November 14, 2016

SANTA MONICA BAY JG7 WATERSHED MANAGEMENT PLAN GROUP

Coordinated Integrated Monitoring Program (CIMP)

Prepared by

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LIST OF ACRONYMS

Acronym	Definition
40 CFR	Code of Federal Regulations
AED	Allowable Exceedance Day
AIN	Assessor's Identification Number
ASBS	Areas of Special Biological Significance
ASTM	American Society for Testing and Materials
Basin Plan	Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties
BMPs	Best Management Practices
Caltrans	California Department of Transportation
CCW	Calleguas Creek Watershed
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIMP	Coordinated Integrated Monitoring Program
County	Los Angeles County
COC	Chain of Custody
CRM	Certified/ Standard Reference Material
CSMP	Coordinated Shoreline Monitoring Plan
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
CWC	California Water Code
DAP	Discharge Assessment Plan
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
EDTA	Ethylene Diamine Tetra Acetic Acid
EIA	Effective Impervious Area
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
ES	Executive Summary
EWMP	Enhanced Watershed Management Program
FLPE	Fluorinated high-density polyethylene
GIS	Geographic Information System
GM	Geometric Mean
GWQC	General Water Quality Constituents

HUC	Hydrologic Unit Codes
IC/ID	Illicit Connection/Illicit Discharge
IMCR	Integrated Monitoring Compliance Report
IMP	Integrated Monitoring Program
IWC	In-stream waste concentration
JG	Jurisdictional Group
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LCS	Laboratory Control Sample/Standard
LID	Low Impact Development
MAL	Municipal Action Limits
MBAS	Methylene Blue Active Substances
MCM	Minimum Control Measure
MDL	Method Detection Limit
MES	Mass Emission Stations
MF	Multi-Family
MGD	Million Gallons per Day
MPN	Most Probable Number
MRP	Monitoring and Report Program
MS4	Municipal Separate Storm Sewer System
MTBE	Methyl tert-butyl ether
NA	Not Applicable
NELAP	National Environmental Laboratory Accreditation Program
NIST	National Institute for Standards and Technology
NPDES	National Pollutant Discharge Elimination System
NSW	Non-Stormwater
NTU	Nephelometric Turbidity Units
OC	Organochlorine
OP	Organophosphate
PBO	Piperonyl Butoxide
PCB	Polychlorinated biphenyl
PDF	Portable Document Format
PE	Polyethylene
Permit	Permit No. R4-2012-0175
PMRP	Pellets Monitoring and Reporting Plan
PRM	Pathogen Related Mortality
QA	Quality Assurance

QC	Quality Control
QPF	Quantitative Precipitation Forecast
RAA	Reasonable Assurance Analysis
REC-1/REC-2	Recreational Beneficial Use Designations
Regional Board	Los Angeles Regional Water Quality Control Board
RL	Reporting Limits
RPD	Relative Percent Difference
RW	Receiving Water
RWL	Receiving Water Limitations
RWQCB	Regional Water Quality Control Board
SCCWRP	Southern California Coastal Water Research Project
SDTF	Standardized Data Transfer Format
SF	Single Family
SIC	Standard Industrial Classification System
SM	Standard Methods
SMB	Santa Monica Bay
SMB JG7 WMP 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
SPE	Solid Phase Extraction
SQO	Sediment Quality Objectives
SSC	Suspended Sediment Concentration
STS	Sodium thiosulfate
SVOC	Semi Volatile Organic Compound
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TKN	Total Kjehdahl Nitrogen
TM	Technical Memo
TMDL	Total Maximum Daily Load
TMRP	Trash Monitoring and Reporting Plan
TOC	Total Organic Carbon
TRE	Toxicity Reduction Evaluation

TSS	Total Suspended Solids
TST	Test of Significant Toxicity
UC	University of California
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WBPCs	Water Body-Pollutant Combinations
WDID	State Waste Discharge Identification
WLA	Waste Load Allocations
WMA	Watershed Management Area
WMP	Watershed Management Program
WQBEL	Water Quality-Based Effluent Limits

Section 1
Introduction

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) was adopted November 8, 2012 by the Los Angeles Regional Water Quality Control Board (Regional Board) and became effective December 28, 2012. 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 Permittees to customize their stormwater programs through the development and implementation of a Watershed Management Program (WMP) or an Enhanced Watershed Management Program (EWMP) to achieve compliance with receiving water limitations (RWLs) and water quality-based effluent limits (WQBELs). The City of Los Angeles (City) has been a participating agency of Jurisdictional Group 7 (JG7) of the Santa Monica Bay (SMB) Watershed since the adoption of the Santa Monica Bay Beaches Bacteria Total Maximum Daily Loads (TMDLs) in 2003. However, the City of Los Angeles and the other MS4 permittees in JG7 could not reach an agreement for a collaborative approach to satisfying the requirements of the MS4 permit. Therefore, on November 26, 2013 the Regional Board requested that the City and the Los Angeles County Flood Control District (LACFCD) (see **Attachment A** for background on the LACFCD), collectively referred to as the SMB JG7 WMP Group, pursue a WMP instead of an EWMP to fulfill the requirements of the MS4 Permit. The primary reasons for this request included: 1) MS4 discharges to Santa Monica Bay are anticipated to be minimal due to the small contributing drainage areas; and 2) opportunities for structural BMP implementation are limited due to the geography of the WMP area (e.g., cliffs at outfalls, landslide and liquefaction hazards, etc.). As such, in December of 2013 the JG7 SMB WMP Group submitted a revised notice of intent to develop a WMP for the City of Los Angeles land area within JG7 of the Santa Monica Bay Watershed.

This Coordinated Integrated Monitoring Program (CIMP) fulfills 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.

Additionally, the CIMP incorporates TMDL monitoring requirements to unify monitoring efforts and to provide consistent observations of watershed conditions.

1.1 SANTA MONICA BAY JURISDICTIONAL GROUP 7 WATERSHED MANAGEMENT PLAN AREA

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.

Nearshore 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.

The SMB JG7 WMP Group area lies within the larger JG7 boundary in the southern portion of the Santa Monica Bay watershed. The JG7 WMP area includes that portion of the area within the Hydrologic Unit Codes (HUC-12): Manhattan Beach – Frontal Santa Monica Bay which extends along the shoreline from Cabrillo Beach up to the Ocean Trails Reserve.

The SMB JG7 WMP Group area is bordered on the north approximately by the Bogdanovich Recreation Center and W 25th street and the south by Royal Palms Beach, White Point Beach, the southern point of Cabrillo Beach, and other shoreline that drains to the Santa Monica Bay. This area is bordered on the west by the City of Ranchos Palos Verdes and on the east by Cabrillo Beach. The SMB JG7 WMP Group area is solely under the jurisdiction of the City of Los Angeles and includes all of the White Point Natural Preserve and Education Center as well as Point Fermin Park.

The SMB JG7 WMP Group is comprised of two participating agencies: the City of Los Angeles and LACFCD. The SMB JG7 WMP Group area, which consists solely of JG7 area under the jurisdiction of the City, totals approximately 1,056 acres, which is approximately 9% of the entire JG7 area within the Santa Monica Bay Watershed (**Figure 1**). The geographical scope of the SMB JG7 WMP Group area includes land owned by the Los Angeles Air Force Base Pacific Crest Housing Area, which the MS4 Permittees have no jurisdiction over and thus is excluded from the SMB JG7 WMP Group Area. Approximate land area and land use summaries for the JG7 WMP Group area are listed in **Table 1**and presented in **Figure 1**. The most prevalent land uses are residential (67%) and open space (27%). The open space area includes 102 acres of restored coastal sage scrub habitat and hiking trails located within the White Point Nature Preserve Wild Park as well as portions of Point Fermin Park. The remaining area

consists of a mixture of commercial, education, and industrial land uses. **Figure 2** illustrates the distribution of percent imperviousness across the JG7 WMP Group area.

Figure 3 depicts the MS4 system in the JG7 WMP Group area, including outfalls, approximate catchment delineations, and storm drain diameters. 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)).

Table 1 Land Use Summary

	SMB JG7 WMP Group	
Land Use	**Acres**	**% of Total**
Agriculture	0.0	0.0%
Commercial	25.5	2.4%
Industrial	1.0	0.09%
Education	32.2	3.1%
Multi-Family Residential	151.0	14.3%
Single Family Residential	561.5	53.2%
Vacant/Open	284.3	26.9%
Transportation	0.0	0.0%
Total	1056	100%

