

DRAFT ENHANCED WATERSHED MANAGEMENT PROGRAM (EWMP)

**for the Beach Cities Watershed Management
Area (Santa Monica Bay and Dominguez
Channel Watersheds)**



Submitted to:
Los Angeles Regional Water Quality Control Board

Submitted by:
Beach Cities EWMP Group

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LIST OF ACRONYMS

AED	Allowable Exceedance Days
ASBS	Area of Special Biological Significance
ASCE	American Society of Civil Engineers
BMP	Best Management Practice
Caltrans	California Department of Transportation
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CFCC	California Financing Coordinating Committee
cfs	Cubic feet per second
CIMP	Coordinated Integrated Monitoring Program
CML	Compliance Monitoring Location
CNT	Center for Neighborhood Technology
COMM	Commercial and Sport Fishing
CSMP	Coordinated Shoreline Monitoring Plan
CTR	California Toxic Rules
cu-ft	Cubic feet
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
DC	Dominguez Channel
DCu	Dissolved Copper
DDT	Dichloro-diphenyl-trichloroethane
DP	Dissolved Phosphorus as P
DZn	Dissolved Zinc
EIFD	Enhanced Infrastructure Financing Districts
EMC	Event Mean Concentration
EWMP	Enhanced Watershed Management Program
FAA	Federal Aviation Administration
FC	Fecal coliform
FIB	Fecal Indicator Bacteria
ft	Foot
GIS	Geographic Information System
GM	Geometric Mean
GO	General Obligation
gpm	Gallons per minute
HFS	High Flow Suspension
HSPF	Hydrological Simulation Program - Fortran
IBD	International BMP Database
IC/ID	Illicit Connection/Illicit Discharge
IDDE	Illicit Discharge Detection and Elimination
IGP	Industrial General Permit
in	inch
IND	Industrial Service Supply
in/hr	Inches per hour
IPM	Integrated Pest Management

J5&6	Jurisdictional Groups 5 and 6
JPA	Joint Powers Authority
LACFCD	Los Angeles County Flood Control District
LADWP	Los Angeles Department of Water and Power
LARWQCB	Los Angeles Regional Water Quality Control Board
lb	Pound
LID	Low Impact Development
LSPC	Loading Simulation Program C++
MAR	Marine Habitat
MB	Manhattan Beach
MCM	Minimum Control Measure
MEP	Maximum Extent Practical
MIGR	Migration of Aquatic Organisms
min	Minute
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
MUN	Municipal and Domestic Supply
NAV	Navigation
NH3	Ammonia as N
NO3	Nitrate as N
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OM&R	Operations, Maintenance, and Replacement
PCB	Polychlorinated Biphenyl
PIPP	Public Information and Participation Program
RAA	Reasonable Assurance Analysis
RARE	Rare, Threatened, or Endangered Species
RB	Redondo Beach
REC-1	Water Contact Recreation
REC-2	Non-Contact Water Recreation
RWL	Receiving Water Limitation
SBPAT	Structural BMP Prioritization and Analysis Tool
SCCWRP	Southern California Coastal Watershed Research Project
SCPWA	Southern California Public Water Authority
SFPUC	San Francisco Public Utilities Commission
SHELL	Shellfish Harvesting
SMB	Santa Monica Bay
SMBBB	Santa Monica Bay Beaches Bacteria
SPWN	Spawning, Reproduction, and/or Early Development
SUSMP	Standard Urban Stormwater Management Program
SWMM	Storm Water Management Model, originally developed by USEPA
SWQDv	Storm Water Quality Design Volume
SWQPA	State Water Quality Protection Area
SWRCB	State Water Resources Control Board

TAC	Technical Advisory Committee
TCu	Total Copper
TKN	Total Kjeldahl Nitrogen as N
TP	Total Phosphorus
TPb	Total Lead
TIE	Toxicity Identification Evaluation
TLR	Total Load Reduction
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
TZn	Total Zinc
USEPA	United States Environmental Protection Agency
WARM	Warm Freshwater Habitat
WBPC	Water Body-Pollutant Combination
WDR	Waste Discharge Requirement
WER	Water Effects Ratio
WERF	Water Environment Research Foundation
WET	Wetland Habitat
WHAT	Web-Based Hydrograph Analysis Tool
WILD	Wildlife Habitat
WLA	Waste Load Allocation
WMA	Watershed Management Area
WMG	Watershed Management Group
WMMS	Watershed Management Modeling System
WMP	Watershed Management Program
WQBEL	Water Quality-Based Effluent Limitation

EXECUTIVE SUMMARY

PURPOSE AND OBJECTIVES

Following adoption of the 2012 Los Angeles Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit¹ (Permit), the Cities of Hermosa Beach, Manhattan Beach, Redondo Beach and Torrance, together with the Los Angeles County Flood Control District (LACFCD), collectively referred to as the Beach Cities Watershed Management Group (Beach Cities WMG) agreed to collaborate on the development of an Enhanced Watershed Management Program (EWMP) for the Santa Monica Bay (SMB) and Dominguez Channel Watershed areas within their jurisdictions (referred to herein as the Beach Cities EWMP Area). The Machado Lake Watershed is being addressed separately by the City of Torrance, and is not addressed in this EWMP².

This EWMP is intended to facilitate effective, watershed-specific Permit implementation strategies in accordance with Permit Part VI.C. Watershed Management Program. This EWMP:

- Summarizes watershed-specific water quality priorities identified by the Beach Cities WMG;
- Outlines the program plan, including specific strategies, control measures and best management practices (BMPs)³, necessary to achieve water quality targets (Water Quality-Based Effluent Limitations [WQBELs] and Receiving Water Limitations [RWLs]); and
- Describes the quantitative analyses completed to support target achievement and Permit compliance.

In compliance with Section VI.C.4.b of the Permit, the Beach Cities WMG submitted to the Los Angeles Regional Water Quality Control Board (LARWQCB) a Notice of Intent (NOI) (**Appendix A**) to develop an EWMP on June 28, 2013, with a revised NOI submitted December 17, 2013 in response to comments received from LARWQCB staff. On March 27, 2014, the Beach Cities WMG received a letter from the Executive Officer of the LARWQCB approving the revised NOI submittal.

¹ Order No. R4-2012-0175 NPDES Permit No. CAS004001 Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4.

