	44	31	43	52	29	50	55	38	50	33	13	25	31	13	27
SMB-2-8	7	5	6	7	3	5	10	3	5	13	5	7	8	0	4	8	1	3
SMB-2-9	7	4	7	7	3	5	10	3	4	13	8	10	8	3	7	8	2	3
SMB-2-10	6	0	0	7	2	4	12	3	12	14	3	7	8	0	2	8	4	6
SMB-2-11	6	0	0	7	3	6	12	2	7	14	4	9	8	0	1	8	1	4
SMB-2-12	7	2	4	7	2	5	10	4	6	13	4	9	8	1	2	8	0	4
SMB-2-13	6	1	2	7	2	5	12	1	5	14	4	8	8	2	5	8	2	5
SMB-2-14	7	1	1	7	2	3	10	1	3	13	4	10	8	2	6	8	1	1
SMB-2-15	7	2	4	7	3	4	10	2	6	13	7	12	8	4	8	8	2	3
SMB-3-1	7	5	7	8	6	6	10	4	5	13	5	8	8	3	3	8	3	4
SMB-3-2	8	4	8	7	5	5	10	5	7	14	6	14	8	3	4	8	3	4
SMB-3-3	29	16	28	44	18	38	52	20	40	55	19	46	33	9	26	31	13	29
SMB-3-4	29	21	29	44	27	43	52	25	42	55	33	51	33	22	33	31	16	28

Appendix A Table 1

Exceedance Frequency for Santa Monica Bay Beaches Bacteria TMDL Monitoring

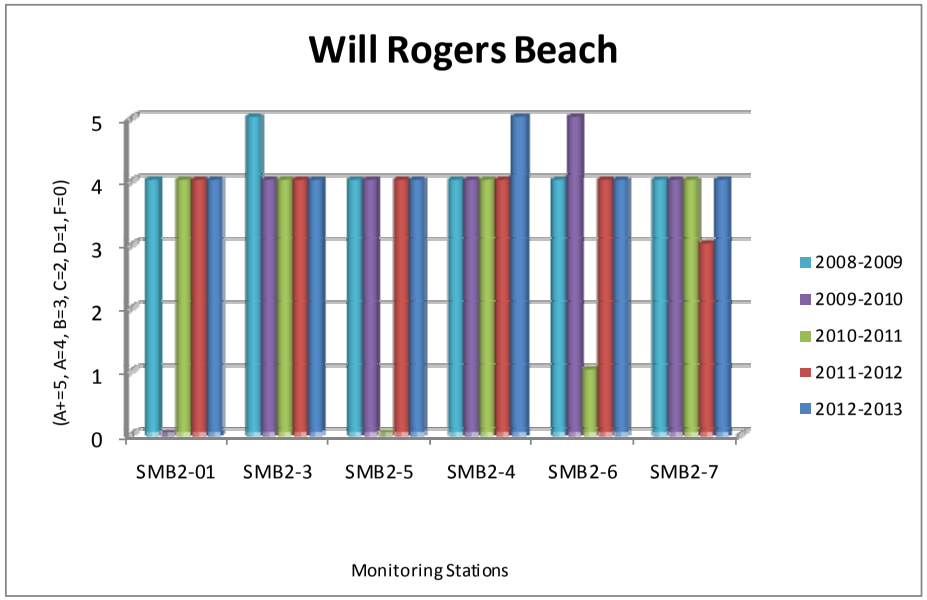
Location	2008			2009			2010			2011			2012			2013		
	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM	#	SS	GM
SMB-3-5	29	11	20	44	15	43	52	16	39	55	20	44	33	7	16	31	13	26
SMB-3-6	6	2	5	7	5	6	12	2	8	14	8	11	8	3	4	8	2	5
SMB-3-7	8	4	7	8	5	6	10	4	5	13	7	10	8	4	6	8	1	5
SMB-3-8	6	1	0	7	2	6	12	2	7	14	5	10	8	1	2	8	3	6
SMB-3-9	7	4	7	7	3	5	10	2	5	13	7	12	8	2	3	8	2	3