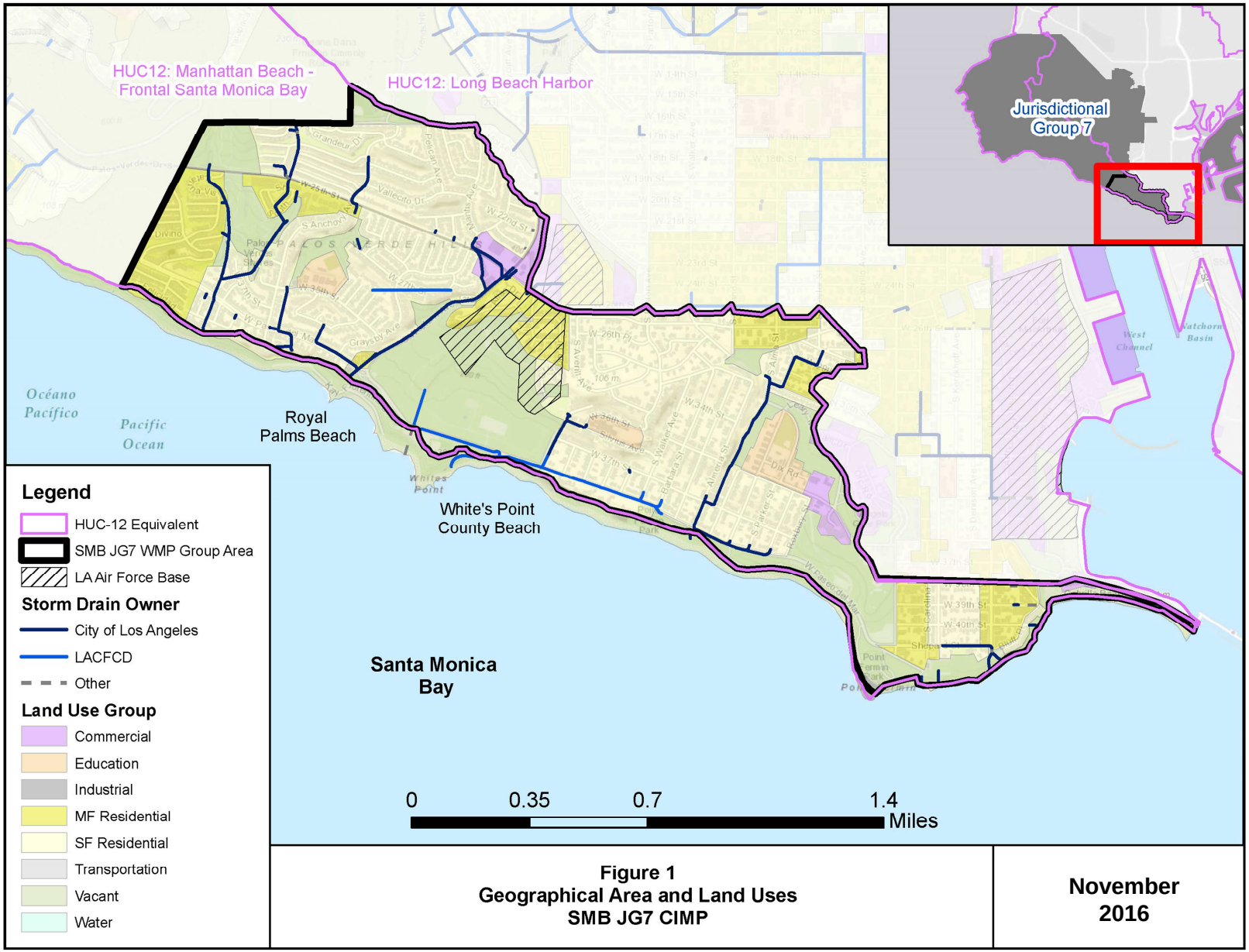

Figure 1
Geographical Area and Land Uses
SMB JG7 CIMP

November 2016

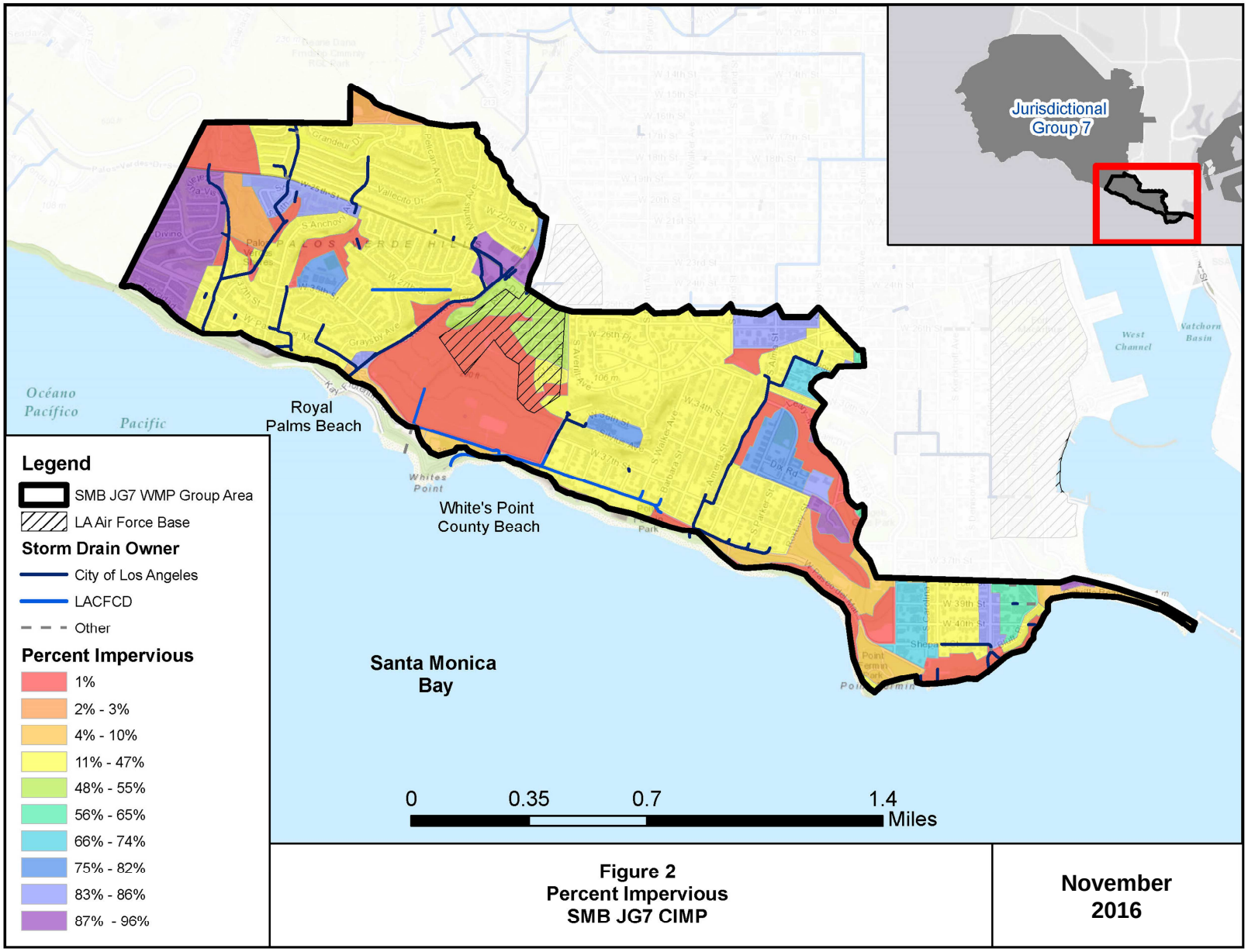

Figure 2
Percent Impervious
SMB JG7 CIMP

November 2016

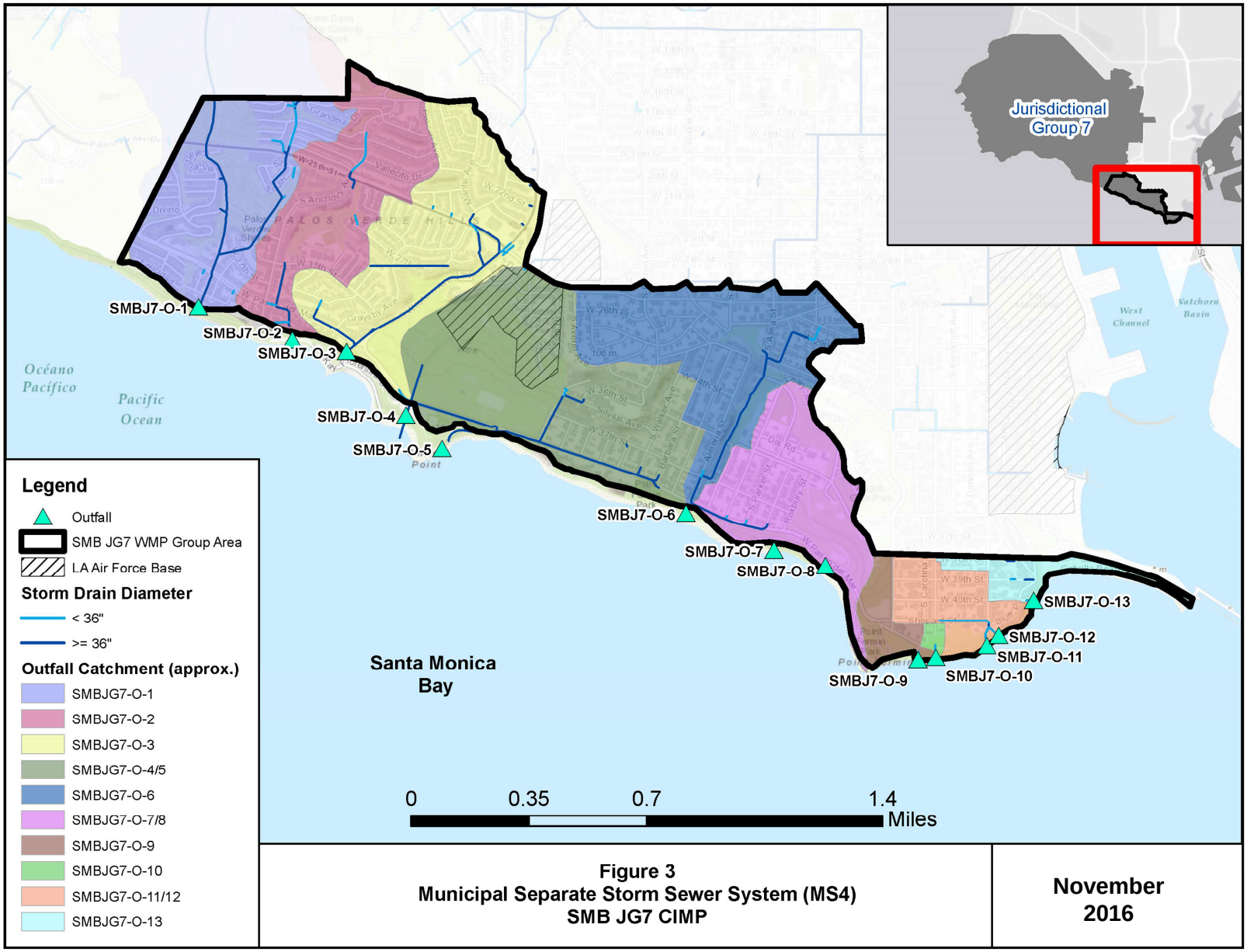

Figure 3
Municipal Separate Storm Sewer System (MS4)
SMB JG7 CIMP

November 2016

The receiving waters defined by the Water Quality Control Plan, Los Angeles Region (Basin Plan) (Regional Board, 1995, Updated 2011) within the SMB JG7 WMP Group area include:

- Santa Monica Bay – Offshore/Nearshore Zone
- Royal Palms Beach
- White's Point County Beach
- Point Fermin Park Beach (not listed in Basin Plan)

Attachment B of the MS4 Permit shows mapped United States Geological Survey Hydrologic Units, and other features, based on HUC-12 watershed boundaries. In lieu of these specified boundaries, the March 26, 2014 Regional Board Reasonable Assurance Analysis (RAA) Guidelines allows WMP groups to use HUC-12 equivalent watersheds, prepared by the LACFCD. Using the LACFCD HUC-12 layer and numbering conventions, the LACFCD HUC-12 boundary relevant to the SMB JG7 WMP Group is Manhattan Beach – Frontal Santa Monica Bay (180701040500).

1.2 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 JG7 WMP Group's CIMP addresses the six required elements of the Permit MRP:

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 summarized below.

1.2.1 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. The data from the Peninsula Cities CIMP will be used unless the SMB JG7 WMP Group chooses to do its own monitoring, in which case, one alternate receiving water monitoring site within the J7 CIMP has been identified. **Section 2** discusses the SMB JG7 WMP Group's receiving water monitoring program.

1.2.2 Stormwater Outfall Monitoring

Stormwater outfall monitoring assesses compliance with municipal action limits (MALs), WQBELs derived from TMDL WLAs, and evaluates whether discharges have 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 JG7 WMP Group generally drain towards Santa Monica Bay. Data from stormwater outfall monitoring for the Peninsula Cities CIMP will be used to represent stormwater quality from the J7 WMP area. If the SMB JG7 WMP Group chooses not to use the data from the Peninsula Cities, one primary alternate and another secondary alternate outfall monitoring site within the J7 CIMP area will be monitored. A synopsis of the outfall drainage area, along with an analysis of its land use/zoning characteristics is summarized in **Section 4**.

1.2.3 Non-Stormwater Outfall Program

To fulfill the Permit requirements, the MRP requires Permittees to implement a Non-Stormwater Outfall Screening and Monitoring Program (Non-Stormwater Program) which is focused on eliminating non-permitted non-stormwater discharges to receiving waters. Additional details of the Non-Stormwater Program are presented in **Section 5**.

1.2.4 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. The SMB JG7 WMP 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, the SMB JG7 WMP 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 JG7 WMP Group.

1.2.5 Regional Studies

The MRP identifies one regional study: the SMC Regional Watershed Monitoring Program. None of the SMC monitoring sites are located within the SMB JG7 WMP Group area due to a lack of streams or rivers.

1.2.6 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 bodies within the SMB JG7 WMP Group area were presented in Section 1. The receiving water bodies (Santa Monica Bay – Offshore/Nearshore zone, Royal Palms Beach, White Point Beach, and Point Fermin Park Beach) are designated as having existing recreational beneficial uses (REC-1 and REC-2), among others. The objectives of the CIMP receiving water monitoring program 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.

The requirements in the MRP for selecting receiving water monitoring sites include utilizing receiving water monitoring sites at previously designated LACDPW mass emission (ME) stations, 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, no existing ME stations were located. As shown in **Figure 4**, three existing Santa Monica Bay Beaches Bacteria TMDL monitoring stations are located within the SMB JG7 WMP Group's jurisdictional area (SMB 7-06, SMB-7-08, and SMB 7-09; SMB 7-07 was destroyed in a landslide). SMB J7 WMP Group is uniquely different from other SMB subwatersheds and watershed groups in that the storm drain outfalls are located along steep bluffs and cliffs up to a hundred feet high or more without safe access to the shoreline. The path to shoreline locations associated with outfalls are often either non-existent or through an unsafe rocky cliff. The City of Los Angeles has assessed all potential replacement outfalls between SMB 7-06 and SMB 7-08, in addition to local receiving water locations, in an attempt to designate a representative replacement additional shoreline monitoring location. However, all potential locations were found to be unsafe for sampling. Details of the outfalls reviewed are included in **Attachment C**. Additionally; four sites in the Santa Monica Bay offshore of the JG7 WMP Group area are monitored as part of the Bight Program. Existing monitoring programs are discussed in Section 2.1 below.

One receiving water station was identified for monitoring as part of the CIMP in the event that the J7 WMP Group performs the monitoring.. Details on the monitoring site selection as well as the proposed frequency, parameters, and duration of monitoring are discussed in Section 2.2 through 2.4.

2.1 EXISTING MONITORING PROGRAMS

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. Bight sampling locations are shown in **Figure 4**. The monitoring sites were analyzed for trace metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), poly brominated diphenyl ethers (PBDEs), chlorinated hydrocarbons, total organic carbon (TOC), nitrogen, phosphorus, and grain size.

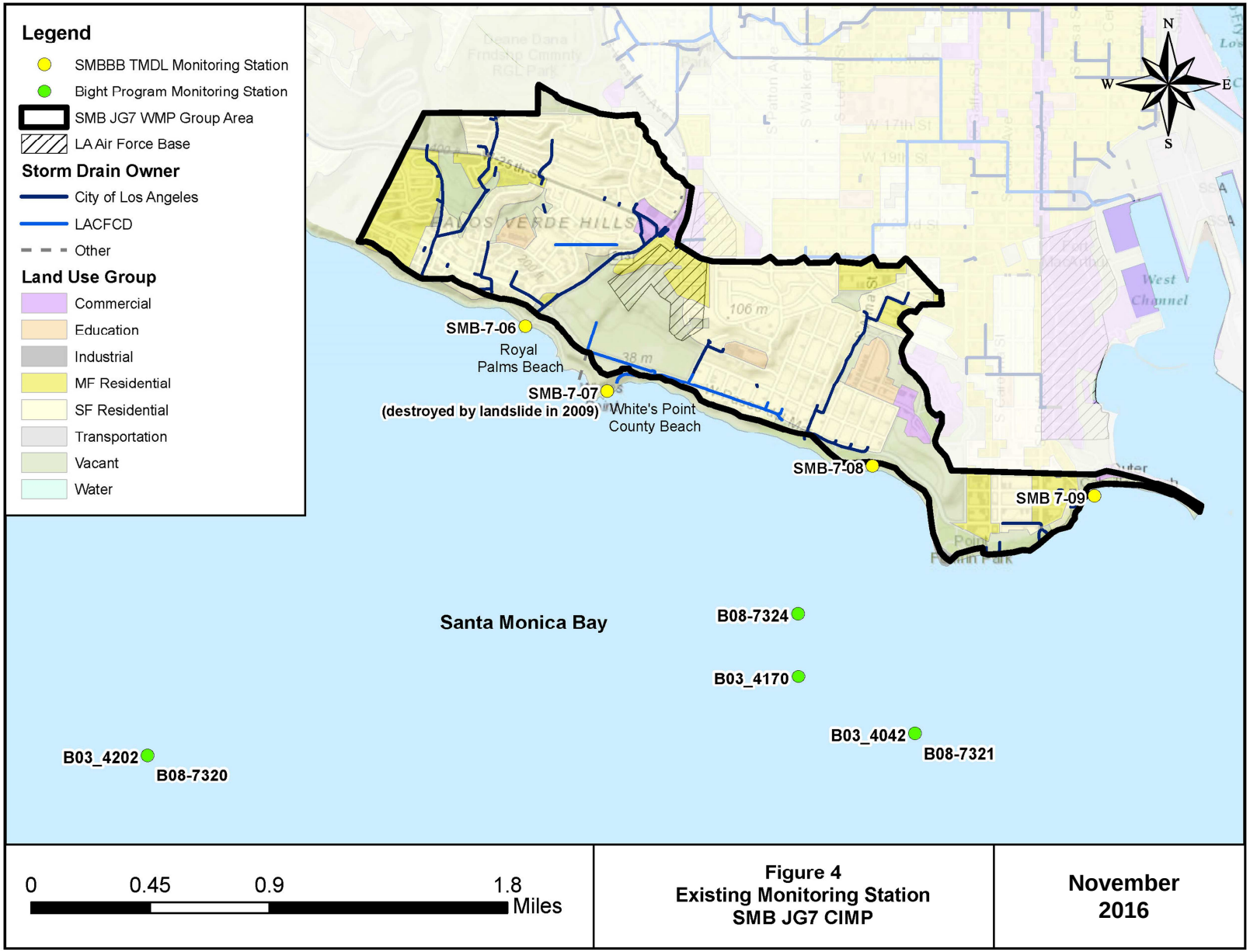

Figure 4
Existing Monitoring Station
SMB JG7 CIMP

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The TMDLs addressing water body-pollutant combinations within or downstream of the SMB JG7 WMP Group include:

- Santa Monica Bay Beaches Bacteria TMDL (Wet and Dry), July 15, 2003 (SMBBB TMDL);
- Santa Monica Bay TMDL for Dichlorodiphenyltrichloroethanes (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).

The water body-pollutant priorities are summarized in **Table 2**, as described in detail in the SMB JG7 WMP. Compliance deadlines associated with each of the TMDLs listed above are also presented in **Table 2**. All SMB JG7 WMP water body-pollutant combinations fall within Category 1, highest priority. No Category 2 or 3 water body-pollutant combinations were identified.

Table 2 Water Body-Pollutant Priorities

Category	Water Body	Pollutant	Compliance Deadline
1: Highest Priority (Approved TMDL)	SMB Beaches	Summer dry weather bacteria	7/15/2006 (Single sample)
		Winter dry weather bacteria	7/15/2009 (Single sample)
		Wet weather bacteria	7/15/2013 (Single sample)[1]
			7/15/2013 (Geometric mean)[1, 2]
	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	[No compliance deadline specified in TMDL][3]
		PCBs	[No compliance deadline specified in TMDL][3]

[1] Per Resolution 2006-008, the JG7 agencies elected to pursue a non-integrated water resources approach to SMBBB TMDL compliance, which resulted in a final wet weather compliance deadline of at most 10-years, or July 15, 2013. http://63.199.216.6/larwqcb_new/bpa/docs/2006-008/2006-008_RB_RSL.pdf

[2] The rolling 30-day geometric mean will be calculated weekly based on calculation of a rolling six week geometric mean using five or more samples, starting all calculation weeks on Sunday.

[3] Although the TMDL lacks a formal compliance schedule for the WLAs, Table 6-5 of the TMDL does specify a timeline for the DDT/PCB targets in water and sediment. Additionally, WLA target was set at existing waste load, so antidegradation conditions exist.

2.1.1 Santa Monica Bay Beaches Bacteria TMDL

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, the first bacteria TMDL adopted by the Regional Board in the State of California. 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.

As this was the first bacteria TMDL, new approaches for regulating bacteria were developed. 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 3**. Through the reconsideration process, winter dry-weather single sample allowable exceedance days were increased for certain sites and modifications were made to the geometric mean calculation for all monitoring sites.

Table 3 Summary of Reconsideration Elements for SMBBB TMDL

TMDL	Reconsideration Items
Santa Monica Bay Beaches Dry-Weather TMDL	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	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.

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), are based on the Los Angeles Basin Plan objectives for body-contact recreation (REC-1) as summarized in **Table 4.** Dry-weather WQBELs compliance was anticipated as of July 15, 2006 for summer dry weather, and July 15, 2009 for winter dry weather. Wet-weather compliance has been required as of July 15, 2013. This is based on Resolution 2006-008, in which the JG7 agencies elected to pursue a non-integrated water resources approach to SMBBB TMDL

compliance, which resulted in a final wet weather compliance deadline of at most 10-years. Therefore, all milestones for SMB 7-06, SMB 7-08, and SMB 7-09 are currently enforceable (there are no interim targets).