² The City of Torrance developed a Special Study Work Plan for the Machado Lake Nutrient TMDL (City of Torrance, 2011) (**Appendix C**), which was approved by the LARWQCB. On January 28, 2015, the City of Torrance submitted to the LARWQCB the BMP Implementation Plan for the Machado Lake Nutrient and Toxics TMDL (City of Torrance, 2014). For reference, the Implementation Plan is attached to this EWMP as **Appendix D**, but it should be reviewed separately from this EWMP. A separate discussion of the Waltheria Basin is also attached as **Appendix E**. Previous work also includes the City of Torrance's Stormwater Quality Master Plan, which is included as **Appendix F**. LACFCD infrastructure in the Machado Lake Watershed is covered under this EWMP as explained in **Attachment G**.

³ For simplification, the term "BMP" will be used to collectively refer to strategies, control measures, and/or best management practices. The Permit also refers to these measures as Watershed Control Measures.

In compliance with Section VI.C.4.c.iv of the Permit, the Beach Cities WMG then submitted a draft EWMP Work Plan to the LARWQCB on June 26, 2014. LARWQCB comments were not received on the EWMP Work Plan; therefore work proceeded on EWMP development consistent with the approach outlined in the EWMP Work Plan. The Beach Cities WMG was required by Section VI.C.4.c.iv of the Permit to submit a draft EWMP no later than June 30, 2015. This document has been developed to serve as the Beach Cities Draft EWMP and is consistent with the Work Plan previously submitted to the LARWQCB.

Watershed Management Programs (WMPs) are a voluntary opportunity afforded by Section VI.C.1 of the Permit for Permittees to collaboratively or individually develop comprehensive watershed-specific control plans and are intended to facilitate Permit compliance and water quality target achievement. Enhanced WMPs (EWMPs) are WMPs which comprehensively evaluate opportunities for collaboration on multi-benefit regional projects that retain all non-stormwater runoff and runoff from the 85th percentile, 24 hour storm event while also achieving benefits associated with issues such as flood control and water supply. Where it is not feasible for regional projects to retain the 85th percentile 24 hour storm, the EWMP must demonstrate through a Reasonable Assurance Analysis, that applicable water quality targets should be achieved. Permittees within the Beach Cities Watershed Management Area (WMA) have elected to prepare an EWMP. The EWMP allows Permittees to collaboratively or individually develop comprehensive watershed-specific control plans which a) prioritize water quality issues, b) identify and implement focused strategies, control measures and BMPs, c) execute an integrated monitoring and assessment program, and d) allow for modification over time. In general, WMPs and EWMPs are intended to facilitate Permit compliance and water quality target achievement and goals that: 1) discharges from covered MS4s achieve applicable WQBELs and RWLs and do not include prohibited non-stormwater discharges; and 2) control measures are implemented to reduce the discharge of pollutants to the maximum extent practicable (MEP). Per Permit Section VI.C.1.e, WMPs and EWMPs are to be developed based on the LARWQCB's WMAs or subwatersheds thereof.

Consistent with Permit requirements, this EWMP is written to:

1. Be consistent with Permit provisions for EWMPs in Part VI.C.1.a.-f and Part VI.C.5-C.8;
2. Incorporate applicable State agency input on priority setting and other key implementation issues;
3. Provide for meeting water quality standards and other Clean Water Act obligations;
4. Include multi-benefit regional projects which retain stormwater from the 85th percentile 24 hour storm where feasible;
5. Include watershed control measures which achieve compliance with all interim and final WQBELs in drainage areas where retention of the 85th percentile 24 hour storm is infeasible with reasonable assurance;
6. Maximize the effectiveness of funding;
7. Incorporate effective innovative technologies;

8. Ensure existing requirements to comply with technology based effluent limitations and core requirements are not delayed; and
9. Ensure a financial strategy is in place.

This EWMP is applicable to the Beach Cities WMG EWMP Area, which consists of all of the incorporated MS4 areas of the cities of Redondo Beach, Manhattan Beach, Hermosa Beach and Torrance (excluding the Machado Lake Watershed) and includes the infrastructure of the LACFCD within those jurisdictions (**Figure ES-1**). This area includes portions of two distinct HUC-12 watersheds⁴, Santa Monica Bay Watershed and Dominguez Channel Watershed, as summarized in **Table ES-1**. The Wylie Sump, Bishop Montgomery Basin, and Ocean Basin are all retention basins with no outlet. Therefore, their drainage areas have been excluded from the EWMP, with no analyses required.

- The western portion of the Beach Cities EWMP Area consists of approximately 7,840 acres of land that drains to Santa Monica Bay (SMB). This accounts for 52% of the total Beach Cities WMG area, and includes portions of the cities of Manhattan Beach, Redondo Beach, and Torrance, and the entirety of the City of Hermosa Beach. This portion of the study area is hereinafter referred to as the “SMB Watershed”.
- The northeastern portion of the Beach Cities EWMP Area is tributary to Dominguez Channel (including Torrance Carson Channel) and is comprised of approximately 7,380 acres of land. This watershed accounts for 48% of the total Beach Cities EWMP Area, and includes portions of the cities of Manhattan Beach, Redondo Beach, and Torrance. Storm drains from the Cities of Manhattan Beach and Redondo Beach drain through the City of Lawndale before discharging to Dominguez Channel. The City of Torrance’s MS4 discharges directly to Dominguez Channel and Torrance Carson Channel (Torrance Lateral). Collectively, this portion of the study area is hereinafter referred to as the “Dominguez Channel Watershed”.

⁴ A HUC-12 watershed is defined by a 12-digit hydrologic unit code (HUC) delineation, which identifies the watershed area based on six levels of classification: regional, sub-region, hydrologic basin, hydrologic sub-basin, watershed, and subwatershed.

Table ES-1. Beach Cities WMG Area Distribution by Participating Agency

Participating Agency	Area (acres)		
	Santa Monica Bay Watershed	Dominguez Channel Watershed	Total EWMP Area (% of total)
City of Redondo Beach	2,614	1,217	3,831 (25%)
City of Manhattan Beach	2,078	350	2,428 (16%)
City of Hermosa Beach	832	-	832 (5%)
City of Torrance	2,314	5,812	8,126 (53%)
Total	7,837	7,379	15,217 (100%)

The EWMP approach, including model selection, data inputs, critical condition selection, calibration performance criteria, and output types is consistent with the LARWQCB Reasonable Assurance Analysis Guidance Document (LARWQCB, 2014) and also leverages previous efforts where relevant models have already been developed. The individual water quality targets, BMPs, Reasonable Assurance Analyses, schedules, and costs for each of the watersheds are summarized in watershed-specific sections that follow.