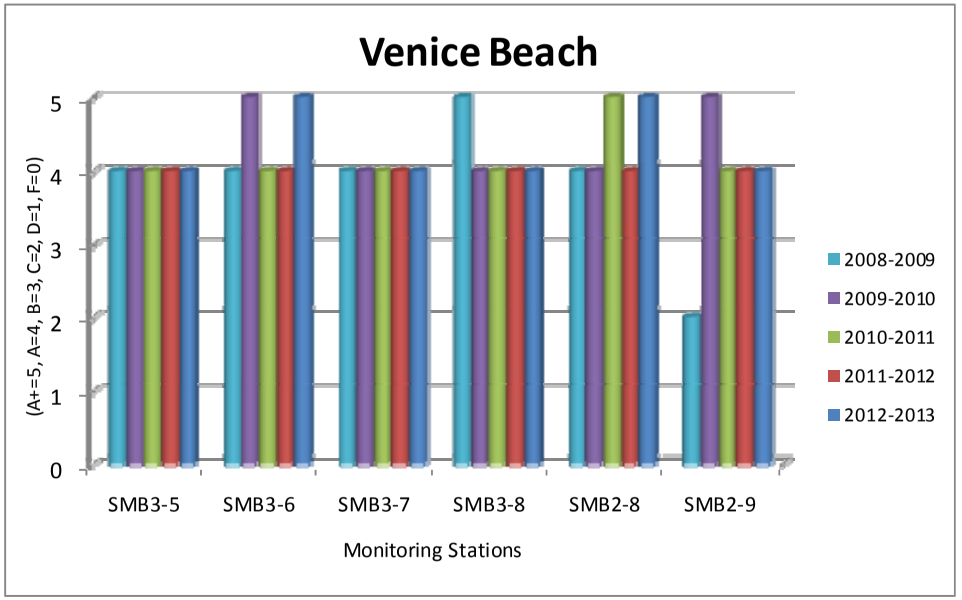
- Number of Samples

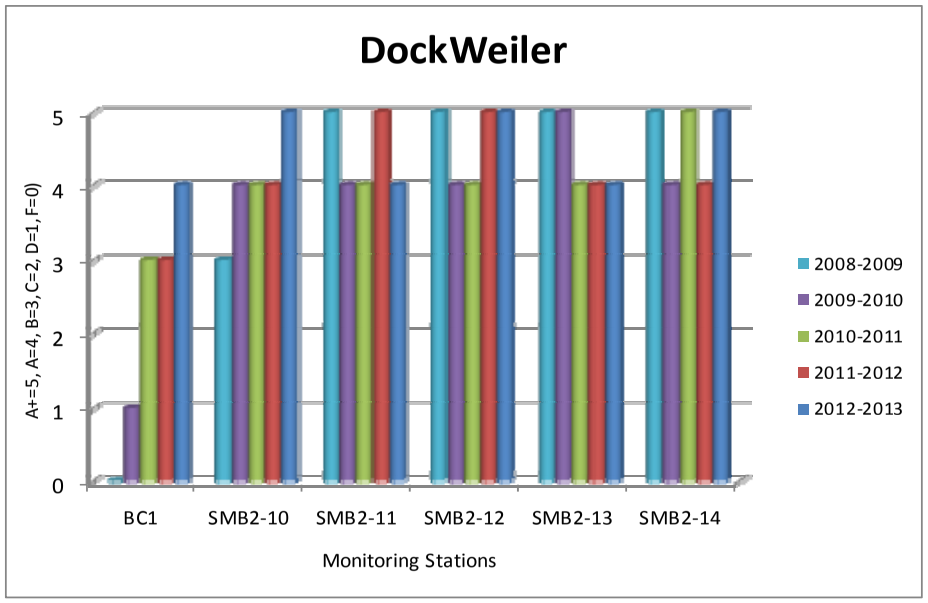
SS - Single Sample (Daily) Exceedances

GM - Geometric Mean Exceedances

Heal the Bay Beach Report Card (2008-2014)