Table 4 SMBBB TMDL Water Quality-Based Effluent Limitations and Receiving Water Limitations

Constituent	Daily Maximum	Rolling 30-day Geometric Mean[2]
Total coliform[1]	10,000/100 mL	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.

2 The reopened 2012 TMDL modified the geometric mean calculation to weekly calculation of a rolling six week geometric mean using five or more sample, starting all calculation weeks on Sunday.

The allowable numbers of exceedance days of the single sample objectives at each of the monitored locations within the JG7 WMP area are summarized in **Table 5**.

Table 5 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 7-06	White's Point, Royal Palms County Beach	0	0	1	1	6	1
SMB 7-08	Point Fermin/Wilder Annex, San Pedro	0	0	1	1	2	1
SMB 7-09	Outer Cabrillo Beach	0	0	1	1	3	1

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.

In summary, to satisfy the monitoring requirements for the SMBBB TMDL, the existing bacteria TMDL monitoring sites (SMB 7-06, SMB-7-08, and SMB 7-09) will continue to be monitored in accordance to the Santa Monica Bay Beaches Bacteria TMDL Coordinated Shoreline Monitoring Plan (CSMP) (Technical Steering Committee 2004).

2.1.2 Santa Monica Bay Nearshore and Offshore Debris TMDL

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 BMPs 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 6**.

Table 6 Santa Monica Bay Debris TMDL Compliance Schedule

Permittees	Baseline[1]	3/20/2016	3/20/2017	3/20/2018	3/20/2019	3/20/2020[2]
		Annual Trash Discharge (gals/yr)				
City of Los Angeles	25,112	20,090	15,067	10,045	5,022	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 their 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. The SMB Debris TMDL specifies that plastic pellet monitoring is not required if Permittees can provide documentation there are no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets within the jurisdiction. 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 JG7 WMP Group will submit or have submitted a TMRP and PMRP. Each jurisdiction has conducted the following:

- **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. As indicated in **Table 1**, industrial land uses in the SMB JG7 WMP only account for 0.09 percent of the entire area, with that nearly negligible area identified as "navigation aids". It has also been verified with the Industrial Waste Management Division of the City of Los Angeles Bureau of Sanitation (LASAN) that within the JG7 WMP area, there are no facilities with standard industrial classification system (SIC) codes associated with plastic pellets (282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893) or facilities with the term "plastic" in the facility or operator name. Additionally, data obtained from the City of Los Angeles Planning Department, based on 2005 SCAG land use data, shows that there is no visible industrial zoning in the SMB JG7 WMP area (shown in **Figure 5**). Therefore, the SMB JG7 WMP Group is not subject to the plastic pellet monitoring requirements of the SMB Debris TMDL. The Illicit Connection Illicit Discharge Elimination Program Manual, developed by the City of Los Angeles Department of Public Works in 1999, contains the operational protocols and policies for City staff to address illicit discharges into the storm drain system. The following spill and response plan is in place both in general, as well as in the case of a plastic pellets spill:

1. The City of Los Angeles has established a hotline (800-974-9794) where spills can be reported. This hotline can be contacted 24/7, and is managed by LASAN's Watershed Protection Division. Any spills reported to the City's 311 number or to LASAN's call center are immediately forwarded to this hotline.
2. An environmental compliance inspector of LASAN's Watershed Protection Division (a total of about 15-20 inspectors) will inspect the location of the spill and evaluate the necessary next steps (determination of responsible party, clean-up, reporting/coordination with Department of Fish and Game).
3. LASAN's Watershed Protection Division will coordinate the containment and clean-up of a plastic pellet spill. Containment may include the use of sand bags and/or mesh screens to prevent plastic pellets from entering catch basins, or the use of trash booms if the pellets have reached the receiving water. LASAN's Watershed Protection Division has an emergency contract in place with a contractor to assist with immediate containment and clean-up needs.

- **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.

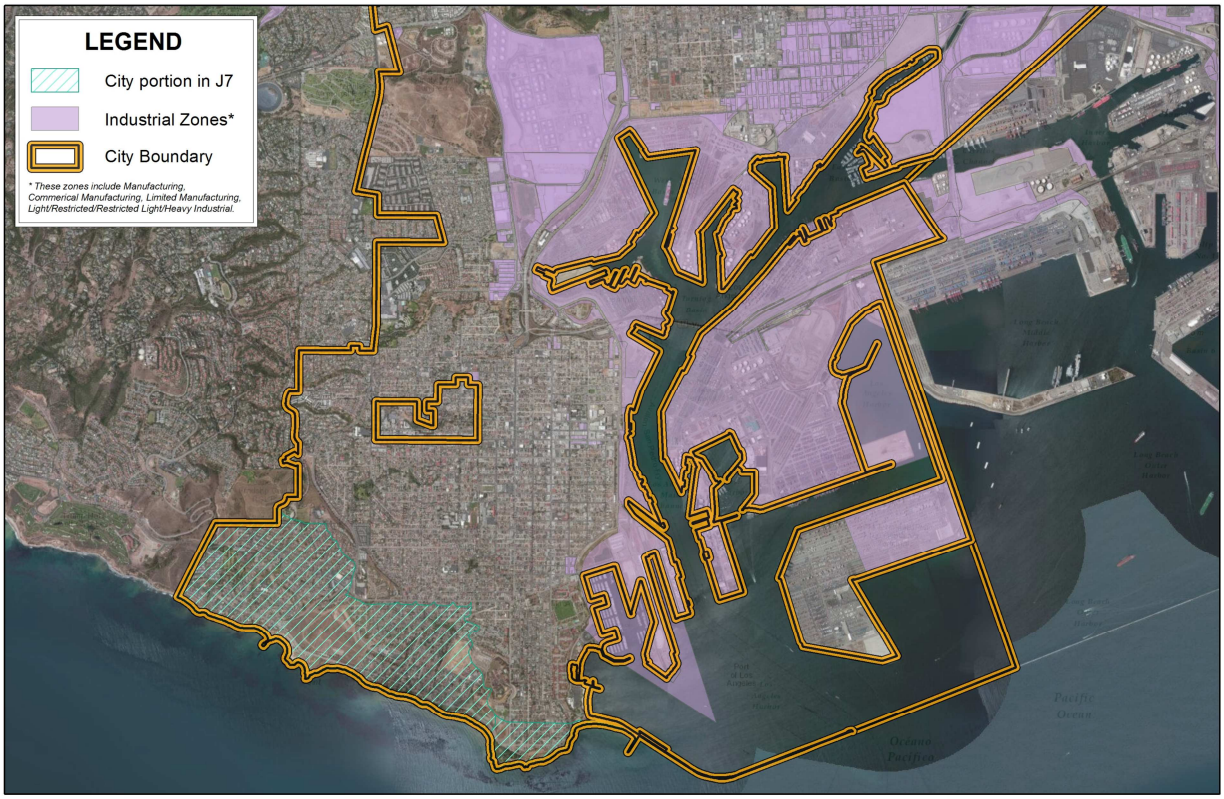

Figure 5. Industrial Zones in the City of Los Angeles Portion of JG7

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 JG7 WMP 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.

2.1.3 Santa Monica Bay DDTs and PCBs TMDL

The SMB DDTs and PCBs TMDL 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), the Regional Board has been advised to implement the TMDL either through an implementation plan, NPDES permit, or other regulatory mechanisms such as State waste discharge requirements (WDRs), conditional waivers of WDRs, and/or enforcement actions. The Regional Board has decided to implement this TMDL through the MS4 Permit. Within the Permit, the WLA targets are stated in **Table 7**, which is expressed as an annual stormwater loading of pollutants to Santa Monica Bay from the LA County MS4.

Table 7 Santa Monica Bay DDTs and PCBs TMDL Waste Load Allocations

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

1 Compliance shall be determined based on a three-year averaging period. WLA is for entire LA County MS4.

The PCB and DDT TMDL states that the highest DDT and PCB loadings were from the Ballona Creek, Hermosa Beach, and Santa Monica Canyon Channel watersheds, which combined accounted for 94% of the developed area draining to Santa Monica Bay. Compliance with the WLAs for DDTs and PCBs will be assessed through monitoring conducted as part of the Peninsula Cities CIMP at Peninsula-SD2 rather than sampling in the JG7 WMP Group area. Data collected at Peninsula-SD2 will be extrapolated to the J7 WMP area by scaling drainage areas. Rationale for the selection of this site as well as extrapolation methodology is provided in the following section. In the event that the J7 CIMP WMP Group chooses to perform monitoring in the J7 area, compliance with the WLAs for DDTs and PCBs will be assessed at the alternate receiving water site identified in the following section.

The most sensitive EPA-approved analytical methods commercially available in the region will be used to analyze PCB congeners and DDTs in receiving water and outfall samples, as necessary (e.g., Method 1668c where feasible; otherwise, Method 8270). Monitoring for PCBs will be reported as the summation of at least 40 congeners and Aroclors, as specified in Attachment E, Table E-2 of the Permit.

2.2 CIMP RECEIVING WATER MONITORING SITE

The primary objective of receiving water monitoring is to assess trends in pollutant concentrations over time, or during specified conditions. Given the close proximity of the Santa Monica Bay JG7 WMP Group to the Peninsula Cities CIMP receiving water data (**Figure 6**) and the SMB JG 7 WMP Group's relatively small size when compared to the rest of areas draining to Santa Monica Bay, monitoring being conducted in the Peninsula Cities CIMP will be utilized. The City of Los Angeles and Peninsula Cities have agreed to share the data from monitoring performed by Peninsula Cities at RW-2 and its associated storm water outfall. The City of LA will use the data to evaluate its receiving water quality through an extrapolation methodology.

The selected Peninsula Cities RW-2 (33.73965, -118.38152) receiving water site was selected given the proximity to JG7 and the similarity in the land use characteristics between the catchment area of these sites and the City's portion of JG7. As shown in **Table 8**, the primary land use in each area is residential with a substantial amount of area being described as vacant/open space.

The concentrations of measured constituents will be considered representative of J7. For mass measurements (i.e., total loading), values will be extrapolated based on total acreage presented in **Table 8**, by multiplying Peninsula Cities mass loading rates with the ratio of the City of LA to Peninsula Cities areas. A factor of 2.13 (496 acres to 1,056 acres) will be used to calculate loading. Monitoring data from the Peninsula Cities will be used to assess compliance according to the extrapolation methodology described above.

Table 8 Land Use Overview of JG7 WMP Area and PV Peninsula Area

Land Use	% of Total		
	JG7 WMP Area	Peninsula Cities CIMP SMB Area	Peninsula Cities CIMP Site SD-2
Commercial	2.4%	1.4%	0.7%
Agriculture	0.0%	0.4%	0.0%
Education	3.1%	2.0%	2.9%
Industrial	0.1%	0.4%	1.5%
Residential	67.5%	55.1%	55.1%
Transportation	0.0%	0.9%	0.7%
Vacant/Open	26.9%	39.9%	39.1%
Total	100%	100%	100%
Land Use	**Acres**		
	JG7 WMP Area	**Peninsula Cities CIMP SMB Area**	**Peninsula Cities CIMP Site SD-2**
Commercial	25.5	133	3.4
Agriculture	0	38	0
Education	32	190	14.3
Industrial	1	38	7.5
Residential	713	5,246	273.4
Transportation	0	86	3.4
Vacant/Open	284	3,798	194.2
Total	1,056	9,520	496

Alternatively, the J7 WMP Group has the option to monitor at one receiving water monitoring site, SMBJ7-RW-1 (33.708912, -118.304331), within the Santa Monica Bay at the transect outward from the alternate CIMP outfall monitoring site SMBJ7-O-6. This location is consistent with the stormwater plume during a qualifying storm event when it has been deemed safe for collection by the Captain of the boat. Single grab samples would be collected from the mixing zone in the ocean, at the nearest distance from the shoreline that the Environmental Monitoring Division boat can safely access. **Figure 6** presents the approximate location of the receiving water monitoring site for the SMB JG7 WMP Group.

The SMB JG7 WMP Group area consists solely of City of Los Angeles land. Primary land uses in the SMB JG7 WMP Group area and the general catchment area of SMBJ7-RW-1 are residential and vacant. Given that the land uses of JG7 WMP and the catchment area are comparable, monitoring at SMBJ7-RW-1 is considered sufficiently representative of the JG7 WMP area. **Table 9** presents the land use composition of the HUC-12, the JG7 WMP area, and the catchment area of the proposed stormwater outfall SMBJ7-O-6, which is considered an approximation of the drainage area tributary to the proposed receiving water site SMBJ7-RW-1.

Table 9 Land Use Overview of Outfall Nearest to Dry Weather Receiving Water Monitoring Site SMBJ7-RW-1

	HUC-12		J7 WMP Area		SMBJ7-RW-1	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Agriculture	90	0.4%	0.0	0%	0.0	0%
Commercial	1,231	5%	26	2%	0.0	0%
Education	806	3%	32	3%	2.8	2%
Industrial	1,488	6%	1.0	0.1%	0.0	0%
MF Residential	2,042	9%	151	14%	22	14%
SF Residential	11,265	47%	562	53%	126	78%
Transportation	1,957	8%	0.0	0%	0.0	0%
Vacant/Open Space	5,237	22%	284	27%	11	7%
Total	24,115	100%	1,056	100%	161	100%

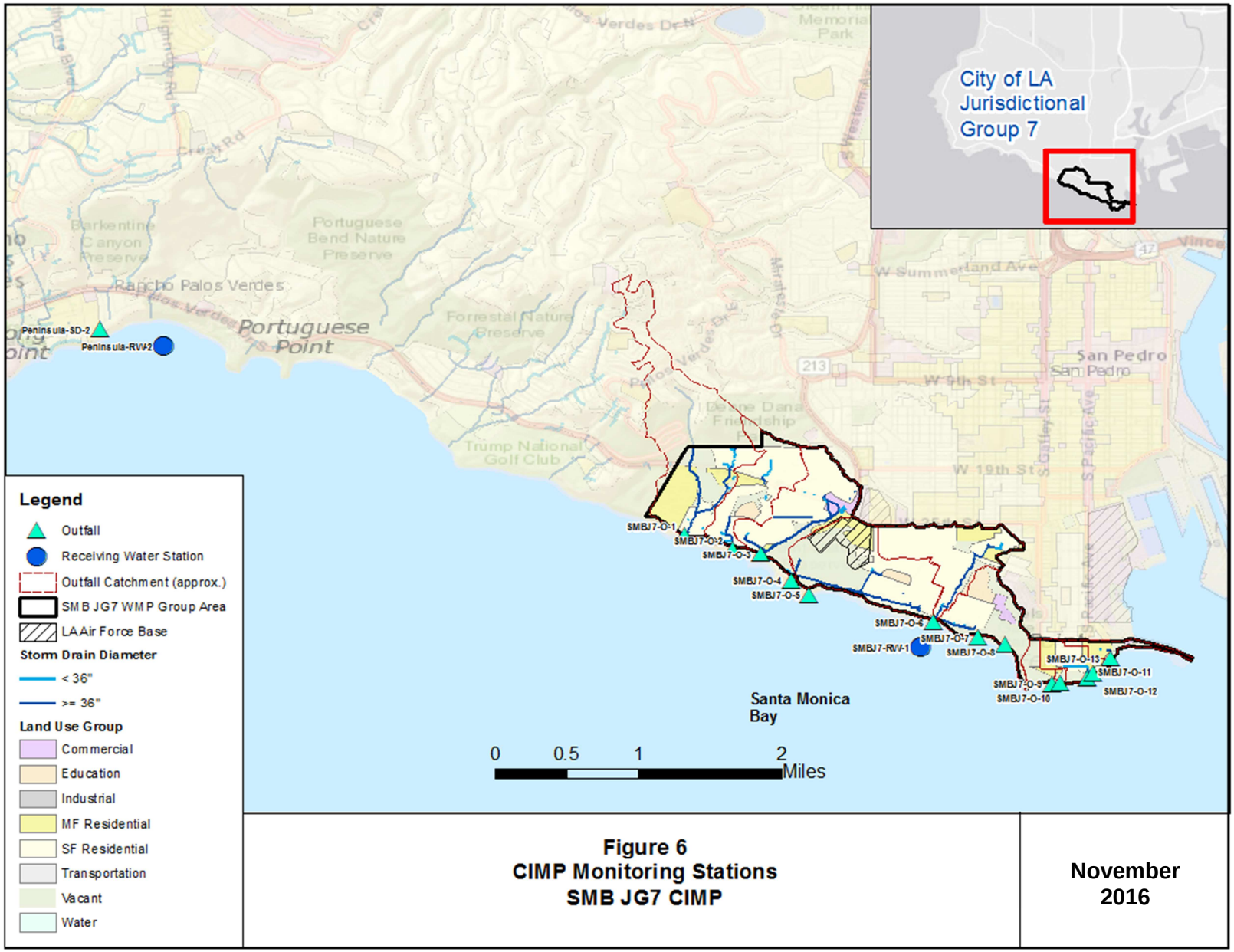

Figure 6
CIMP Monitoring Stations
SMB JG7 CIMP

November 2016

2.3 MONITORING FREQUENCY, PARAMETERS, AND DURATION

The MRP section of the MS4 Permit identifies specific requirements for salt water (Santa Monica Bay). Wet- and dry-weather monitoring frequency, parameters, and duration will be addressed in the following sections. Parameters for monitoring were based on the MS4 Permit requirements as well as the water quality priorities as identified in the SMB JG7 WMP. Additional analytical and monitoring procedures are discussed in **Attachments B-D**. Parameters to be collected and sampling frequency to meet the receiving water monitoring requirements of the MRP are summarized in **Table 10**[1].