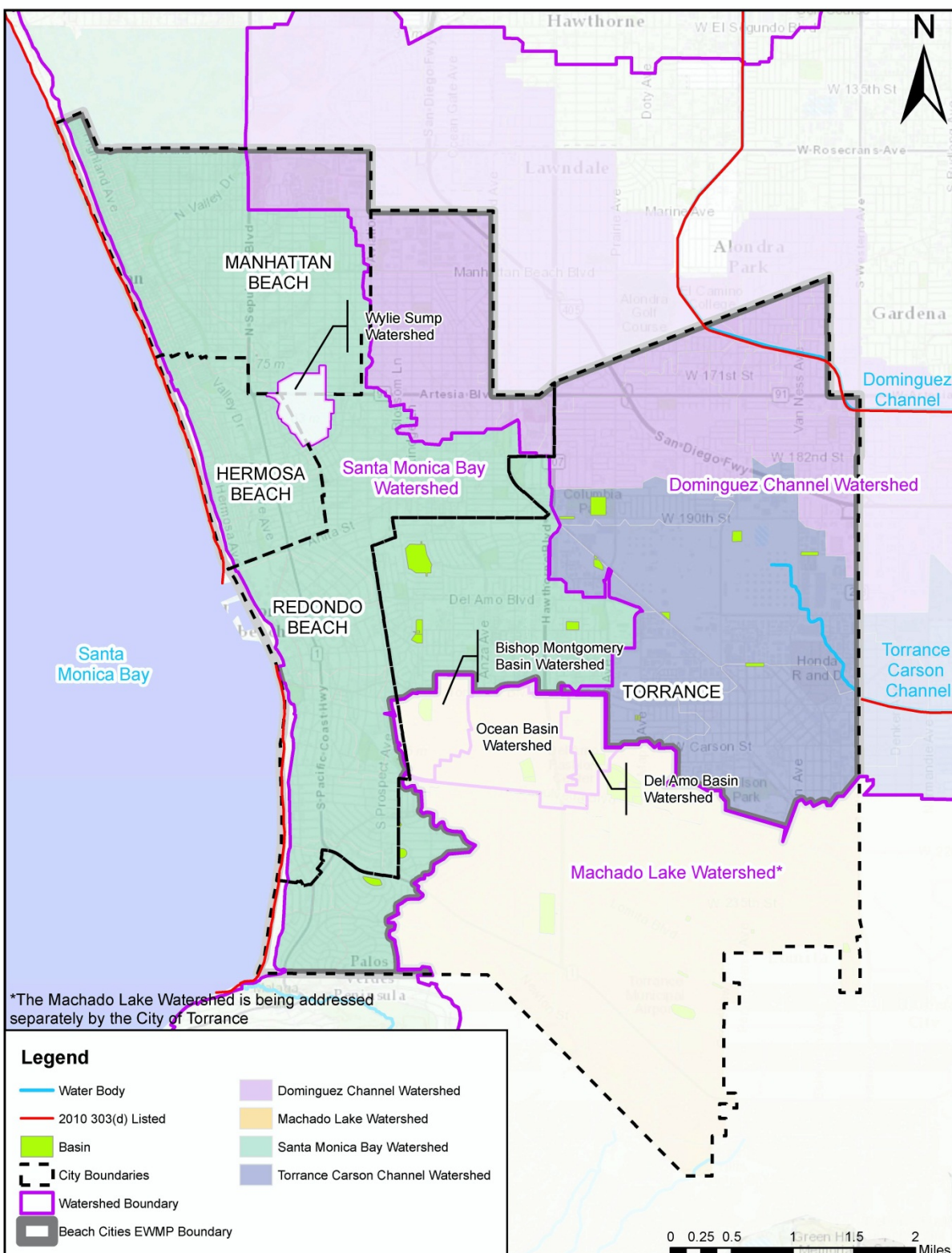


Figure ES-1. Beach Cities EWMP Area

SANTA MONICA BAY WATERSHED

Receiving waters for stormwater runoff from the Beach Cities EWMP Area were screened for water quality priorities by reviewing Total Maximum Daily Loads (TMDLs), the State's 303(d) list, and additional water quality data. Each identified water quality priority for a given receiving water body was categorized as a water body-pollutant combination. Water body-pollutant combinations were classified into one of three categories, in accordance with Section VI.C.5(a).ii of the Permit. **Table ES-2** presents the prioritized water body-pollutant combinations within the SMB Watershed portion of the Beach Cities EWMP Area. Water body-pollutant combinations categorized below are subject to change based on future data collected as part of the Coordinated Integrated Monitoring Program (CIMP) or other monitoring program.

Table ES-2. Water Body-Pollutant Combination Prioritization for the Santa Monica Bay Watershed

Category	Water Body	Pollutant	Reason/Justification
1: Highest Priority	Santa Monica Bay Beaches	Dry Weather Bacteria	SMB Beaches Dry Weather Bacteria TMDL
		Wet Weather Bacteria	SMB Beaches Wet Weather Bacteria TMDL
	Santa Monica Bay	Trash/Debris	SMB Debris TMDL
		DDTs	SMB PCBs and DDT TMDL
		PCBs	SMB PCBs and DDT TMDL
2: High Priority	N/A	None	No other 303(d) listings exist for the Beach Cities portion of SMB
3: Medium Priority	N/A	None	Outfall and receiving water monitoring data are not available for the Beach Cities portion of SMB

The Reasonable Assurance Analysis was performed on bacteria in each of the defined analysis regions (**Figure ES-2**), as it was the controlling pollutant within the SMB Watershed. Bacteria targets are summarized in **Table ES-3**.

The MS4 compliance targets for dichloro-diphenyl-trichloroethanes (DDTs) and polychlorinated biphenyls (PCBs) established in the Santa Monica Bay DDT & PCB TMDL were based on the assumption that the existing stormwater pollutant loads for DDT and PCBs were lower than what was needed to protect the Santa Monica Bay from these legacy pollutants (i.e., based on data used in the TMDL, no MS4 pollutant load reduction is expected to be required). Therefore, no reductions in DDT and PCB loading from the Beach Cities WMG MS4s are required to meet the TMDL and therefore, no Reasonable Assurance Analysis is required.