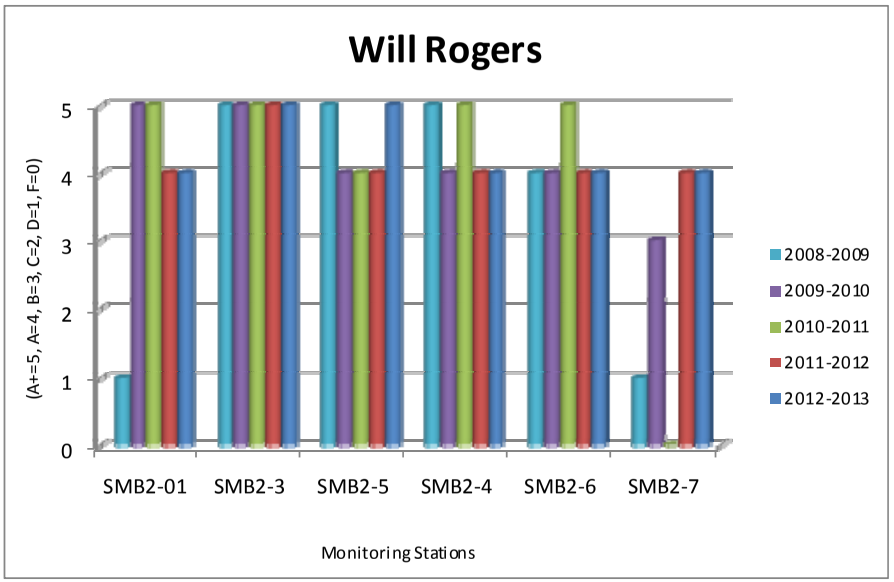


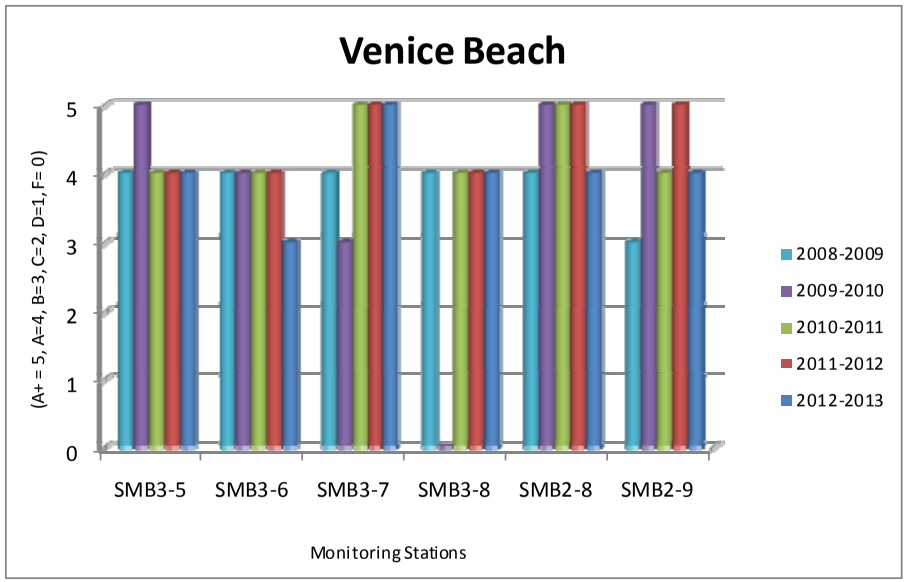


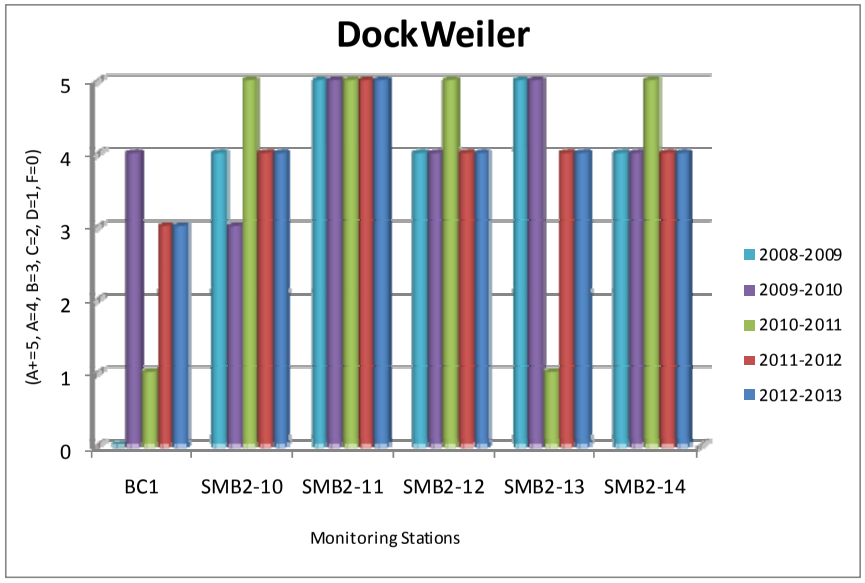


Summer Dry Period

(April 1 – October 31)