Table 10 Receiving Water Monitoring Parameters and Annual Frequency

Constituents	Wet Weather	Dry Weather
Field parameters(1)	3	2
Pollutants identified in Table E-2 of the MRP	1(2)	1(2)
Aquatic Toxicity and Toxicity Identification Evaluation (TIE)	2(3)	1
Total Coliform(4)	3	2
E. Coli (4)	3	2
Enterococcus(4)	3	2

[1] Field parameters are defined as DO, pH, temperature, salinity (due to ocean monitoring), and specific conductivity and TSS

[2] Monitoring frequencies only apply during the first year of monitoring and will be conducted during the first significant rain event of the storm year for wet weather and during the critical dry weather event for dry weather. For constituents 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 constituents 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)

[3]A TIE is only required if either the survival or sublethal endpoint of the toxicity text demonstrates a percent effect value equal to or greater than 50% at the instream waste concentration.

[4] Will be monitored at the existing CSMP monitoring locations and CSMP sampling schedule

2.3.1 Wet Weather

Wet-weather receiving water monitoring will be conducted for the duration of the MS4 permit. Data from the Peninsula Cities CIMP will be used as representative of the receiving water adjacent to the J7 WMP area due to the locations' proximity, land use, and topographic similarities. However, SMBJ7-RW-1 will serve as the alternate site in the case that J7 WMP Group performs its own monitoring. Wet-weather conditions will be defined as a storm event of greater than or equal to 0.1 inch of precipitation, as measured from the closest Los Angeles County controlled rain gauge within the watershed. Wet-weather monitoring will be conducted initially for all MRP Table E-2 parameters during the first significant rain event of the first year of monitoring; three times a year for field parameters, Total Coliform, *E. coli*, and

[1] Because samples will be collected in Santa Monica Bay, suspended sediment concentrations will be significantly less than if collected in a creek or river, making collection of sufficient sediment to conduct the analysis most likely infeasible. As such, whole water samples will be analyzed consistent with standard receiving water monitoring for DDTs and PCBs.

Enterococcus; and twice a year for aquatic toxicity, per Part VI.C.1.a of the MRP. Wet-weather receiving water monitoring will target the first significant rain event of the storm year and will be performed in close coordination with stormwater outfall monitoring to be reflective of potential impacts from MS4 discharges.

2.3.2 Dry Weather

Outfall catchment areas in the SMB JG7 WMP Group area are relatively small, ranging from less than 140 acres to approximately 370 acres. During dry weather it is unlikely that discharge from these outfalls would be of sufficient quantity to impact the Santa Monica Bay, where wet weather monitoring is conducted. However, data from the Peninsula Cities CIMP will be used as representative of the receiving water adjacent to the J7 WMP area due to the locations' proximity, land use, and topographic similarities. Alternatively, if the adjacent CIMP data are not available or the J7 WMP Group does its own monitoring, dry weather receiving water monitoring will be conducted at SMBJ7-RW-1.

2.4 RECEIVING WATER MONITORING SUMMARY

Data from the Peninsula Cities CIMP monitoring site Peninsula-RW2 will be used as representative of the receiving water adjacent to the J7 WMP area due to the locations' proximity, land use, and topographic similarities. Monitoring data from the Peninsula Cities CIMP at this site will be used to assess compliance according to the extrapolation methodology described in Section 2.2 and would be used for both wet and dry weather sampling. Loading will be extrapolated based on drainage area to best reflect the receiving water adjacent to the J7 WMP area. One alternate monitoring site within the JG7 WMP area has been selected, SMBJ7-RW-1, in the case that the JG7 WMP Group performs its own monitoring. In this case, both wet and dry weather receiving water monitoring would be performed from a boat in the Santa Monica Bay, at a transect outward from SMBJ7-O-6, consistent with the stormwater plume during wet weather. The approximate location of this monitoring site is presented in **Figure 6**. A summary of constituents and monitoring frequency for the receiving water monitoring site was presented in **Table 10**. Sampling and analytical methods for receiving water monitoring is provided in **Attachments B-D**.

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). The SMB JG7 WMP Group has gathered for submittal as a map and/or in a database the items below with the exception of numbers 9 and 11e, which will be determined as the CIMP progresses:

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
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 Permittees' 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

Figures 1 through **3** present the available database information, listed above, for the SMB JG7 WMP Group. Each year, a storm drain, channel, outfall map as well as an associated database for the SMB JG7 WMP Group are required to be updated to incorporate the most recent characterization data for outfalls with significant non-stormwater discharge. 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.

Table 11 below summarizes the sources of the GIS data used to generate the maps and database.

Table 11 GIS Data Sources

Description	Source	Attributes
HUC 12 watersheds	Regional Water Quality Control Board	Watershed name
Storm drains	Los Angeles County Flood Control District and City of Los Angeles	Owner and size
LA Air Force Base	Delineated in-house	N/A
Topographic basemap	ESRI	N/A
EWMP and WMP Groups	Regional Water Quality Control Board	EWMP or WMP Group Name
Land use descriptions and percent impervious values	Los Angeles County	Land use names and groups, percent impervious
Outfalls	LACFCD provided major outfalls, others identified in-house,	Outfall name
Drainage areas to outfalls	Delineated in-house	CatchID
TMDL monitoring stations	Coordinated Shoreline Monitoring Plan	Site ID
Bight program monitoring station	Bight	Station name
SMB J2/J3 CIMP monitoring stations	J2/J3 CIMP	Station ID

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 to exceedances of RWLs derived from TMDL WLAs or receiving water quality objectives. The majority of SMB JG7 WMP Group storm drains generally drain towards Santa Monica Bay. An analysis of land use per HUC-12, drainage area and SMB JG7 WMP Group area was conducted for the monitoring site.

4.1 PROGRAM 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 Permittees' 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 potential stormwater outfall monitoring site was evaluated and assessed on how representative it is of the surrounding land use of the SMB JG7 WMP 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
- Vacant/Open Space
- Commercial
- Education
- Multi-Family Residential
- Transportation

4.2 STORMWATER OUTFALL MONITORING SITES

Due to inaccessibility of outfalls within the City of Los Angeles area in J7, and because of similarity of land use primarily across the J7 area, the City of Los Angeles and Peninsula Cities have agreed to share the data from monitoring performed by Peninsula Cities at RW-2 and its associated storm water outfall, Peninsula-SD2 (33.74123, -118.38799). The City of LA will use the data to evaluate its receiving water quality, stormwater outfall and the suspended sediment for DDT and PCBs through an extrapolation methodology described below.

Data from stormwater outfall monitoring for the Peninsula Cities CIMP will be used to represent stormwater quality and exceedances from the J7 WMP area. The Peninsula Cities stormwater outfall site

SD-2 was selected based on similar land use characteristics. As shown in **Table 12**, the primary land use in each area is residential with a substantial amount of area being described as vacant/open space.

The representative data would be extrapolated based on drainage area to best reflect conditions with the J7 WMP area. Measured concentrations for the Peninsula Cities area will be considered representative of the City of LA WMP area, with no extrapolation. Mass loading rates from the Peninsula Cities data will be extrapolated to the City of LA J7 WMP area by multiplying Peninsula Cities mass loading rates with the ratio of the City of LA to Peninsula Cities areas. A factor of 2.13 (496 acres to 1,056 acres) will be used to calculate loading.

Table 12 Land Use Overview of JG7 WMP Area and PV Peninsula Area

	% of Total		
Land Use	**JG7 WMP Area**	**PV Peninsula Cities CIMP SMB Area**	**PV Peninsula Cities CIMP Site SD-2**
Commercial	2.4%	1.4%	0.7%
Agriculture	0.0%	0.4%	0.0%
Education	3.1%	2.0%	2.9%
Industrial	0.1%	0.4%	1.5%
Residential	67.5%	55.1%	55.1%
Transportation	0.0%	0.9%	0.7%
Vacant/Open	26.9%	39.9%	39.1%
Total	100%	100%	100%
	Acres		
Land Use	**JG7 WMP Area**	**PV Peninsula Cities CIMP SMB Area**	**PV Peninsula Cities CIMP Site SD-2**
Commercial	25.5	133	3.4
Agriculture	0	38	0
Education	32	190	14.3
Industrial	1	38	7.5
Residential	713	5,246	273.4
Transportation	0	86	3.4
Vacant/Open	284	3,798	194.2
Total	1,056	9,520	496

Alternatively, if the J7 WMP Group performs the monitoring in the J7 area, one primary stormwater outfall monitoring site and one alternate site, as shown in **Figure 6**, has been selected for monitoring, pending further evaluation for safe access.

Site SMBJ7-O-6 (33.711563, -118.303522), identified as the primary monitoring site, is located north of SMBBB TMDL monitoring location SMB-7-08. This outfall is an 18-feet by 25-feet reinforced concrete

box structure that, based on the GIS data, appears to be the outfall for a 66-inch diameter reinforced concrete pipe. The outfall is located near the intersection of Paseo del Mar and Almeria Street.

Site SMBJ7-O-3 (33.7177861, -118.3211305), selected as the alternate monitoring site, is located near SMBBB TMDL monitoring location SMB-7-06. This stormwater outfall is a 2-feet diameter pipe that carries flow from the upper canyon under the pathway to the beach front.

Runoff from both SMBJ7-O-3 and SMBJ7-O-6 is solely from the City of Los Angeles. **Table 13** compares the land use composition of these catchment areas, HUC-12, and the SMB JG7 WMP Group area. Although this table reflects the same delineation for SMBJ7-O-6 as presented for SMBJ7-RW-1, it should be noted that the area tributary to an offshore location is likely larger than the outfall delineation area. Additionally, pending an accessibility review, if conditions prohibit safe access to these sites another location may be selected.

Table 13 Land Use Overview of Potential Outfall Monitoring Sites

	HUC-12		J7 WMP Area		SMBJ7-O-3		SMBJ7-O-6	
Land Use	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total
Agriculture	90	0.4%	0.0	0%	0.0	0%	0.0	0%
Commercial	1,231	5%	26	2%	14	8%	0.0	0%
Education	806	3%	32	3%	0.0	0%	2.8	2%
Industrial	1,488	6%	1.0	0.1%	0.0	0%	0.0	0%
MF Residential	2,042	9%	151	14%	7.3	4%	22	14%
SF Residential	11,265	47%	562	53%	131	75%	126	78%
Transportation	1,957	8%	0.0	0%	0.0	0%	0.0	0%
Vacant/open	5,237	22%	284	27%	24	14%	11	7%
Total	24,115	100%	1,056	100%	177	100	161	100%

4.3 MONITORING FREQUENCY, PARAMETERS, AND DURATION

The stormwater outfall monitoring site will be monitored for three (3) storm events per year, in coordination with receiving water monitoring, for all required constituents except aquatic toxicity. Samples will be collected by continuous auto-sampler, within the collection period targeting the entire storm water discharge for storms lasting less than 24 hours, or a minimum of the first 24 hours of the storm water discharge for storms lasting more than 24 hours. A permanent auto-sampler will be installed within 18 months of CIMP approval. If the installation of a permanent automatic stormwater sampler cannot be expedited, the City will have the option to conduct water quality sampling using time-weighted temporary/portable sampling equipment, as a first option, or collecting a grab sample every 20 minutes for three hours or the duration of the storm (if less than three hours), as a second option (USEPA, 1992a). 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 the monitoring site 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 B**,

may not be tested at the outfall in the first monitoring year. Instead, if water quality objectives are exceeded in the receiving water during the first significant storm event, then those exceeding parameters would be tested at the outfall three times annually beginning with the next storm event that occurs at least 50-days later. Monitoring for the selected site 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 B**.

Table 14 Stormwater Outfall Monitoring Parameters and Annual Frequency

Constituents	**Annual Frequency**
Flow, hardness, pH, dissolved oxygen, temperature, specific conductivity, and TSS	3
Table E-2 pollutants detected above relevant objectives in receiving waters[2]	3
Aquatic Toxicity and Toxicity Identification Evaluation (TIE)	(see note 1)
Total Coliform	3
Fecal Coliform / (*E. coli*)	3
Enterococcus	3
PCBs[3]/DDT	3

1. Toxicity is only monitored from outfalls when triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test was inconclusive. If toxicity is observed at the outfall a TIE must be conducted.
2. All Table E-2 parameters may not be tested at the outfall in the first monitoring year. Instead, if water quality objectives are exceeded in the receiving water during the first significant storm event, then those exceeding parameters would be tested at the outfall three times annually beginning with the next storm event that occurs at least 50-days later.
3. PCB congeners will be analyzed as specified in the Peninsula Cities CIMP.

Section 5
Non-Stormwater Outfall Screening and 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.

5.1 PROGRAM OBJECTIVES

The objectives of the Non-Stormwater 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.

5.2 NON-STORMWATER OUTFALL SCREENING AND MONITORING PROGRAM

The Non-Stormwater Program is focused on dry-weather discharges to receiving waters from major outfalls. 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 Program is complimentary to the IC/ID minimum control measure.

For the SMB JG7 WMP Group area, all major outfalls will be screened prior to proceeding with dry weather monitoring. To determine whether an outfall must be monitored for non-stormwater discharges, the SMB JG7 WMP Group has developed an outfall screening and monitoring program. The sections starting with **Section 5.3** are part of the monitoring program. Within 90 days of the approval of this CIMP, the SMB JG7 WMP Group will initiate steps to identify and monitor the non-stormwater discharges. The non-stormwater outfall program will involve following steps:

1. **Outfall Screening**: The SMB JG7 WMP Group will implement a screening process to determine whether the monitoring site exhibits non-stormwater discharges and if so, if it is considered significant or if it can be excluded from further investigation. This process will include: 1) updating the outfall inventory, 2) measuring observed flows, and 3) testing for E. coli where flow is observed.
2. **Prioritized Source Investigation** (Part IX.E of the MRP): The SMB JG7 WMP Group will use the data collected as part of the Outfall Screening process to prioritize outfalls for source investigations.
3. **Significant Non-stormwater Discharge Source Identification** (Part IX.F of the MRP): If the monitoring site exhibits significant non-stormwater discharges, the SMB JG7 WMP Group will perform source investigations per the established prioritization.
4. **Monitoring Non-Stormwater Discharges Exceeding Criteria** (Part IX.G of the MRP): Using the information collected during screening and source identification efforts, the SMB JG7 WMP Group will monitor the site if it has 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. Dry weather monitoring will be conducted in the month of August, which is the historically driest month on record for the SMB JG7 WMP Group area[2].