Trash was not modeled as part of the Reasonable Assurance Analysis, instead the Reasonable Assurance Analysis describes how the Beach Cities WMG Agencies will comply with the TMDL through their Trash Monitoring and Reporting Programs which are aimed at meeting the zero trash discharge definition in the TMDL.

Table ES-3. Water Quality Targets for the Santa Monica Bay Watershed

Water Body	Pollutant	RWL/WQBEL from the Permit	Note on Modeling Assumptions
Santa Monica Bay Beaches	Fecal Coliform (modeled as surrogate for all three fecal indicator bacteria in the Santa Monica Bay Beaches Bacteria [SMBBB] TMDL)	Allowable Exceedance Days per season per year (varies by beach Compliance Monitoring Location)	Used 90 th percentile rain year (based on wet days) as the critical condition. Accounted for site-specific exceedance rates and the number of discharge days modeled for each Compliance Monitoring Location.

2015

Targets – Santa Monica Bay

Target load reductions (TLRs) represent a numerical expression of the Permit compliance metrics that can be modeled and can serve as a basis for confirming, with reasonable assurance, that implementation of the proposed BMPs will result in attainment of the applicable TMDL-based WQBELs and RWLs in the Permit for Category 1 pollutants, or the Water Quality Objectives for Category 2 and Category 3 pollutants. For bacteria the target load reductions are expressed as Allowable Exceedance Days (AEDs) per year. TLRs for both interim and final compliance deadlines are presented for all analysis regions including both open beach and point zero compliance monitoring locations (CMLs) (Table ES-4).

Table ES-4. TLRs for Fecal Coliform in the Santa Monica Bay Watershed

Analysis Region	Baseline Annual Load (10 ¹² Most Probable Number [MPN])	Interim Target Load Reduction		Final Target Load Reduction	
		Absolute (10 ¹² MPN)	% of baseline annual load	Absolute (10 ¹² MPN)	% of baseline annual load
SMB-5-01 ¹	7.4	Interim target load reduction assessed on a watershed-wide basis	13%	0	0%
SMB-0-06	23.0			0	0%
SMB-5-02	534.8			247.6	46.3%
SMB-5-02/SMB-5-03 ²	34.9			0	0%
SMB-5-03 ¹	29.0			0	0%
SMB-5-03/SMB-5-04 ²	89.3			0	0%
SMB-5-04 ¹	17.1			0	0%
SMB-5-04/SMB-5-05 ²	8.2			0	0%
SMB-5-05 ¹	182.8			0	0%
SMB-5-05/SMB-6-01 ²	6.7			0	0%
SMB-6-01 ³	706.6			312.1	44.2%
BCSump ³	379.4			178.0	46.9%
SMB-6-01/ SMB-6-02 ²	162.5			0	0%
SMB-6-02 ¹	99.6			0	0%
SMB-6-03	62.2			0	0%
SMB-6-04	209.9			0	0%
SMB-6-05 ¹	90.9			0	0%
SMB-0-08	138.9			0	0%
SMB-6-06 ¹	6.7			0	0%
SMB Watershed-Wide	3875.9	368.9	13%	737.7	26%

¹ Anti-degradation site

² For the unmonitored tributary areas located in-between the CML tributary areas, TLRs were assigned from the geographically smaller of the two adjacent CML analysis regions.

³ “BCSump” was defined as a separate analysis region for modeling purposes. The baseline load for “BCSump” analysis region was combined with the baseline load of the “SMB-6-01” analysis region to equal the total baseline load contributing to the SMB-6-01 CML (“SMB-6-01+BCSump”).

Nine CMLs were assigned zero TLRs to reflect their historic good water quality (consistent with anti-degradation-based wet weather allowable exceedance days). Although the SMBBB TMDL requires only the maintaining of beach water quality at anti-degradation compliance locations, the Beach Cities EWMP will seek to implement nonstructural and Low Impact Development (LID)-based BMPs within the SMB portion of their EWMP area; this will further protect and potentially improve water quality at these beaches and is consistent with the Jurisdictional Group 5 and 6 (J5&6) Implementation Plan (Geosyntec Consultants, 2011).

BMPs – Santa Monica Bay

EWMPs offer Permittees the opportunity to identify and implement focused strategies, control measures and BMPs to achieve applicable water quality targets (WQBELs and RWLs) and to reduce the discharge of pollutants to the maximum extent practicable. In order to demonstrate reasonable assurance, BMPs were identified and prioritized. Prioritization was based on cost (low cost BMPs were prioritized); BMP effectiveness for the pollutants of concern (BMPs that had greater treatment efficiency for the specific pollutants of concern were prioritized); and implementation feasibility as determined by the Beach Cities agencies. In general, nonstructural (e.g., programmatic) BMPs were prioritized over structural BMPs due to their lower relative cost.

The following is an overview of the types of BMPs contemplated in this EWMP within the Santa Monica Bay Watershed.

Programmatic BMPs: These source controls include a combination of BMPs such as new or enhanced pet waste controls (ordinance, signage, education/outreach, mutt mitts, etc.), Clean Bay Restaurant Program, human waste source tracking and remediation (e.g., leaking sewer investigations including implementation of each agency's Sanitary Sewer Management Plan consistent with Statewide Waste Discharge Requirements [WDRs], etc.), enhanced street sweeping (e.g., 100% vacuum sweepers, increased frequency, posting of 'No Parking' signs for street sweeping, etc.), increased catch basin and storm drain cleaning, and other new or enhanced nonstructural BMPs that target the pollutants addressed in this EWMP.

Public Retrofit Incentives: These BMPs include programs directed at incentivizing the public to decrease the amount of stormwater runoff from their property, specifically via downspout disconnection programs that redirect roof runoff to vegetated or otherwise pervious areas.

Redevelopment: Beginning in 2001, redevelopment projects were required by the Permit (via the Standard Urban Stormwater Management Program [SUSMP]) to incorporate stormwater treatment BMPs into their projects if their project size exceeded specified thresholds. The 2001 MS4 Permit SUSMP redevelopment requirements were applied between 2003 (the point at which the Bacteria TMDL was implemented) and 2015 for the SMB EWMP area. Additionally, the 2012 MS4 Permit established new criteria for redevelopment projects, requiring certain sized projects to capture, retain, or infiltrate the 85th percentile design storm or the 0.75-inch design storm, whichever is greater, via the implementation of LID BMPs. These were taken into account as well.