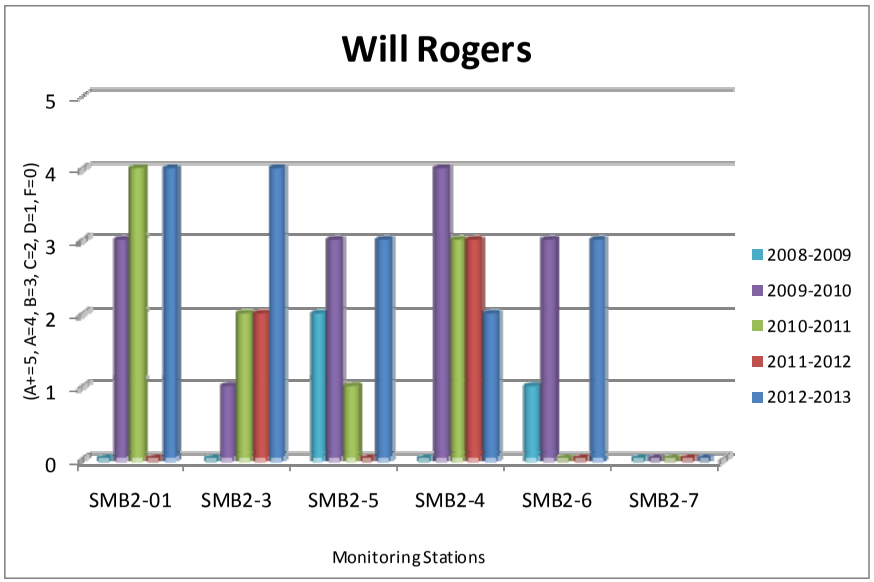


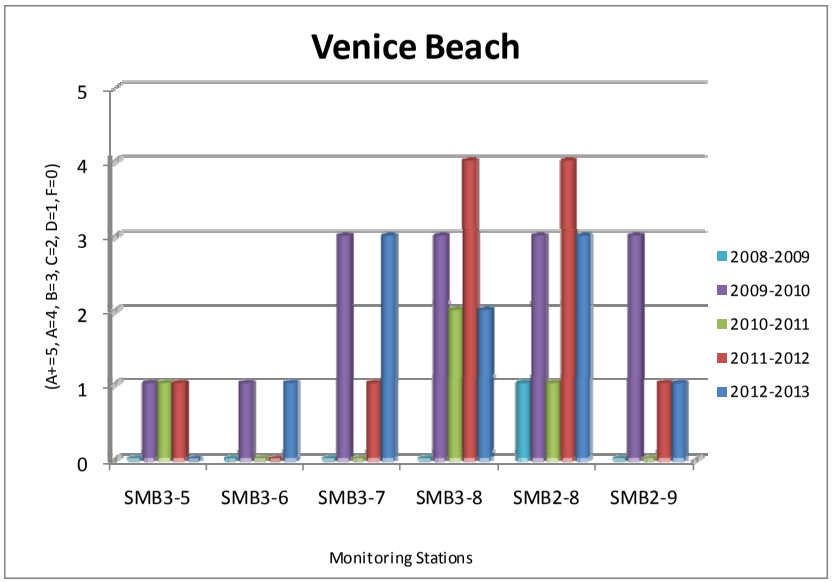


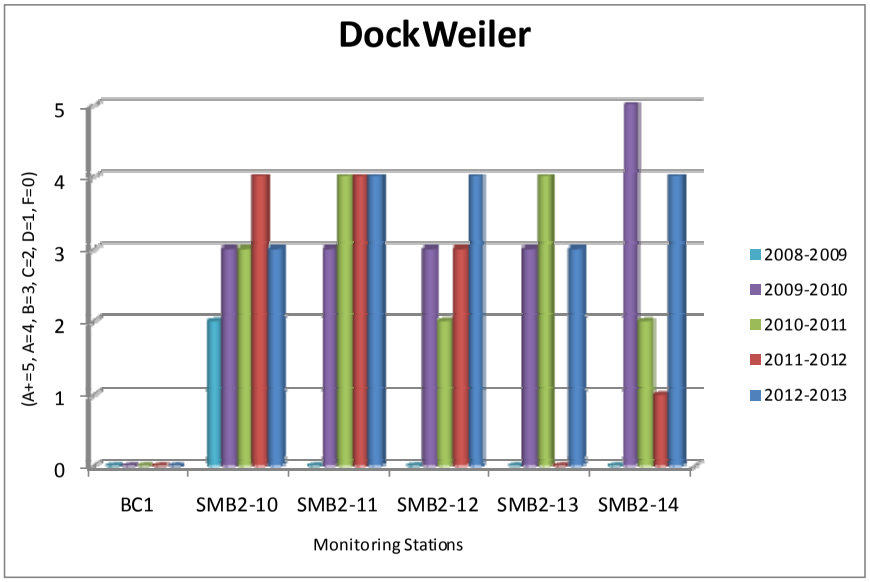


Winter Dry Period

(November 1 – March 31)