[2] The driest month on record was determined based on the rainfall records at the LA County DPW gauges at Palos Verdes and Torrance Airport, between 1996 and 2008.

5.3 IDENTIFICATION OF OUTFALLS WITH SIGNIFICANT NON-STORMWATER DISCHARGES

An initial field survey was conducted for the identification of outfalls in the JG7 WMP Group area, the majority of which were observed to be corrugated metals pipes protruding from the top of rocky cliffs above rocky beaches. As described in the field survey, observation of outfalls was limited by accessibility and safety constraints. **Attachment C** 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. The SMB JG7 WMP Group has undertaken a field reconnaissance to evaluate the major outfall(s), in its jurisdiction, dependent on accessibility. A major outfall for the SMB JG7 WMP Group is defined as follows:

- 36-inch or larger pipes
- 12-inch or larger pipes from industrial zoned areas

Table 15 summarizes the pertinent information for each of the outfalls in the SMB JG7 WMP Group area. As shown, six of the 13 outfalls qualify as major outfalls and will be included in the non-stormwater outfall screening process, noting that accessibility and safety constraints may still limit access to these outfalls.

Table 15 Non-Stormwater Screening Sites in SMB JG7 WMP Group Area

Station ID	Type of Outlet	Outlet Size	Major Outfall?
SMBJ7-O-1	Corrugated metal pipe	84-inch diameter	Yes
SMBJ7-O-2	Corrugated metal pipe	48-inch diameter	Yes
SMBJ7-O-3(1)	Corrugated metal pipe	72-inch diameter	Yes
SMBJ7-O-4	Corrugated metal pipe	36-48-inch diameter (approx.)	Yes
SMBJ7-O-5(2)	Reinforced concrete pipe (damaged in landslide, replaced by plastic pipe)	36-inch diameter (approx.)	Yes
SMBJ7-O-6	Reinforced concrete pipe (however, appears to be reinforced concrete box at outfall)	66-inch diameter	Yes
SMBJ7-O-7(3)	Corrugated metal pipe (broken)	18-inch diameter (approx.)	No
SMBJ7-O-8	Corrugated metal pipe	18-inch diameter (approx.)	No
SMBJ7-O-9	Corrugated metal pipe	21-inch diameter	No
SMBJ7-O-10	Brick	24-inch diameter	No
SMBJ7-O-11	Corrugated metal pipe	27-inch diameter	No
SMBJ7-O-12	Vitrified clay pipe	16-inch diameter	No
SMBJ7-O-13	Polyethylene lined	12-inch diameter	No

[1] Adjacent to SMB 7-06
[2] Adjacent to SMB 7-07
[3] Adjacent to SMB-7-08

In order to collect data to determine whether the outfalls contribute significant non-stormwater discharge, the SMB JG7 WMP Group has already performed three non-stormwater outfall screenings on major outfalls between April and August of 2014 to ensure the source investigation schedule (25 percent by December 2015 and 100 percent by December 2017) was met. The SMB JG7 WMP Group has identified *E. coli* and flow as the primary characteristic for determining significant non-stormwater discharges and will monitor for *E. coli* and flow during the three initial screening. The initial screening serves the dual purpose of data collection for completing the MS4 infrastructure database, addressed in **Section 3**, and the initial evaluation of the outfall for significant non-stormwater discharge. Criteria for identifying significant non-storm water discharges will be determined based on the screening results (e.g., which outfalls, if any, are flowing, how the flows compare relative to one another, the laboratory results for E. coli, etc.). A standard field data collection form will be used, including information fields for:

- Channel bottom, calculated flow
- Whether discharge ponds, or reaches the receiving water
- Clarity
- Presence of odors and foam

Additionally, outstanding information for the MS4 inventory database will be collected, including, at a minimum, geographically referenced photographs. The inventory of MS4 outfalls will identify those with significant non-storm water discharges and those that do not require further assessment, including the rationale for such determination if no further action is required. The database will contain outfall locations linked to storm drains, channels, and outfalls map, which will be updated annually to incorporate the most recent data for outfalls with significant non-storm water discharge.

At least one re-assessment of the non-storm water outfall-based screening and monitoring program will be conducted during the term of the Permit term to determine whether changes or updates are needed. Seasonal variability will be considered in the timing of the re-assessment. If changes are needed, they will be specified in written program documents, to be implemented after approval from the Los Angeles Board Regional Board Executive Officer, and described in the next annual report.

5.4 PRIORITIZED SOURCE IDENTIFICATION

If any outfalls exhibiting significant NSW discharges are identified through the Outfall Screening process and incorporated into the inventory, Part IX.E of the MRP requires that the Permittees prioritize the outfalls for further source investigations.

The following prioritization criteria will be utilized initially and may be revised as priorities in the JG7 WMP area change:

1. Outfalls with the highest loading based on considerations related to E. coli.
2. Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the NSW Action Levels identified in Attachment G of the Permit. Once the prioritization is completed, a source identification schedule will be developed. The schedule will focus on the outfalls with the highest E. coli loading rate first and ensure that source investigations are

completed on no less than 25% of the outfalls with significant NSW discharges by December 28, 2015 and 100% by December 28, 2017.

5.5 SIGNIFICANT NON-STORMWATER DISCHARGE SOURCE IDENTIFICATION

Based on the prioritized list of major outfalls with significant NSW discharges, investigations must 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 16**:

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 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 JG7 WMP 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 16 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 JG7 WMP 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, and it has been determined that the source is not causing or contributing to exceedances in the receiving water, then the outfall will require no further assessment. 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 JG7 WMP Group has determined that they will address the non-stormwater discharge through modifications to programs or by structural BMP implementation, the SMB JG7 WMP Group will incorporate the approach into the implementation schedule developed in the EWMP, and monitoring of the outfall may be discontinued.

5.6 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, if any outfalls 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 16)** non-essential conditionally exempt (Type B from **Table 16**), or unknown (Type D from **Table 16**) the site must be monitored. Monitoring will begin within 90 days of completing the source identification and will be coordinated with dry weather receiving water sampling efforts.

5.6.1 Monitoring Frequency, Parameters, and Duration

After the outfall screening and determination of the outfall(s) that have significant non-stormwater flows, those site(s) will be monitored. While a monitoring frequency of four times per year is specified in the Permit, it is inconsistent with the dry weather receiving water monitoring requirements. The receiving water monitoring requires two dry weather monitoring events per year. As a result, the SMB JG7 WMP Group will conduct required NSW outfall monitoring twice per year. The NSW outfall monitoring events will be coordinated with the dry weather receiving water monitoring events, which would then be triggered, to allow for an evaluation of whether the NSW discharges are causing or contributing to an observed exceedance of water quality objectives in the receiving water. At the SMB JG7 WMP beaches, fecal indicator bacteria are highest priority during dry weather and are considered a primary metric for determining significant NSW discharges. As noted on page 5 of Attachment E of the MS4 Permit, grab samples will be taken for constituents that are required to be collected as such, including fecal indicator bacteria. Because dry weather receiving water monitoring and sampling occurs as grab samples, the NSW outfall samples will also be collected as grab samples.

If the outfall(s) are found to be significant non-stormwater outfall(s), they will be monitored for all required constituents 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 identified pollutants during dry weather, or where the TIE results were inconclusive. If the discharge exhibits aquatic toxicity, then a TIE shall be conducted. An overview of the constituents to be monitored and the corresponding frequency is listed in **Table 17**. The outfall(s) 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 **Attachments B-D**.

Table 17 Non-stormwater Outfall Monitoring Parameters and Annual Frequency (Year 1)

Constituent	Annual Frequency
Flow, hardness, pH, dissolved oxygen, temperature, specific conductivity, and TSS	2
Table E-2 pollutants detected above relevant objectives	2
Aquatic Toxicity and Toxicity Identification Evaluation (TIE)[1]	TBD
Total Coliform	2
E. Coli	2
Enterococcus	2

[1] Toxicity is only monitored from outfalls when triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test identified pollutants or the results of the TIE were inconclusive. If toxicity is observed at the outfall a TIE must be conducted.

5.7 NON-STORMWATER OUTFALL PROGRAM SUMMARY

The SMB JG7 WMP Group will conduct the following steps as part of the non-stormwater outfall program at all major outfalls in the SMB JG7 WMP Group area:

1. Perform the outfall screening and determine whether any major outfall has significant non-stormwater discharge (Part IX.C of the MRP);
2. Identify sources of significant non-stormwater discharges (Part IX.F of the MRP); and, if relevant
3. Continue to monitor NSW discharges which exceed the criteria (Part IX.G of the MRP).

As non-stormwater discharges are addressed, monitoring at the outfall(s) will cease. Additionally, if monitoring demonstrates that discharges do not exceed any WQBELs, action levels or water quality standards for pollutants identified on the 303(d) list, then modifications to the monitoring program, specifically the elimination of parameters/constituents may be proposed and will be subject to approval by the Executive Officer of the Regional Board.

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 JG7 WMP 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 WMP is approved by the Regional Board or the Executive Officer, the SMB JG7 WMP 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 JG7 WMP 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

The City of Los Angeles has an established process of 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.).

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 City department for collecting, reviewing, and reporting the data. The SOP developed by the City of Los Angeles 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

The City 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 18** 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 18 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 JG7 WMP 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

Development of a data collection template and established SOPs will aid in future analyses and annual reporting. The example data collection template, presented in **Table 19**, includes the information to be tracked for each project.

Table 19 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*	*Paseo Del Mar and Almeria Street 33.711563, -118.303522*	*1234 Paseo Del Mar*	*Los Angeles*	*90731*	*3/11/2014*

Required = Required Field
Recommended = Recommended

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)	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 #
B14-0001	*18.943*	*0.920*	*473,200*	*Gallons*	*100%*	*0.920*	*None*	*(Bio)Infiltration Basins*	*34.012711, 118.271411*	*5.540*	-		*No*	*None*	*0.00%*	*0.00%*	*11/15/2014*	*4 [19C123456*
								Permeable Pavement	*34.012311, 118.272411*	*3.400*	-				*0.00%*	*0.00%*		
								Water Harvesting	*34.012311, 118.271411*	*2.400*	-				*0.00%*	*0.00%*		
								Media Filtration Practices	*34.012511, 118.271411*	*2.103*	*6722*	*cf*			*0.00%*	*0.00%*		
								Wet Detention	*34.012811, 118.271811*	*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*

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 JG7 WMP 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.

The City has developed mechanisms for tracking new development/re-development projects that have been conditioned for post-construction BMPs pursuant to MS4 Permit Part VI.D.7 The City has also developed mechanisms for tracking the effectiveness of these BMPs pursuant to MS4 Permit Attachment E.X.

Section 7
Regional Studies

As stated earlier, the MRP identifies one regional study: the SMC Regional Watershed Monitoring Program. The goal of the program is to conduct ongoing, large-scale regional monitoring on coastal streams and rivers. However, since there are no streams or rivers in the SMB JG7 WMP Group area, there are no SMC monitoring sites located in the WMP Group area.

Regardless, the City of Los Angeles and the LACFCD will continue to participate in the Regional Watershed Monitoring Program (Biosassessment Program) being managed by the Southern California Stormwater Monitoring Coalition (SMC). Initiated in 2008, the SMC's Regional Bioassement 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. The SMC, including the SMB JG7 WMP Group agencies, is currently working on designing the bioassessment monitoring program for the next five-year cycle, which is scheduled to run from 2015 to 2019.

SCCWRP's Bight Regional Monitoring program is also expected to continue. Among other focuses, this program assesses the health of the Southern California Bight with respect to offshore water quality.

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 JG7 WMP Group do not require the completion of special studies. However, the SMB DDT and PCB TMDL has 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 JG7 WMP 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 identified in Section 2.1, 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 WMP and CIMP are to be implemented using the adaptive process. As new program elements are implemented and data gathered over time, the WMP 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 WMP 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 WMP. As part of the adaptive management process, re-evaluation of the CIMP will need to be conducted to better inform the SMB JG7 WMP Group of ever-changing conditions of the watershed. Each program of the CIMP will be re-evaluated every two years, in line with the WMP'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 will either need to be added or changed.

- **Monitoring Constituents**: Eliminate or reduce monitoring of certain constituents if constituents were not initially detected during initiation of the CIMP and are not being addressed by a watershed control measure.
- **Monitoring Frequency**: Increase or decrease monitoring frequency based on the evaluation of RWL, WQBELs, and non-stormwater action levels.

Modifications to the monitoring program, specifically the elimination of parameters/constituents, may be proposed and will be subject to approval by the Executive Officer of the Regional Board. For all other modifications or adjustments (which by their nature need immediate action), Regional Board approval may not be necessary. Examples of this type of modifications include changing testing laboratories, moving sampling locations due to lack or absence of flow, etc. It is assumed that the use of a scanned letter sent by email to the Regional Board will suffice as notification in these instances.

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 JG7 WMP Group.

11.1 DOCUMENTS AND RECORDS

Consistent with the Part XIV.A of the MRP requirements, the SMB JG7 WMP 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 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 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.

11.1.2 Annual 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 RWLs, 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 covering the preceding reporting year from July 1 through June 30th, for at least the duration of the Permit term.

11.1.3 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 JG7 WMP Group's CIMP will initiate 90 days after approval by the Executive Officer of the Regional Board. CIMP monitoring will be implemented in a phased-in approach to allow sufficient time for permitting and installation of equipment for all monitoring sites. Established TMDL monitoring programs, specifically the SMBBB TMDL 2004 approved CSMP, will continue without modification.

Section 13
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Attachment A

LACFCD 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 A-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.