Non-MS4 Permitted Parcels or Areas: In general, this BMP assumes that regulated parcels/areas would be in compliance with the NPDES Statewide Storm Water Permit Waste Discharge

Requirements (WDRs) from State of California Department of Transportation (Order No. 2012-0011-DWQ, NPDES No. CAS000003) and the California NPDES General Permit for Storm Water Discharges Associated with Industrial Activities (Industrial General Permit [IGP], Order 2014-0057-DWQ).

Structural BMPs: Both existing and proposed regional and distributed structural BMPs are included in this EWMP to address water quality targets in the SMB Watershed. Because bacteria were identified as the controlling pollutant of concern, infiltration BMPs were prioritized as they are most effective for addressing bacteria. General design criteria for proposed structural BMPs are summarized in **Table ES-5**.

Table ES-5. Proposed Structural BMPs in the Santa Monica Bay Watershed

Analysis Region	Project Name	Description	Storage Volume (cu-ft)	Tributary Area (acres)
SMB-5-02	Manhattan Beach Infiltration Trench ²	Located along the coast of Manhattan Beach, the sub-surface trench has a potential surface area of 2 ac, an average depth of 2 ft with a diversion rate of 160 cfs and an infiltration rate under the trench of 13 in/hr.	198,000	1,475 ¹
SMB-5-02	Distributed Green Streets	The distributed green streets, proposed to address runoff from 5% of single family residential, multi-family residential, and commercial land uses, are assumed to have 6 in of ponding, 1.5 ft of amended soil, 3 in of mulch, and an infiltration rate of 0.15 in/hr.	205,500	66
SMB-6-01	Hermosa Beach Infiltration Trench	Located along the coast of Hermosa Beach, the sub-surface trench has a potential surface area of 0.2 ac, an average depth of 1.7 ft, a diversion flowrate of 25 cfs, and an infiltration rate of 12.5 in/hr.	13,300	2,000 ¹
SMB-6-01	Hermosa Beach Greenbelt Infiltration ²	Located in Hermosa Beach, between Valley Dr. and Ardmore Ave., the sub-surface trench has a potential surface area of 1.5 ac, an average depth of 5 ft, a diversion flowrate of 48 cfs, and an assumed infiltration rate of 12 in/hr.	319,000	1,800 ¹
SMB-6-01	Park #3	Located northwest of Blossom Lane and 190 th street, the sub-surface infiltration basin has a potential surface area of 0.5 ac, an average depth of 5ft, a diversion flowrate of 13 cfs, and an infiltration rate of 1 in/hr.	87,000	1,430 ¹

Analysis Region	Project Name	Description	Storage Volume (cu-ft)	Tributary Area (acres)
SMB-6-01	Distributed Green Streets	The distributed green streets, proposed to address runoff from 25% of single family residential, multi-family residential, and commercial land uses, are assumed to have 6 in of ponding, 1.5 ft of amended soil, 3 in of mulch, and an infiltration rate of 0.15 in/hr.	605,200	190

¹ This includes upstream BMPs and associated tributary drainage areas

² Alternative project locations have also been identified

Distributed green streets BMPs are proposed and were modeled as part of the Reasonable Assurance Analysis within select analysis regions, at analysis region-specific implementation levels (e.g., runoff from 14% of single family residential, multi-family residential, and commercial land uses would be treated by green streets BMPs). It should be noted that if at any time in the future, specific distributed green streets or regional/centralized BMPs are found to be infeasible for implementation, alternative BMPs or operational changes will be planned within the same subwatershed and within the same timeline, to meet an equivalent subwatershed load reduction. In addition, if monitoring data indicate that more easily implementable, alternative BMPs can provide equivalent (or superior) load reductions, these alternative BMPs may be implemented at the discretion of the WMG Agencies.

Demonstration of Compliance – Santa Monica Bay

To demonstrate wet weather compliance, a Reasonable Assurance Analysis was conducted in which the following steps were taken:

1. For each analysis region, develop TLRs for 90th percentile year based on Permit requirements and LARWQCB guidance;
2. Identify structural and non-structural BMPs that were either implemented after applicable TMDL effective dates or are planned for implementation in the future:
 - a. Assume a load reduction for non-modeled non-structural (or programmatic) BMPs (five percent of baseline pollutant load);
 - b. Calculate load reductions for public incentives for retrofits on private property (e.g., downspout disconnects) and redevelopment (e.g., low impact development requirements);
 - c. Calculate load reductions attributable to anticipated new permit compliance activities of non-MS4 Permittees (e.g., Industrial General Permit holders and California Department of Transportation [Caltrans]); and
 - d. Calculate load reductions for proposed regional BMPs that were identified in existing plans;
3. Compare total estimated load reduction for each analysis region with the TLRs; and

4. Meet the TLRs by backfilling the remaining load reduction with new regional or distributed green streets BMPs, and with green streets that address a certain percentage of specific developed land uses.

Results of the Reasonable Assurance Analysis for each analysis region in the SMB watershed are presented in **Table ES-6** below. The values provided correspond to the load reductions attributable to the BMP types following the applicable final and interim compliance deadlines. As shown, the final TLR is met in all SMB watershed analysis regions with varying applications of non-structural and regional BMPs. The interim 50% TLR is met through a combination of nonstructural and existing regional BMPs.

For dry weather bacteria compliance, a qualitative analysis was conducted to show compliance at each of the CMLs. Many CMLs have an effective diversion such that they are consistently operational, well maintained, and sized to effectively eliminate discharges to the surf zone during year-round dry weather days. For the remaining smaller outfalls a systematic screening conducted in 2002 demonstrated that there was no discharge to the wave wash during summer dry weather from these storm drains. Rescreening of outfalls will be conducted as part of the Non-Stormwater Screening and Monitoring in the Coordinated Integrated Monitoring Program and will include both summer dry weather and winter dry weather screening. For the CMLs in the SMB Watershed that have anti-degradation based allowed exceedance days for both winter-dry and summer-dry weather, reasonable assurance is assumed to be demonstrated through the basis that the TMDL established their allowed exceedance days based on historic conditions (i.e., no water quality improvements were necessary).