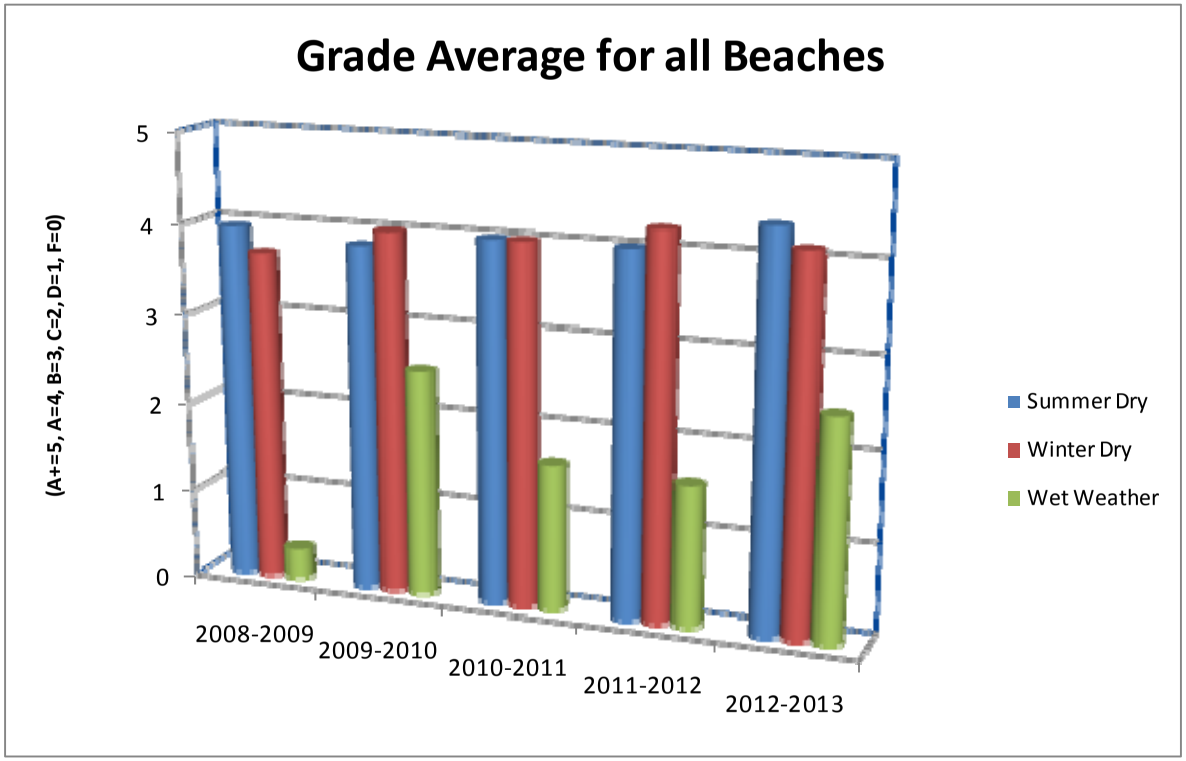






Wet Weather

(Year round)


Grade Average for all Beaches
(A+=5, A=4, B=3, C=2, D=1, F=0)
5
4
3
2
1
0
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
Summer Dry
Winter Dry
Wet Weather

JG 2/3 BEACH REPORT CARD

2013-2014

Beach	Location/ Shoreline Station	Summer Dry (April 1 - Oct 31)	Winter Dry (Nov 1 - Mar 31)	Wet Weather Year Round
Castle rock	Castlerock Drain (SMB 2-01)	A+	--	--
Will Rogers State Beach	Santa Ynez drain (SMB 2-02)	A+	A -	--
	17200 PCH (SMB 2-03)	A	A+	B
	Bay Club (SMP 2-05)	A+	A+	B
	Pulga (SMB 2-04)	A+	A+	A+
	Temescal canyon (SMB 2-06)	A	A+	C
	SMC (SMB 2-07)	A	B	F
Santa Monica Beach	Montana Drain (SMB 3-01)	A	A	D
	Wilshire Blvd drain (SMB 3-02)	A	C	F
	SM Pier (SMB 3-03)	D	F	F
	Pico Kenter (SMB 3-04)	A	A	F
	Stran Street (SMB 3-09)	A+	B	B
	Ashland (SMB 3-05)	A	A	D
Venice Beach	Rose Avenue (SMB 3-06)	A+	A	A
	Brooks Ave (SMB 3-07)	A	A	F
	Windward (SMB 3-08)	A+	A+	A+
	Venice Pier (SMB 2-08)	A	A	A+
	Topsail (SMB 2-09)	A	A	C
Dock Weiler	Ballona Creek Mouth	A	A	F
	Culver Blvd drain (SMB 2-10)	A	A	F
	N. West Chester (SMB 2-11)	A	A	A+
	World Way (SMB 2-12)	A+	A+	B
	Imperial HWY (SMB 2-13)	A	B	F
	HTP, 1 mile outfall (SMB 2-14)	A+	A	A
	Grand Ave (SMB 2-15)	A	A	A

Note: All shoreline station SMB 2-XX are within Jurisdictional Group 2, and SMB 3-XX are within Jursidictional Grou