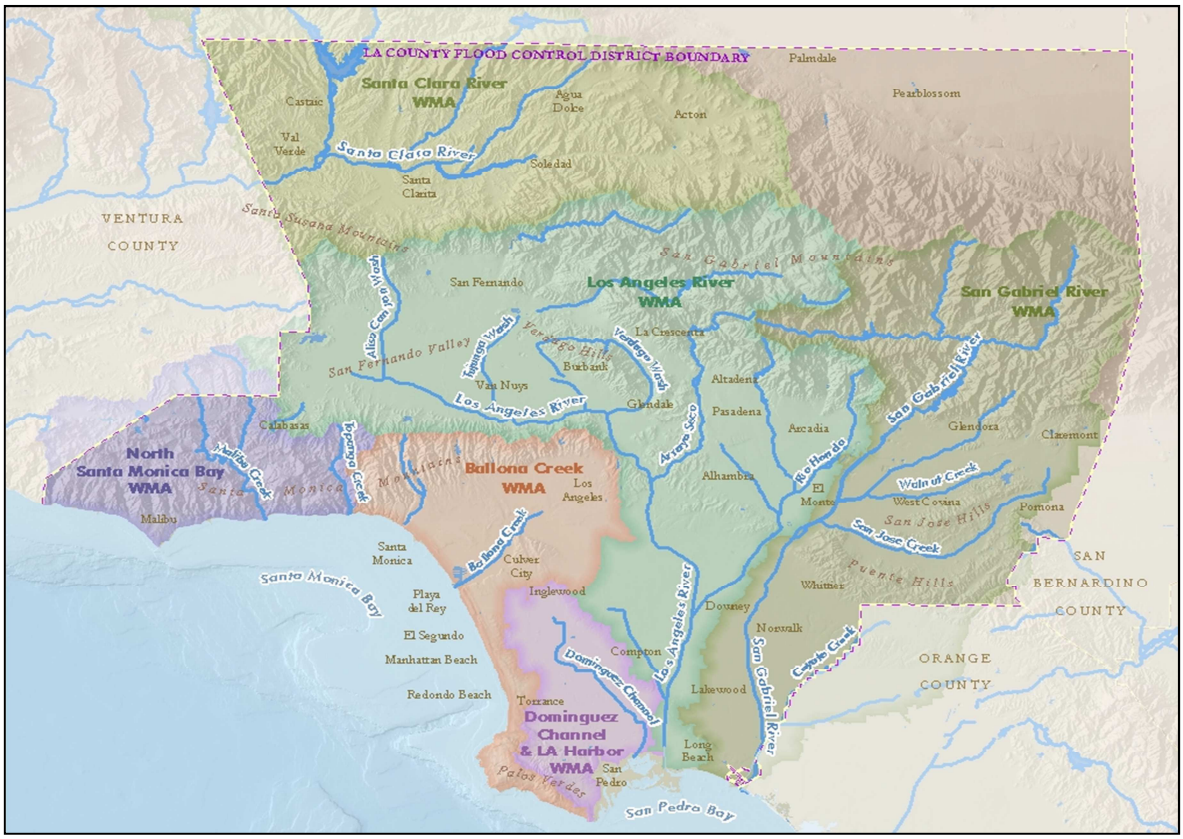


Figure A-1
Los Angeles County Flood Control District Service Area

Attachment B

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 B-1.**

Table B-1
Analytical Methods and Project Reporting Limits for Field Parameters

Parameter	Method	Range	Project RL
Current velocity/flow	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	TBD	TBD	1 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 JG7 WMP 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 are summarized in **Table B-2** for analysis in water. For organic constituents, environmentally relevant detection limits will

be used to the extent practicable. The RLs listed in **Table B-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 B-2** are considered equivalent and can be used in place of the methods presented in **Table B-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 B-2**. Depending on the laboratory selected for analysis, analytical methods may change, retaining the required minimum RL. 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 B-3.**

Table B-2
Analytical Methods and Project Reporting Limits (RL) for Laboratory Analysis of Water Samples

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
Toxicity				
Ceriodaphnia dubia (Freshwater)	EPA-821-R-02-013 (1002.0) and EPA-821-R-02-012 (2002.0)	TUc	2	NA
Strongylocentrotus purpuratus (marine waters)	EPA-600-R-95-136 (1002.0)	TUc	2	NA
Haliotis rufescens (marine waters)	EPA-600-R-95-136	TUc	2	NA
Bacteria				
Total coliform (marine waters)	SM 9221	MPN/100mL	10	10,000
Enterococcus (marine waters)	SM 9230	MPN/100mL	10	104
Fecal coliform (marine and fresh waters)	SM 9221	MPN/100mL	10	400
E. coli (fresh waters)	SM 9221	MPN/100mL	10	235
Conventional Pollutants				
Oil and Grease	EPA 1664A	mg/L	5	5
Cyanide	SM 4500-CN E	mg/L	0.005	0.005

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
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
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				

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
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

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
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 (Repeat parameters will be tested by one method or another, not both)				
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
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

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
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
Aldrin	EPA 1699	ng/L	0.006[3]	5
alpha-BHC	EPA 1699	ng/L	0.007[4]	10
beta-BHC	EPA 1699	ng/L	0.006[4]	5
delta-BHC	EPA 1699	ng/L	0.005[4]	5
gamma-BHC (Lindane)	EPA 1699	ng/L	0.009[4]	20
Chlordane-alpha	EPA 1699	ng/L	0.007[4]	100
Chlordane-gamma	EPA 1699	ng/L	0.006[4]	100
Oxychlordane	EPA 1699	ng/L	0.007[4]	NA
Cis-nonachlor	EPA 1699	ng/L	0.004[4]	NA
Trans-nonachlor	EPA 1699	ng/L	0.011[4]	NA

[3] RL assumed equal to MDL in Table 1 from EPA Method 1699

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
2,4'-DDD	EPA 1699	ng/L	0.003[4]	NA
2,4'-DDE	EPA 1699	ng/L	0.003[4]	NA
2,4'-DDT	EPA 1699	ng/L	0.002[4]	NA
4,4'-DDD	EPA 1699	ng/L	0.005[4]	50
4,4'-DDE	EPA 1699	ng/L	0.006[4]	50
4,4'-DDT	EPA 1699	ng/L	0.001[4]	10
Dieldrin	EPA 1699	ng/L	0.005[4]	10
Endosulfan I	EPA 1699	ng/L	0.024[4]	20
Endosulfan II	EPA 1699	ng/L	0.030[4]	10
Endosulfan Sulfate	EPA 1699	ng/L	0.013[4]	50
Endrin	EPA 1699	ng/L	0.003[4]	10
Endrin Aldehyde	EPA 1699	ng/L	0.012[4]	10
Heptachlor	EPA 1699	ng/L	0.007[4]	10
Heptachlor Epoxide	EPA 1699	ng/L	0.012[4]	10
Toxaphene	EPA 1699	ng/L	Not reported	500
PCBs (Repeat parameters will be tested by one method or another, not both)				
Congeners[2]	EPA 8270C/EPA 625	ng/L	2	NA
Aroclors (1016, 1221, 1232, 1242, 1248, 1254, 1260)	EPA 8270C/EPA 625/EPA 608	ng/L	500	500

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
Organophosphorus Pesticides (Repeat parameters will be tested by one method or another, not both)				
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
Chlorpyrifos	EPA 1699	ng/L	0.020[4]	50
Diazinon	EPA 1699	ng/L	0.027[4]	10
Malathion	EPA 1699	ng/L	0.296[4]	1000
Triazine	EPA 1699			
Atrazine	EPA 1699	µg/L	0.000014[4]	2
Cyanazine	EPA 1699	µg/L	0.000038[4]	2
Prometryn	EPA 1699	µg/L	Not reported[4]	2
Simazine	EPA 1699	µg/L	0.000012[4]	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
2,4-Dichlorophenol	EPA 625	µg/L	1	1

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
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

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
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 625	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
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

Parameter/Constituent	Method[(1)]	Units	Project	MRP Table E-2
			Reporting Limit	Minimum Level
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.
2. Analysis for PCB congeners includes the following constituents: PCB-8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.

Table B-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%
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 Test Acceptibility Critera (TAC) relative to the reference toxicant test.
2. Must meet all method Test Acceptibility Critera (TAC) relative to sample replicates.
3. See Table B-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 B-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 mixings 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 B-4**.These values may vary based on the selected laboratory. The analytical laboratories will supply sample containers that already contain preservative (**Table B-4**), including ultra-pure hydrochloric and nitric acid, where applicable. After collection, samples will be stored at 4°C until arrival at the contract laboratory.

Table B-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

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

Parameter	Sample Container	Sample Volume[1]	Immediate Processing and Storage	Holding Time
(SSC)				
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	Store at 4°C	180 days
Metals				6 months[4]
Mercury	Glass	500 mL	Store at 4°C	48 Hours
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	20 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.
5. One year if frozen, otherwise 14 days to extract and 40 days from extraction to analysis.
6. Sample volumes for follow-up testing and Phase I TIEs for sediments may change based on percent solids in previous samples. In addition, collection of sediment for follow-up testing and Phase I TIEs may change based on observations of toxicity in previous sampling events.

1.3 Aquatic Toxicity Testing and Toxicity Identification Evaluations

Aquatic toxicity testing supports the identification of BMPs to address sources of toxicity in urban runoff. 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 WMP. The sub-sections below describe the detailed process for conducting SMB J7 aquatic toxicity monitoring, evaluating results, and the technical and logistical rationale. Control measures and management actions to address confirmed toxicity caused by urban runoff are addressed by the WMP, either via currently identified management actions or those that are identified via adaptive management of the WMP.

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 selection process for assessing aquatic toxicity in receiving waters.

1.3.1.1 *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).
- Daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test Method).
- Static non-renewal Green alga, *Selenastrum capricornutum* (Growth Inhibition Test Method).

The three test species were evaluated to determine if either a sensitive test species had already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s). In reviewing the available data in the ULAR watershed, metals, historical organics, and currently used pesticides have been identified as problematic and are generally considered the primary aquatic life toxicants of concern found in urban runoff. Given the knowledge of the presence of these potential toxicants in the watershed, the sensitivities of each of the three species were considered to evaluate which is the most sensitive to the potential toxicants in the watershed.

Ceriodaphnia dubia (*C. dubia*) has been reported as a sensitive test species 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) compared to *P. promelas* (species mean acute value of 69.93 µg/l; EPA, 2007). *C. dubia*'s relatively higher sensitivity to metals is common across 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 (CVRWQCB). The UC Davis researchers 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, a study of the City of Stockton urban stormwater runoff found acute and chronic toxicity response to *C. dubia*, with no toxicity response 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*. *C. dubia* is also the test organism selected to assess the ambient toxicity of the Los Angeles River by the Los Angeles River Watershed Monitoring Program and has been the most-sensitive species to the Donald C. Tillman and the Los Angeles-Glendale Water Reclamation Plant effluent as well as the Los Angeles River receiving water in the vicinity of the water treatment plants. 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 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 this 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 to conduct the 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's* 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 the *P. promelas* regularly detected toxicity.

As *C. dubia* is identified as the most sensitive to known potential toxicant(s) typically found in receiving waters and urban runoff in the freshwater potions of this watershed, *C. dubia* is selected as the most sensitive species. The species also has the advantage of being easily maintained by means of in-house mass cultures. The relative ease of test preparation, the ease of interpreting results, and the smaller 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)

1.3.2 Testing Period

The following describes the testing periods to assess toxicity in samples collected in the ULARWMAG EWMP area during dry and wet weather conditions. Although wet weather conditions in the region generally persist for less than the chronic testing periods (7 days), the *C. dubia* chronic test will be used

for wet weather toxicity testing in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA, 2002b). Utilization of chronic tests on wet weather samples are not expected to generate results representative of the typical conditions found in the receiving water intended to be simulated by toxicity testing.

Chronic toxicity tests will be used to assess both survival and reproductive/growth endpoints 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).

1.3.3 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

Per the MRP, 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) is set at 100% receiving water for receiving water samples and 100% effluent for outfall samples. Using the TST approach, a t-value is calculated for a test result and compared with a critical t-value from USEPA's TST Implementation Document (USEPA, 2010). Follow-up triggers are generally based on the Permit specified statistical assessment as described below.

For chronic *C. dubia* toxicity testing, if a ≥50% reduction in survival or reproduction is observed between the sample and laboratory control that is statistically significant, a toxicity identification evaluation (TIE) will be performed.

TIE procedures will be initiated as soon as possible after the toxicity trigger threshold is observed to reduce the potential for loss of toxicity due to extended sample storage. If the cause of toxicity is readily apparent or is caused by pathogen related mortality (PRM) or epibiont interference with the test, the result will be rejected. If necessary, a modified testing procedure will be developed for future testing.

In cases where significant endpoint toxicity effects ≥50% are observed in the original sample, but the follow-up TIE baseline "signal" is not statistically significant, the cause of toxicity will be considered non-persistent. No immediate follow-up testing is required on the sample. However, 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 result in the removal of pollutants causing toxicity in receiving waters. Successful TIEs will direct monitoring at outfall sampling sites to inform management actions. As such, the goal of conducting TIEs is to identify pollutant(s) that should be sampled during outfall monitoring so that management actions can be identified to address the pollutant(s).

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 to remove toxicity without specific identification of the toxicants.
- Phase II utilizes methods to specifically identify toxicants.
- Phase III utilizes methods to confirm the suspected toxicants.

A Phase I TIE will be conducted on samples that exceed a TIE trigger described above. Water quality data will be reviewed to further support evaluation of potential toxicants. A range of sample manipulations may be conducted as part of the TIE process. The most common manipulations are described in **Table B-5**. Information from previous chemical testing and/or TIE efforts will be used to determine which of these (or other) sample manipulations are most likely to provide useful information for identification of primary toxicants. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b).

Table B-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
Ethylenediamine-Tetraacetic Acid (EDTA) or Cation Exchange Column*	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
Temperature adjustments(2)	Pyrethroids become more toxic when test temperatures are decreased
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

* Denotes treatments that will be conducted during the initiation of toxicity monitoring, but may be revised as the program is implemented. These treatments were recommended for initial stormwater testing in Appendix E (Toxicity Testing Tool for Storm Water Discharges) of the State Water Resources Control Board's June 2012 Public Review Draft "Policy for Toxicity Assessment and Control".

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).
2. Temperature adjustments are another recent manipulation used to evaluate pyrethroid-associated toxicity. Lower temperatures increase the lethality of pyrethroid pesticides. (Harwood, You and Lydy, 2009)

Toxicity causation will be tentatively identified based on the treatments in **Table B-5** and, when possible, the results verified based on water column chemistry analyses. After an initial determination of the cause of toxicity, the information may be used during future events to to modify the targeted treatments to more closely target the expected toxicant or to provide additional treatments to narrow the toxicant cause(s). Moreover, if the toxicant or toxicant class is not initially identified, toxicity monitoring during subsequent events will confirm if the toxicant is persistent or a short-term episodic occurrence.

As the primary goal 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(s) (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 constituents causing toxicity in a given sample if the results of Phase I TIE testing and a review of available chemistry data fails to provide information necessary to identify constituents that warrant additional monitoring activities or management actions to identify likely sources of the toxicants and lead to elimination of the sources of these contaminants. Phase III TIEs will be conducted following any Phase II TIEs.

For the purposes of determining whether a TIE is inconclusive, TIEs will be considered inconclusive if:

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

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

In cases where significant endpoint toxicity effects greater than 50% are observed in the original sample, but the follow-up TIE baseline "signal" is not statistically significant, the cause of toxicity will be considered non-persistent. No immediate follow-up testing is required on the sample. However, future test results should be evaluated to determine if parallel TIE treatments are necessary to provide an opportunity to identify the cause of toxicity.

Note that the MRP (page E-33) allows a TIE Prioritization Metric (as described in Appendix E of the Southern California Stormwater Monitoring Coalition's (SMC) Model Monitoring Program) for use in ranking sites for TIEs. However, as the extent to which TIEs will be conducted is unknown, prioritization cannot be conducted at this time. However, prioritization may be utilized in the future based on the results of toxicity monitoring and an approach to prioritization will be developed through the CIMP adaptive management process and will be described in future versions of the CIMP.

1.3.5 Follow Up on Toxicity Testing Results

If the results of two TIEs on separate receiving samples collected during the same condition (i.e., wet or dry weather) are inconclusive, a toxicity test conducted during the same condition (i.e., wet or dry weather), using the same test species, will be conducted at applicable upstream outfalls as soon as feasible (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a inconclusive TIE). The same TIE evaluation triggers and TIE approach presented below, respectively will be followed based on the results of the outfall sample.

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

- ULARWMAG 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 requirements of the TREs will be met as part of the adaptive management process in the ULAR EWMP rather than conducted via the CIMP. 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.

1.3.6 Summary of Aquatic Toxicity Monitoring

The approach to conducting aquatic toxicity monitoring as described in the previous sections of this Attachment is summarized in **Figure B-1**. 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.