Table ES-6. Santa Monica Bay Watershed – Fecal Coliform Reasonable Assurance Analysis Results – Interim and Final Compliance

Analysis Region	Implementation Benefits (average load reduction as % of baseline load for critical year)							TLR	Compliance (TLR Met)?
	Non-Structural BMPs (Non-Modeled)	Public Retrofit Incentives + Redevelopment	Non-MS4	Regional BMPs	Distributed BMPs	Distributed BMP Implementation Level	Estimated Load Reduction		
SMB-5-01	5%	2%	0%	0%	0%	N/A	7%	0%	Yes
SMB-0-06	5%	2%	0%	0%	0%	N/A	7%	0%	Yes
SMB-5-02	5%	4%	2%	36%	3%	5% MFR/COM/SFR	50%	46%	Yes
SMB-5-02/5-03	5%	3%	0%	0%	0%	N/A	8%	0%	Yes
SMB-5-03	5%	3%	0%	0%	0%	N/A	8%	0%	Yes
SMB-5-03/5-04	5%	4%	0%	5%	0%	N/A	15%	0%	Yes
SMB-5-04	5%	5%	0%	1%	1% ²	N/A	12%	0%	Yes
SMB-5-04/5-05	5%	4%	0%	2%	0%	N/A	11%	0%	Yes
SMB-5-05	5%	4%	5%	3%	0%	N/A	18%	0%	Yes
SMB-5-05/6-01	5%	3%	0%	2%	0%	N/A	10%	0%	Yes
SMB-6-01+ BCSump ¹	5%	3%	3%	33%	2%	25% MFR/COM/SFR	46%	45%	Yes
SMB-6-01/6-02	5%	2%	4%	0%	0%	N/A	11%	0%	Yes
SMB-6-02	5%	3%	1%	4%	0%	N/A	13%	0%	Yes
SMB-6-03	5%	3%	5%	10%	0%	N/A	23%	0%	Yes
SMB-6-04	5%	4%	3%	0%	0%	N/A	12%	0%	Yes
SMB-6-05	5%	3%	6%	0%	0%	N/A	15%	0%	Yes
SMB-0-08	5%	2%	0%	0%	0%	N/A	7%	0%	Yes
SMB-6-06	5%	5%	0%	0%	0%	N/A	10%	0%	Yes
Final Compliance Deadline (2021)	5%	3%	3%	21%	1%	N/A	33%	26%	Yes
Interim Compliance Deadline (2018)	2.5%	0.8%	1.5%	9.6%	0%	N/A	14.4%	13%	Yes

¹ “BCSump” was defined as a separate analysis region for modeling purposes. The baseline load for “BCSump” analysis region was combined with the baseline load of the “SMB-6-01” analysis region to equal the total baseline load contributing to the SMB-6-01 CML (“SMB-6-01+BCSump”).

² Distributed green street BMP load reduction in SMB-5-04 is a result of the existing filter/infiltration boxes retrofitted on the east side of Hermosa Avenue in the City of Hermosa Beach.

Schedule – Santa Monica Bay

In order to meet the compliance deadlines for the water body-pollutant combinations discussed above based on load reduction projections in the Reasonable Assurance Analysis, the proposed structural BMPs within the SMB Watershed would be implemented as described in **Figure ES-3**.

Figure ES-3. Proposed Project Sequencing in the Santa Monica Bay Watershed

Project Name	Timeline						
	2015	2016	2017	2018	2019	2020	2021
Catch basin retrofits							
Manhattan Beach Infiltration Trench*							
Green streets application in SMB-5-02							
Hermosa Beach Greenbelt Infiltration*							
Hermosa Beach Infiltration Trench							
Park #3							
Green streets application in SMB-6-01							

* Alternative project locations have also been identified

DOMINGUEZ CHANNEL WATERSHED

Within the Dominguez Channel Watershed, water body-pollutant combinations were classified into one of three categories, in accordance with Section VI.C.5(a).ii of the Permit. **Table ES-7** presents the prioritized water body-pollutant combinations within the Dominguez Channel Watershed portion of the Beach Cities EWMP Area. Water body-pollutant combinations categorized below are subject to change based on future data collected as part of the CIMP or other monitoring program.

Table ES-7. Water Body-Pollutant Prioritization for the Dominguez Channel Watershed

Category	Water Body	Pollutant	Reason for Categorization
1: Highest Priority	Dominguez Channel (including Torrance Lateral)	Toxicity	Dominguez Channel Toxics TMDL
		Total Copper	Dominguez Channel Toxics TMDL
		Total Lead	Dominguez Channel Toxics TMDL
		Total Zinc	Dominguez Channel Toxics TMDL
2: High Priority	Dominguez Channel (including Torrance Lateral)	Indicator Bacteria	303(d) List
3: Medium Priority	Dominguez Channel (including Torrance Lateral)	Cyanide	Historic exceedances of the California Toxics Rule (CTR) continuous concentration water quality objective (5.2 ug/L)
		pH	Historic exceedance of the Basin Plan Objective (6.5 – 8.5)

Category	Water Body	Pollutant	Reason for Categorization
		Selenium	Historic exceedances of the CTR continuous concentration water quality objective (5.0 ug/L)
		Mercury	Historic exceedances of the CTR human health criterion for organisms only (0.051 ug/L)
		Cadmium	Historic exceedances of the CTR continuous concentration water quality objective (2.2 ug/L)

For the purposes of the wet weather Reasonable Assurance Analysis, the EWMP area draining to Dominguez Channel was combined into a single analysis region to establish TLRs and into two analysis regions, one including the portion of the Cities of Redondo Beach and Manhattan Beach (Dominguez Channel – Redondo Beach/Manhattan Beach [DC-RB/MB]) and one including the portion of the City of Torrance (DC – Torrance), to evaluate the performance of BMPs. For the purposes of the dry weather Reasonable Assurance Analysis for which bacteria are the only water body-pollutant combination, the EWMP area draining to Dominguez Channel was combined into the same single analysis region. The Dominguez Channel watershed analysis regions are shown in **Figure ES-4**.