Appendix B

Example Calibration, Field and Chain of Custody Forms

Example Field Calibration Log Sheet

METER CALIBRATIONS/FIELD MEASUREMENTS STN NO_____

Calibrated by:_____ Location:_____

Date:_____ Time:_____

TEMPERATURE Meter MAKE/MODEL _____ S/N _____ Thermister S/N _____ Thermometer ID _____

Lab Tested against NIST Thermometer/Thermister? N Y Date: _____ ±_____ °C

Measurement Location: SINGLE POINT AT _____ ft DEEP STREAMSIDE _____ FT FROM LEFT RIGHT BANK VERTICAL AVG/MEDIAN OF _____ POINTS

Field Readings #1 _____ #2 _____ #3 _____ #4 _____ #5 _____ **MEDIAN:**_____ °C Remark ___ ___ Qualifier ___ ___

pH Meter MAKE/MODEL _____ S/N _____ Electrode No. _____ Type: GEL LIQUID OTHER _____

Sample: FILTERED UNFILTERED CONE SPLITTER CHURN SPLITTER SINGLE POINT AT _____ FT DEEP VERTICAL AVG. OF _____ POINTS

pH BUFFER	BUFFER TEMP	THEO-RETICAL pH FROM TABLE	pH BEFORE ADJ.	pH AFTER ADJ.	SLOPE	MILLI-VOLTS
pH 7						
pH 7						
pH 7						
pH ___						
pH ___						
pH ___						
CHECK pH ___						

TEMPERATURE CORRECTION FACTORS FOR BUFFERS APPLIED? Y N

BUFFER LOT NUMBERS :

pH 7: _____

pH ____: _____

CHECK pH ____: _____

BUFFER EXPIRATION DATES:

pH 7: _____

pH ____ : _____

CHECK pH ____: _____

Calibration Criteria: ± 0.2 pH units

Field Readings # 1_____ # 2_____ # 3_____ # 4_____ # 5 _____ **MEDIAN:** _____ **Units** Remark ___ ___ Qualifier ___ ___

SPECIFIC CONDUCTANCE Meter MAKE/MODEL _____ S/N _____ Sensor Type: DIP FLOW-THRU OTHER_____

Sample: CONE SPLITTER CHURN SPLITTER SINGLE POINT AT _____ ft DEEP VERTICAL AVG. OF _____ POINTS

STD VALUE	STD TEMP	SC BEFORE ADJ.	SC AFTER ADJ.	STD LOT NO	STD EXPIR-ATION DATE	COMMENTS

AUTO TEMP COMPENSATED METER ___

MANUAL TEMP COMPENSATED METER ___

CORRECTION FACTOR APPLIED? Y N

CORRECTION FACTOR= _____

Calibration Criteria: the greater of 5 µS/cm or 3% of measured value

Field readings # 1_____ # 2_____ # 3_____ # 4_____ # 5 _____ **MEDIAN:** _____ **µS/cm** Remark ___ ___ Qualifier ___ ___

DISSOLVED OXYGEN Meter MAKE/MODEL _____ S/N _____ Probe No. _____

Air Calibration Chamber in Water Air-Saturated Water Air Calibration Chamber in Air Winkler Titration Other_____

Sample: SINGLE POINT AT _____ ft DEEP VERTICAL AVG. OF _____ POINTS BOD BOTTLE OTHER_____ Stirrer Used? Y N

WATER TEMP °C	BAROMETRIC PRESSURE mm Hg	DO TABLE READING mg/L	SALINITY CORR. FACTOR	DO BEFORE ADJ.	DO AFTER ADJ.