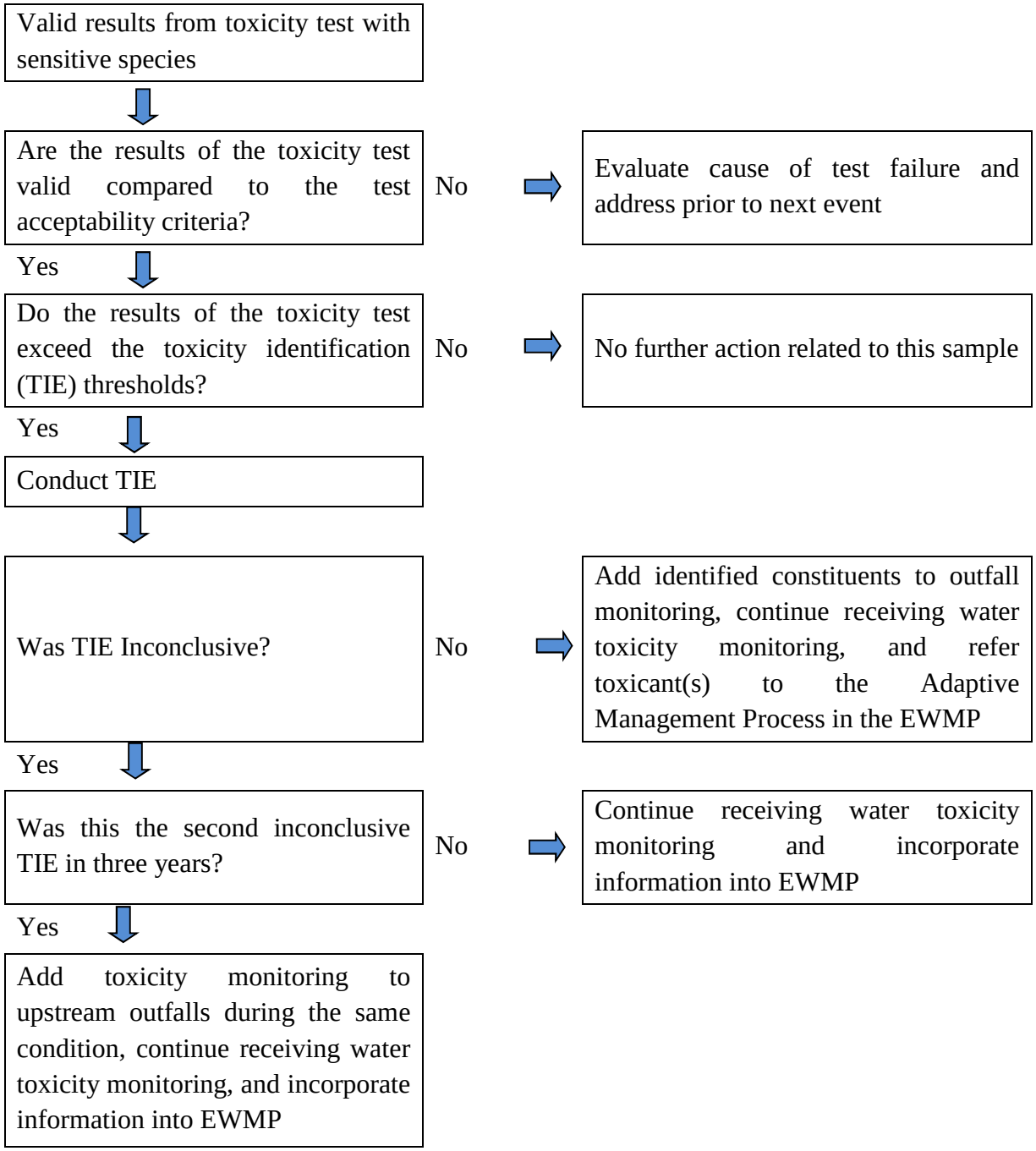


Figure B-1. Detailed Aquatic Toxicity Assessment Process

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.

2.1 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 B-6 provides a checklist of field equipment to prepare prior to each monitoring event.

Table B-6
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 B-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

All samples will be identified with a unique identification code to ensure that results are properly reported and interpreted. 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 SM- ###.# - AAAA - XXX, where:

- SM indicates that the sample was collected as part of the SMB JG7 WMP 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.
- AAAA indicates the unique site ID for each site.
- 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.

Alternatively, if the above naming convention is not employed, the selected alterative convention will be consistent between sampling events and sampling stations.

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 B-1** and be calibrated before field events based on manufacturer guidance, but at a minimum prior to each event. **Table B-7** 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 D**).

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 JG7 WMP 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 B-1**. Calibration verification documentation will be retained in the event's calibration verification log.

Table B-7
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	Is factory-set and 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 the closest Los Angeles County controlled rain gauge to the SMB JG7 WMP Group area. Wet weather will be defined as a storm event of greater than or equal to 0.1 inch of precipitation, as determined by the closest Los Angeles County controlled rain gauge to the SMB JG7 WMP Group area.

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.

The MRP includes specific criteria for the time of monitoring events. For dry weather toxicity monitoring, if triggered, sampling must take place during the historically driest month, which has been determined to be the month of August.

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 a 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. Subsequent storm events must meet the tracking requirements, 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 B-8.** 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. 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.

Table B-8
Real-Time Rain Gage Used to Define Weather Conditions for CIMP Monitoring[1]

Rainfall Gage	Operator	Latitude	Longitude
Fire Station 56 Rolling Hills (376)	Los Angeles County Department of Public Works	33°45'35.25"N	118°21'16"W

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

The National Weather Service's weather forecast for the SMB JG7 WMP Group area can be accessed on-line at http://www.wrh.noaa.gov/lox/ then click on the location of the SMB JG7 WMP Group 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 JG7 WMP 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. Alternatively, all measurements could be collected on an electronic device such as laptop or tablet computer. 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 for each sampling event that contains a calibration log sheet, a field log sheet for each site, and appropriate contact information. Alternatively, all measurements could be collected on an electronic device such as laptop or tablet computer. 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 D** contains an example of the field log sheet.

2.2.3 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 B-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 B-9**. 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 B-9**.

Table B-9
Information on Laboratories Conducting Analysis for the SMB JG7 WMP Group CIMP

Laboratory[1]	General Category of Analysis	Shipping Method	Contact	Phone	Address	Lab Certification No. & Expiration Date[2]
Information for all laboratories will be added to this table following their selection and upon CIMP update.						

Lab certifications are renewed on an annual basis.

2.2.4 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 D**.

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 JG7 WMP 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 be comprised of a minimum of two persons per crew.. To ensure safety, field crews will have the 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, when possible, even non-running vehicles.
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** 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[7] 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.

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

2.4.2 Field Measurements and Observations

Field measurements will be collected and observations made at each sampling site during sample collection. 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 **Table B-3**. All field measurement results and field observations will be recorded on a field log sheet similar to the one presented in **Appendix D** 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.

2.4.2.1 *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 meter8 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.

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

2.4.2.2 *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} W_{Top} is measured at 0-feet, W_{Mid} W_{Mid} is measured at 5 feet, and W_{Bottom} W_{Bottom} is measured at 10 feet).
- **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., $D_{50\%}^{Mid}$ $D_{50\%}^{Mid}$ 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:

$$\text{Representative Cross Section} =$$

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

$$\text{Representative Cross Section} =$$

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

- **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 = 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.

2.4.2.3 *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:

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

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

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.

2.4.3.1 *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.

2.4.3.2 *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.

2.4.3.3 *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.

2.4.3.4 *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. Connect power source to autosampler computer. This can be in the form of a battery or a power cable.
2. Install pre-cleaned tubing into the pump. Clean tubing will be used at each site and for each event, in order to minimize contamination.
3. Attach strainer to intake end of the tubing and install in sampling channel.
4. If running flow based composite samples; install flow sensor in sampling channel and connect it to the automatic compositor.
5. 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.
6. 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.

2.4.3.5 *Dissolved Metals Field Filtration*

Samples for dissolved metals will be filtered by the laboratory, or in the event samples for dissolved metals are required to be filtered in the field, the following method for dissolved field filtration will be

conducted. A peristaltic pump or 50mL plastic syringe 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, if triggered, 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 receiving water samples collected from the Santa Monica Bay by boat will be single grab sample.

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 JG7 WMP 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

Wet weather samples will generally be collected by a continuous sampler as either time- or flow-weighted composites at outfalls. Grab samples may be utilized to collect wet weather samples 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 auto-sampler may not be warranted. 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 JG7 WMP 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.

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).

2.4.6.1 *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

Suspended Sediment collection will occur as described by the Peninsula CIMP when data from the Peninsula Cities is used for the SMB J7 CIMP reporting. The following described suspended sediment collection in the event that the SMB J7 WMP Group performs the monitoring.

Most of the organochlorine (OC) pesticides and PCBs tend to strongly associate with sediment and organic material. These constituents commonly have octanol/water partition coefficients (log Kow) that are greater than six, elevated soil/water partition coefficients (log Kd) and elevated soil adsorption coefficients (log Koc). Concentrations of OC pesticides and PCBs are often below or are very close to the limits of detection for conventional analytical methods used for analyzing water samples.

A number of studies have been performed to directly measure the concentration of contaminants associated with suspended solids but there are no standardized procedures established for this type of testing. 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 (dry weight) of sediment (typically 10 grams dry weight is preferred by laboratories) for each of the groups of analytes (DDT, PCBs) in order to achieve detection limits necessary to quantify loads. 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 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. This approach will utilize High Resolution Mass Spectrometry (HRMS) to analyze for DDT (USEPA 1699) and PCBs (USEPA 1668). HRMS analyses are quantified by isotope dilution techniques. 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.

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 three years (approximately four to six storm events) the data will be reevaluated to assess whether direct analysis of the filtered suspended sediments are necessary to improve load assessments. If deemed necessary, a modified approach will be evaluated for analysis of suspended sediments. It is currently not clear whether direct measurement of the target toxics in suspended sediments will result in any significant improvements in our ability to assess loads. In fact, collecting, transporting and processing the high volumes of stormwater necessary for this approach may result in a decrease in our ability to obtain useful data and will likely result in a decrease in our ability to assess pollutant loads.

Sampling and Analytical Procedures

Stormwater samples will be collected using autosamplers or grab samples, depending on sample location. 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. Processing of sample waters provided to the laboratory will depend upon the results of the SSC analysis. Given adequate sample volumes and normal levels of suspended sediment, a field duplicate will be analyzed for each analysis.

Table B-10 provide a summary of the detection limits attainable in water samples using HRMS analytical methods. Estimated detection limits are provided for concentrations of the target constituents in suspended sediments given the assumption that 2-liter sample volumes will be used for each test, suspended sediment content of the water sample is 100 mg/L, and that 100 percent of the target constituents are associated with the suspended sediment. This provides a conservative assumption with respect to evaluating the potential impacts of concentrations of DDT and PCBs in suspended sediment on concentrations in bed sediment.

Quality Control Measures

Quality control measures for all HRMS analyses will include field equipment blanks to assess background contamination due to the field equipment and sample handling. A field equipment blank will be analyzed from each set of field equipment during the first year. Data will be evaluated at the end of the year to determine if field equipment blanks should be reduced to one per season. For the field blank, two liters of HPLC grade water provided by the laboratory will be pumped through the entire autosampler and intake hose for each analytical test (DDT and PCBs). The blank water will be pumped into pre-cleaned sample containers and refrigerated until the stormwater sampling is completed. If the storm does not occur immediately after blanking, the equipment blank will be transmitted under COC to the laboratory in order the meet the requirement for extraction of aqueous samples within 7 days of collection. Extracts will be held until stormwater samples are received unless storm does not develop within a period of 30 days after extraction (samples are required to be analyzed within 40 days of

extraction). If a successful storm event is monitored immediately after the equipment blank is taken, the equipment blank and stormwater samples will be submitted to the laboratory together. Given adequate sample volumes, field duplicates will also be analyzed to assess variability associated with the sampling and subsampling processes.

Laboratory quality control measures will include analysis of method blanks, initial calibrations, analysis of Ongoing Precision and Recovery (OPR) samples and use of labeled compounds to assess recoveries and matrix interferences. Method blanks will be based upon processing of laboratory water volumes identical to those used for the field samples. Initial calibrations are run periodically but daily calibration checks are conducted to verify stability of the calibration. OPR tests will be conducted with each batch of samples. OPR samples are blanks spiked with labeled isotopes that are used to monitoring continued performance of the test. Labelled isotopes are added to each field sample and analyzed to measure recovery in the sample matrix. Estimated Detection Limits (EDLs) will be calculated for each analyte associated with each field sample. For each analyte 'x', the EDL is calculated by the following formula:

$$EDL_x = 2.5 * \frac{(Na)*(Qis)*(Rah)}{(Ais)*(RRF)*(wv)}$$

Where:
- Na = Analyte peak to peak noise height.
- Qis = Concentration of internal standard.
- Rah = Area of Height Ratio
- Ais = Area of internal standard
- RRF = initial calibration average relative response factor for the congener of interest.
- wv = sample weight/volume.
- 2.5 = Minimum signal to noise ratio.

Summary

Overall, the proposed approach based upon analyzing whole water samples to estimate concentrations of target pollutants meets the overall objectives of the program while also enhancing the chances of successfully monitoring multiple storm events and provide data necessary to evaluate relative loads from multiple storms each year. The proposed methods are also expected to allow incorporation of quality control measures necessary to evaluate potential source of contamination and variability that might be attributable to both the sampling and analytical processes.

Table B-10. Recommended Methods and Estimated Detection Limits, for DDT and Total PCBs

Constituent and Analytical Method	Detection Limits Associated with Suspended Sediments	
	Water Detection Limit [1]	Equivalent Suspended Sediment Detection Limit [2]
	pg/L	ng/g – dry wt
DDTs (EPA 1699)		
2,4'-DDD	40	0.4
2,4'-DDE	80	0.8
2,4'-DDT	80	0.8
4,4'-DDD	40	0.4
4,4'-DDE	80	0.8
4,4'-DDT	80	0.8
Total DDT	80	0.8
Total PCBs (EPA 1668)	5-20	0.05-0.2

[1]Water EDLs based upon 2 liters of water.
[2]Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.

2.4.8 Bioaccumulation Sample Collection

No bioaccumulation sampling will be conducted under this program.

2.4.9 Trash Monitoring

The SMB JG7 WMP 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

Manufacturers of plastic pellets were not identified within any of the SMB JG7 WMP 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.

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. Additional detail on data quality is provided in Section 13 (QA/QC Data Evaluation) of the *Caltrans Comprehensive Protocols Guidance Manual* (2000)[9]. 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 previously. **Table B-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.

Table B-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	5% of all samples	< 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 75-125% for Metals	Check LCS/CRM recovery. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed.

[9] http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-03-105.pdf

Quality Control Sample Type	QA Parameter	Frequency[1]	Acceptance Limits	Corrective Action
			50-150% Recovery for Pesticides [3]	
Matrix Spike Duplicate	Precision	1 per analytical batch	RPD < 30% if |Difference| > RL	Check lab duplicate RPD. Attempt 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 B-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 5% of samples collected 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 B-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 JG7 WMP 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 B-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 B-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 mixing, 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 mixing, 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 JG7 WMP Group. Laboratory QA Manuals are available for review at the analyzing laboratory.