The wet weather Reasonable Assurance Analysis was performed on copper, lead, zinc, and bacteria (fecal coliform) within the Dominguez Channel Watershed. Water quality targets were identified for Dominguez Channel watershed in the same manner as in SMB Watershed. The water quality targets for prioritized water body-pollutant combinations are summarized in **Table ES-8** below.

Table ES-8. Water Quality Targets for the Dominguez Channel Watershed

Water Body	Pollutant	RWL/WQBEL from the Permit or Assumed Based on Other Similar Los Angeles Region TMDLs	Approach for Applying the Critical Period
Dominguez Channel	Fecal Coliform	19% allowed exceedance of the REC-1 water quality objective, (400 MPN/100mL) on non-high flow suspension days	90th percentile year (based on wet days) was used as the critical condition. Allowable number of wet weather exceedance days for the critical year was set to 19% of non-high flow suspension wet days, rounding down.
	Total Copper	WQBEL=9.7 ug/L Waste load allocation (WLA)= Concentration*Daily Volume	90th percentile daily load during wet weather was used as the critical condition. This calendar day was identified for each metal by ranking daily loads for metal wet days between 2003 and 2012.
	Total Lead	WQBEL=42.7 ug/L WLA= Concentration*Daily Volume	
	Total Zinc	WQBEL=69.7 ug/L WLA= Concentration*Daily Volume	

Although toxicity was identified as a Category 1 water body-pollutant combination, it was not modeled for Dominguez Channel and the Torrance Lateral since it is not a wet weather parameter that can be modeled using currently available Reasonable Assurance Analysis tools for the Los Angeles Region. Instead, the Reasonable Assurance Analysis qualitatively describes how the Beach Cities WMG Agencies will comply with the TMDL WQBELs. Toxicity will continue to be monitored

under the Beach Cities' CIMP. Although ammonia was identified as a Category 2 water body-pollutant combination, monitoring data since 2003 show that all water quality samples at monitoring locations S28 and TS19 meet the freshwater Basin Plan Objective for ammonia, and as a result, ammonia was not modeled as part of the Beach Cities' Reasonable Assurance Analysis. Similarly, the Category 3 water body-pollutant combinations cyanide, pH, selenium, mercury, and cadmium, all within the Torrance Lateral, were not modeled either due to a lack of demonstrated MS4 linkage or due to data limitations. These parameters will be monitored under the Beach Cities' CIMP and if future monitoring data suggest that the Beach Cities' MS4s may cause or contribute to cadmium exceedances in the receiving water, the EWMP will be revised to address these pollutants.

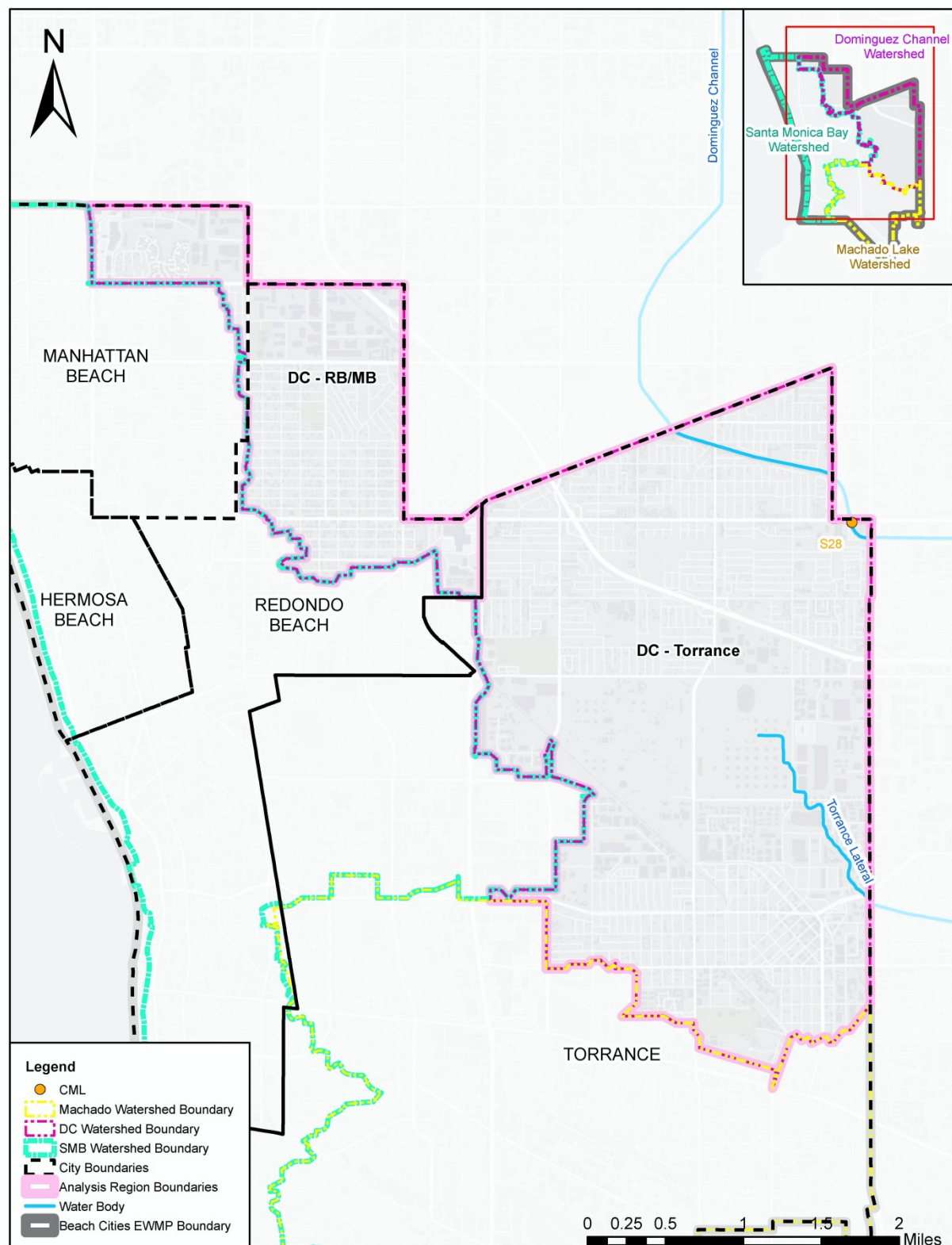


Figure ES-4. Analysis Regions within the Dominguez Channel Watershed portion of the Beach Cities EWMP Area

Targets – Dominguez Channel

As discussed previously, TLRs represent a numerical expression of the Permit compliance metrics (e.g., allowed mass per day for metals for wet weather and allowable exceedance days per year for bacteria) that can be modeled and can serve as a basis for confirming, with reasonable assurance, that implementation of the proposed BMPs will result in attainment of the applicable TMDL-based WQBELs and RWLs in the Permit for Category 1 pollutants, or the Water Quality Objectives for Category 2 and Category 3 pollutants. TLRs were developed for the single combined analysis region (**Table ES-9**).