Calibration Criteria: ± 0.3 mg/L

Zero DO Check _____mg/L Adj. to _____ mg/L Date: _____

Zero DO Solution Date_____ Thermister Check? Y N Date_____

Membrane Changed? N Y Date: _____ Time: _____

Barometer Calibrated? N Y Date: _____ Time: _____

Battery Check: REDLINE _____ RANGE _____

Field readings # 1_____ # 2_____ # 3_____ # 4_____ # 5 _____ **MEDIAN:** _____ **mg/L** Remark ___ ___ Qualifier ___ ___

OBSERVATIONS

Weather:_____

Water Color:_____ In stream Activity:_____

Water Characteristics (flow type, odor, turbidity, floatables):_____

Other comments (trash, wildlife, recreational uses, homeless activity, etc. – Use notes section if more room is needed):

_____

GENERAL INFORMATION Date: _____

Site ID: _____ Sampling Personnel:_____

GPS Coordinates: (lat) _____ (long) _____ Picture/Video #: _____

***In situ* WATER QUALITY MEASUREMENTS**

Time	Temp (^{0}C)	pH	D.O. (mg/L)	Elec Cond. (uS/cm)	Turbidity (NTU)

COLLECTED WATER QUALITY SAMPLES

Sample ID	Analysis	Time	Volume	Notes
				Field blank
				Field duplicate

ADDITIONAL WATER QUALITY SAMPLING NOTES:

FLOW MEASUREMENTS WITH VELOCITY METER

Estimated Total Width of Flowing Water (ft): _____ Distance measured from (circle): RIGHT or LEFT

Measurement Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Distance from Bank (ft)														
Depth (ft)														
Velocity (ft/s)														

FLOW MEASUREMENTS WITH FLOAT AND STOPWATCH Number of Flow Paths:_____

Fill out Path # ➔	Path#	Path#	Path#	Path#	Path#
Width of Flow at **Top** of Marked Section:					
Width of Flow at **Middle** of Marked Section:					
Width of Flow at **Bottom** of Marked Section:					
Depth of Flow at 0% of **Top** Marked Section:					
Depth of Flow at 25% of **Top** Marked Section:					
Depth of Flow at 50% of **Top** Marked Section:					
Depth of Flow at 75% of **Top** Marked Section:					
Depth of Flow at 100% of **Top** Marked Section:					
Depth of Flow at 0% of **Middle** Marked Section:					
Depth of Flow at 25% of **Middle** Marked Section:					
Depth of Flow at 50% of **Middle** Marked Section:					
Depth of Flow at 75% of **Middle** Marked Section:					
Depth of Flow at 100% of **Middle** Marked Section:					
Depth of Flow at 0% of **Bottom** Marked Section					
Depth of Flow at 25% of **Bottom** Marked Section:					
Depth of Flow at 50% of **Bottom** Marked Section:					
Depth of Flow at 75% of **Bottom** Marked Section:					
Depth of Flow at 100% of **Bottom** Marked Section					
Distance Marked-off for Velocity:					
Time 1:					
Time 2:					
Time 3:					

Specify if measurements are in inches or feet using "in" or "ft"

FLOW MEASUREMENT WITH GRADUATED CONTAINER

Container Volume:_____ Percent Capture:_____

Time to fill container:

	Minutes	Seconds
Time1		
Time2		
Time3		

CHAIN OF CUSTODY RECORD

Company:				Phone:				Job No.														Page _____ of _____	
Project Manager:				Email:				Analysis Requested														Test Instruction & Comments	
Project Name:				Project #																			
Site Name: & Address:																							
	Sample ID	**Lab ID**	**Date**	**Time**	**Matrix**	**Container Number/Size**	**Pres.**																
1																							
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							
13																							
14																							
15																							

Sample Receipt: To Be Filled By Lab	**Turn Around Time**	Relinquished By: 1	Relinquished By: 2	Relinquished By: 3
Total Number of Containers	Normal	Signature	Signature	Signature
Custody Seals Yes No N/A	Rush	Printed Name		Printed Name
Received in Good Condition Yes No	Same Day	Date Time	Date Time	Date Time
Properly Cooled Yes No N/A	24 Hrs	Received By 1	Received By 2	Received By 3
Samples Intact Yes No N/A	48 Hrs	Signature	Signature	Signature
Samples Accepted Yes No	72 Hrs	Printed Name	Printed Name	Printed Name
		Date Time	Date Time	Date Time