Attachment C

Outfall Investigation Photographic Log

Site ID:

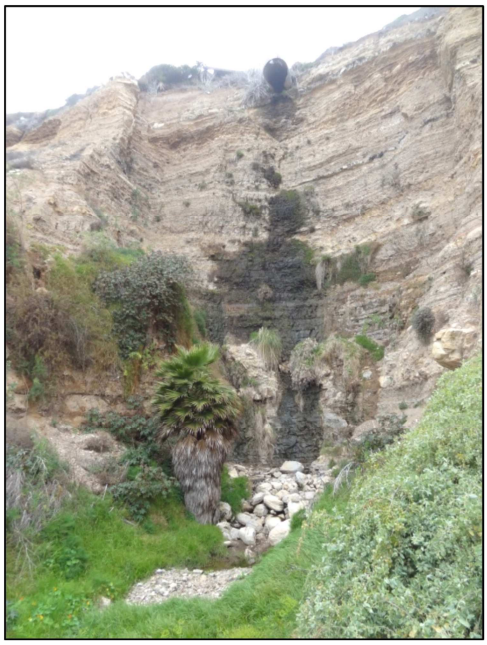
SMBJ7-O-1

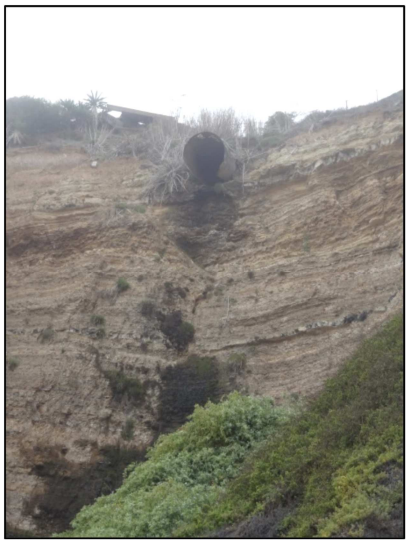
GPS Coordinates:

33.720405, -118.328695

Description:

- Outfall diameter approximately 5 feet
- Outfall appears to be corrugated metal pipe
- Outfall not discharging at time of inspection
- Cliff is moist, suggesting minor discharge
- Relatively large area to allow for ponding in event of outfall discharge
- Outfall not accessible – protruding from cliff
- Approximately ¼ mile west of paved ground at White Point /Royal Palms County Beach parking lot (walked on rocks to access and take photos)
- No safe access to associated with this outfall





Land Use	HUC12		JG7 WMP Area		SMBJ7-O-1	
	Acres	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	1.4	0.4
Education	806.2	3.3	32.2	3.1	2.6	0.7
Industrial	1487.5	6.2	1.0	0.1	0.0	0.0
MF Residential	2042.4	8.5	151.0	14.3	60.0	15.8
SF Residential	11265.0	46.7	561.5	53.2	134.2	35.5
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	180.3	47.6
Total	24115.1	100	1056	100	378.4	100

Site ID:

SMBJ7-O-2

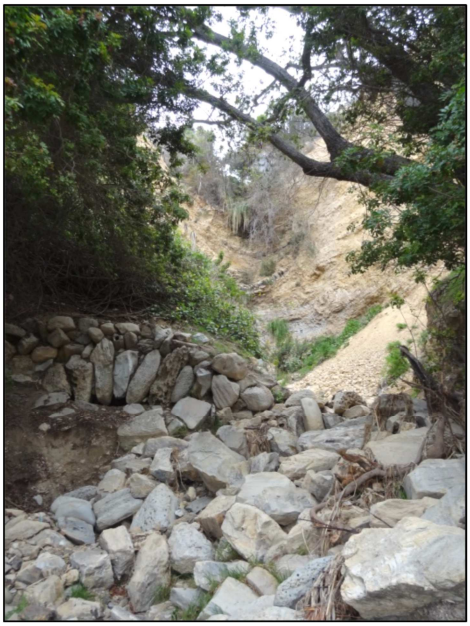
GPS Coordinates:

33.718976, -118.323855

Coordinates of bridge

Description:

- Could not observe the outfall from either below or above (private property above)
- Photos are of rock-lined spillway that appears to be downstream of outfall
- No discharge observed at time of investigation (dry)
- Located just west of White Point/Royal Palms County Beach parking lot
- This is adjacent to Station SMB 7-06 which is currently one of the active bacteria TMDL monitoring stations



	HUC12		JG7 WMP Area		SMBJ7-O-2	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	0.0	0.0
Education	806.2	3.3	32.2	3.1	8.0	5.7
Industrial	1487.5	6.2	1.0	0.1	0.0	0.0
MF Residential	2042.4	8.5	151.0	14.3	6.8	4.8
SF Residential	11265.0	46.7	561.5	53.2	99.6	70.7
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	26.5	18.8
Total	24115.1	100	1056	100	140.8	100

Site ID:

SMBJ7-O-3

GPS Coordinates:

33.718484, -118.321043

Description:

- Outfall diameter approximately 3-4 feet
- Outfall appears to be corrugated metal pipe
- Outfall was discharging at time of investigation (approximately 5^{+} gpm)
- Ponding was observed at the time of investigation – flow did not reach downstream culvert that brings flow to the beach
- Mouth of pond/earth channel is connected to a 2 foot diameter culvert that appears to be the designated location of SMB 7-06 (see photos on next page)
- Ponding location and downstream channel located on west site of White Point/Royal Palms County Beach parking lot

Site ID: SMBJ7-O-3 (continued)	 

	HUC12		JG7 WMP Area		SMBJ7-O-3	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	13.9	7.9
Education	806.2	3.3	32.2	3.1	0.0	0.0
Industrial	1487.5	6.2	1.0	0.1	0.0	0.0
MF Residential	2042.4	8.5	151.0	14.3	7.3	4.2
SF Residential	11265.0	46.7	561.5	53.2	131.3	74.5
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	23.8	13.5
Total	24115.1	100	1056	100	176.4	100

Site ID:

SMBJ7-O-3 (Downstream segment)

GPS Coordinates:

33.7177861, -118.3211305

Description:

- Outfall diameter approximately 2 feet
- Outfall not discharging at time of investigation (dry)
- Outfall is downstream of SMBJ7-O-3, carries water from SMBJ7-O-3 pond/earth channel to the beach front
- Accessible with parking located nearby in White Point/Royal Palms County Beach parking lot

Site ID:

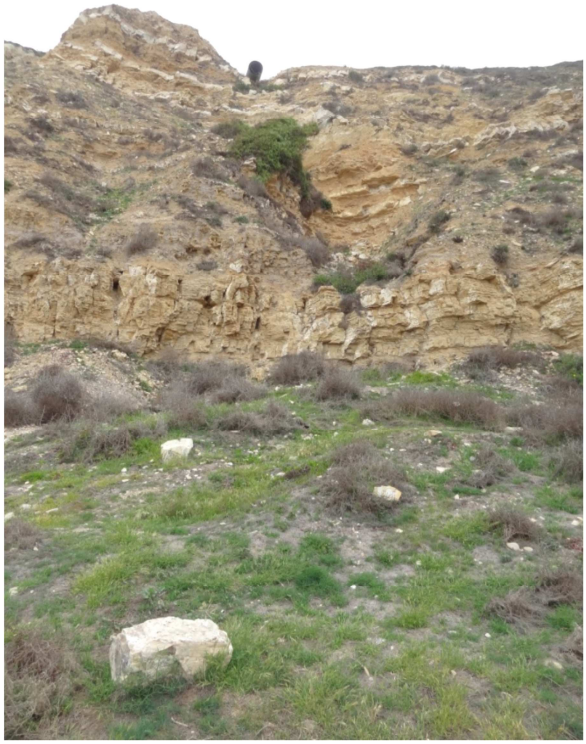
SMBJ7-O-4

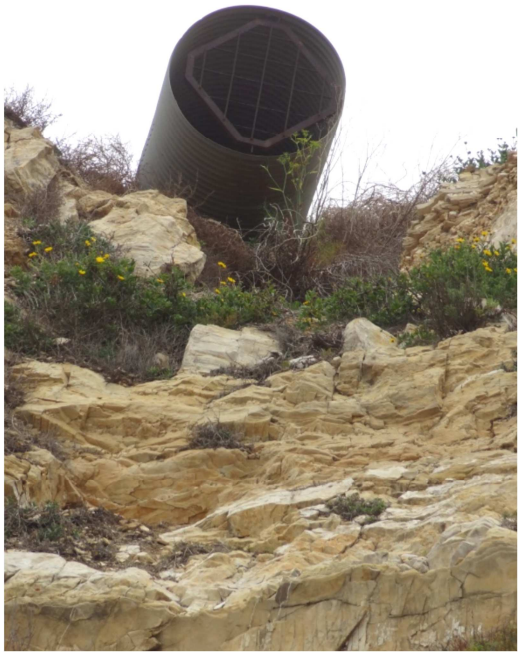
GPS Coordinates:

33.715769, -118.317973

Description:

- Outfall diameter approximately 3-4 feet
- Outfall not discharging at time of investigation (dry)
- Outfall is hanging from cliff – no safe access
- Located approximately 500 feet east of White Point/Royal Palms County Beach parking lot and adjacent to SMB 7-06 which is already one of the bacteria TMDL monitoring stations.





Site ID:

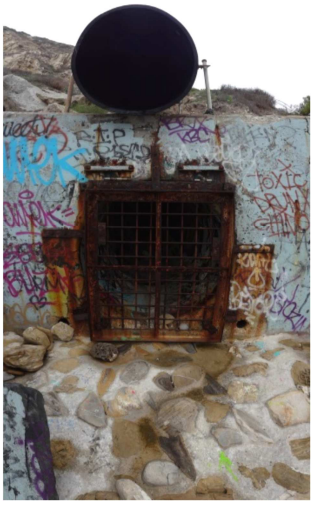
SMBJ7-O-5

GPS Coordinates:

33.714331, -118.316115

Description:

- Outfall Diameter approximately 3 feet
- Two pipes (one plastic, one concrete channel) on top of each other
- Outfall(s) not discharging during the time of inspection
- To access site, had to pass a gate that said “Danger” located approximately ¼ mile east of White Point/Royal Palms County Beach parking lot
- The shoreline at the zero point of this outfall is SMB 7-07 which has not been monitored since 2009 due to a landslide which resulted in an unsafe access road. Prior to 2009, SMB 7-07 was monitored for bacteria weekly.



	HUC12		JG7 WMP Area		SMBJ7-O-4/5	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	0.0	0.0
Education	806.2	3.3	32.2	3.1	5.9	2.6
Industrial	1487.5	6.2	1.0	0.1	0.0	0.0
MF Residential	2042.4	8.5	151.0	14.3	22.1	9.8
SF Residential	11265.0	46.7	561.5	53.2	96.7	43.0
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	100.1	44.5
Total	24115.1	100	1056	100	224.8	100

Site ID:

SMBJ7-O-6

GPS Coordinates:

33.711563, -118.303522

Description:

- Width of Outfall approximately 25’
- Height of Outfall approximately 18’
- Outfall discharge was a slow trickle during time of observation
- Water ponded at mouth of the outfall
- Trash and excessive vegetation at mouth of outfall
- Accessible from path that begins on Paseo Del Mar and Barbara Street
- Path was initially determined to be safe if a handrail was installed. However, further assessment by the County Sanitation District, the monitoring agency, found the path to be unsafe to access especially during wet weather events

	HUC12		JG7 WMP Area		SMBJ7-O-6	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	0.0	0.0
Education	806.2	3.3	32.2	3.1	2.8	1.7
Industrial	1487.5	6.2	1.0	0.1	0.0	0.0
MF Residential	2042.4	8.5	151.0	14.3	21.9	13.6
SF Residential	11265.0	46.7	561.5	53.2	125.7	77.9
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	11.0	6.8
Total	24115.1	100	1056	100	161.4	100

Site ID:

SMBJ7-O-7

GPS Coordinates:

33.709988, -118.298985

Description:

- Outfall diameter approximately 1.5 feet
- Outfall material corroded corrugated metal pipe (broken in multiple areas)
- Outfall was not discharging at time of inspection
- Pipe was filled with sediment – suggests minimal flow if any
- Located in identified vicinity of SMB-7-08
- Accessible from a path that begins on Paseo Del Mar and Meyler Street. The shoreline across from this location is designated as SMB 7-08 and is already being monitored for bacteria weekly.

Site ID:

SMBJ7-O-8

GPS Coordinates:

33.709331, -118.296322

Description:

- Outfall diameter approximately 1.5 feet
- Outfall material is corrugated metal pipe
- Outfall not discharging at time of inspection
- Outfall represents only road runoff
- Not accessible for monitoring - hanging from cliff
- Across the street from Fort Mac Arthur Museum / Battery Osgood-Farley National Register Site
- This outfall is not safely accessible

	HUC12		JG7 WMP Area		SMBJ7-O-7/8	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	10.2	8.8
Education	806.2	3.3	32.2	3.1	15.6	13.5
Industrial	1487.5	6.2	1.0	0.1	1.2	1.0
MF Residential	2042.4	8.5	151.0	14.3	0.0	0.0
SF Residential	11265.0	46.7	561.5	53.2	33.3	28.9
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	55.1	47.8
Total	24115.1	100	1056	100	115.4	100

Site ID:

SMBJ7-O-9

GPS Coordinates:

33.705307, -118.291571

Description:

- Outfall diameter approximately 1.75 feet
- Outfall material is corrugated metal pipe
- Near the end of W. Paseo Del Mar

	HUC12		JG7 WMP Area		SMBJ7-O-9	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	0.0	0.0
Education	806.2	3.3	32.2	3.1	0.0	0.0
Industrial	1487.5	6.2	1.0	0.1	0.5	2.1
MF Residential	2042.4	8.5	151.0	14.3	2.9	12.3
SF Residential	11265.0	46.7	561.5	53.2	0.0	0.0
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	20.2	85.6
Total	24115.1	100	1056	100	23.6	100

Site ID:

SMBJ7-O-10

GPS Coordinates:

33.705402, -118.290650

Description:

- Outfall diameter approximately 2 feet
- Outfall material is brick

	HUC12		JG7 WMP Area		SMBJ7-O-10	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	0.0	0.0
Education	806.2	3.3	32.2	3.1	0.0	0.0
Industrial	1487.5	6.2	1.0	0.1	0.0	0.0
MF Residential	2042.4	8.5	151.0	14.3	0.8	20.8
SF Residential	11265.0	46.7	561.5	53.2	0.5	14.0
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	2.4	65.2
Total	24115.1	100	1056	100	3.7	100

Site ID:

SMBJ7-O-11

GPS Coordinates:

33.705864, -118.288023

Description:

- Outfall diameter approximately 2.25 feet
- Outfall material is corrugated metal pipe
- Near the intersection of S. Pacific Avenue and Bluff Place

Site ID:

SMBJ7-O-12

GPS Coordinates:

33.706292, -118.287400

Description:

- Outfall diameter approximately 1.3 feet
- Outfall material is vitrified clay pipe
- Near the intersection of S. Pacific Avenue and Bluff Place

	HUC12		JG7 WMP Area		SMBJ7-O-11/12	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	0.0	0.0
Education	806.2	3.3	32.2	3.1	0.0	0.0
Industrial	1487.5	6.2	1.0	0.1	0.0	0.0
MF Residential	2042.4	8.5	151.0	14.3	18.3	38.0
SF Residential	11265.0	46.7	561.5	53.2	20.7	43.0
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	9.1	19.0
Total	24115.1	100	1056	100	48.1	100

Site ID:

SMBJ7-O-13

GPS Coordinates:

33.707872, -118.285646

Description:

- Outfall diameter approximately 1 foot
- Outfall material is polyethylene liner
- Close to the end of W 40th Street, near intersection with Bluff Place

	HUC12		JG7 WMP Area		SMBJ7-O-13	
Land Use	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Water	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture	89.8	0.4	0.0	0.0	0.0	0.0
Commercial	1230.5	5.1	25.5	2.4	1.4	5.5
Education	806.2	3.3	32.2	3.1	0.0	0.0
Industrial	1487.5	6.2	1.0	0.1	0.0	0.0
MF Residential	2042.4	8.5	151.0	14.3	10.8	41.5
SF Residential	11265.0	46.7	561.5	53.2	4.5	17.3
Transportation	1956.6	8.1	0.0	0.0	0.0	0.0
Vacant	5236.9	21.7	284.3	26.9	9.3	35.7
Total	24115.1	100	1056	100	26.0	100

Attachment D

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 ___ ___

EXAMPLE Field Log **Page 1 of 2**

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)	Salinity (for ocean sampling only) (PSU)

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"

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