Table ES-9. TLRs for the Dominguez Channel Watershed

Pollutant	Compliance Deadline	Units	Baseline Annual Load	Interim Target Load Reductions		Final Target Load Reductions	
				Absolute	% of baseline annual load	Absolute	% of baseline annual load
Copper	2032	lb	21	N/A		13	62%
Lead	2032	lb	8.7			0	0%
Zinc	2032	lb	230			175	76%
Fecal coliform	2022	10 ¹² MPN	1,498	124	8.3%	-	-
	2027	10 ¹² MPN	1,498	255	17%	-	-
	2032	10 ¹² MPN	1,498	-	-	493	33%

BMPs – Dominguez Channel

Both existing and proposed regional and distributed BMPs are included in this EWMP to address water quality targets in the Dominguez Channel Watershed. Distributed green streets BMPs are proposed and were modeled as part of the Reasonable Assurance Analysis within the DC-RB/MB analysis region, at an implementation level of 14% (i.e., runoff from 14% of single family residential, multi-family residential, commercial, and industrial land uses would be treated by green streets BMPs). General design criteria for proposed structural BMPs are summarized in **Table ES-10**.

Table ES-10. Proposed Structural BMPs in the Dominguez Channel Watershed

Analysis Region	Project Name	Description	Storage Volume (cu-ft)	Tributary Area (acres)
DC – MB/RB	Powerline Easement Infiltration*	Located along powerline easements and/or adjacent to Marine Avenue and Manhattan Beach Boulevard, the sub-surface biofilter has a potential surface area of 7.2 ac, an average depth of 5 ft, a diversion flowrate of 132 cfs, and a negligible infiltration rate.	N/A (Flow-through BMP)	1,500
DC – MB/RB	Artesia Blvd. and Hawthorne Blvd. Filtration	Located near the intersection of Artesia Blvd. and Hawthorne Blvd., the sub-surface biofilter has a potential surface area of 1 ac, an average depth of 5 ft, a diversion flowrate of 13.6 cfs, and a negligible infiltration rate.	N/A (Flow-through BMP)	130
DC- MB/RB	Distributed Green Streets BMPs	The distributed green streets (to address runoff from 14% of single family residential, multi-family residential, commercial, and industrial land uses) are assumed to have 6 in of ponding, 1.5 ft of amended soil, 3 in of mulch, and an infiltration rate of 0.15 in/hr.	636,300	200
DC- Torrance	Catch Basin Inlet Filters	The City of Torrance plans to retrofit catch basins with inlet filters.	N/A	5,760

*Alternative project location has also been identified

It should be noted that if at any time specific distributed green streets or regional/centralized BMPs are found to be infeasible for implementation, or new innovative BMPs are developed, alternative BMPs or operational changes will be planned within the same analysis region and within the same timeline, to meet an equivalent analysis region load reduction. The performance of the proposed catch basin inlet filters within the City of Torrance will also be evaluated as potential alternatives to the proposed structural BMPs within the Cities of Redondo Beach and Manhattan Beach.

Demonstration of Compliance – Dominguez Channel

To demonstrate wet weather compliance, the Reasonable Assurance Analysis was performed according to the following steps:

1. For each analysis region, develop TLRs for the critical condition (90th percentile year for bacteria and 90th percentile load day for metals) based on Permit requirements and LARWQCB guidance;
2. Identify structural and non-structural BMPs that were either implemented after applicable TMDL effective dates or are planned for implementation in the future:
 - a. Assume a load reduction for non-modeled non-structural (or programmatic) BMPs (five percent of baseline pollutant load);
 - b. Calculate load reductions for public incentives for private retrofit (e.g., downspout disconnects) and redevelopment;
 - c. Calculate load reductions attributable to anticipated new permit compliance activities of non-MS4 entities (e.g., Industrial General Permit holders and Caltrans); and
 - d. Calculate load reductions for proposed regional BMPs that were identified in existing plans;
3. Compare total estimated load reduction for each analysis region with the TLRs; and
4. Meet the TLRs by backfilling the remaining load reduction with new regional or distributed green streets BMPs, with green streets modeled by assuming treatment of runoff from a percentage of specific developed land uses. Within the DC-Torrance analysis region, an estimated load reduction attributable to distributed catch basin inlet filters was derived from a review of literature/studies on their performance (**Appendix B**). If the estimated performance is supported by future monitoring data, these filters may be used as alternative BMPs in other portions of the Dominguez Channel Watershed.

Results of the wet weather Reasonable Assurance Analysis for each analysis region are presented in **Table ES-11** below. The values provided correspond to the load reductions attributable to the BMP types following the applicable compliance deadline. As shown, the TLRs are predicted to be met in the DC-RB/MB analysis region for metals and fecal coliforms with varying applications of non-structural and regional BMPs as described previously. Within the DC-Torrance analysis region, the TLRs will be met through implementation of catch basin inlet filters as needed. Monitoring and subsequent adaptive management will be employed to evaluate the achieved load reductions prior to each of the compliance deadlines, installing additional filters as needed until compliance is achieved for every applicable WQBEL or RWL.

For dry weather, bacteria is the only applicable pollutant in the Dominguez Channel watershed, and it is a Category 2 water body-pollutant combination (i.e., 303(d)-listed but not currently subject to a TMDL).

The City of Torrance's dry weather load reduction strategy will focus on non-structural source control and pollution prevention measures that are designed to reduce the amount of pollutants and understand the effect of pollutants entering runoff through education, enforcement and behavioral modification programs.

Within the Cities of Redondo Beach and Manhattan Beach, the implementation of the two regional BMPs at both outlets from the DC-RB/MB analysis region to address wet weather pollutants will control dry weather flows by capturing the small flows in the pre-treatment volume and either retaining them or treating them in the media filter.

In addition, each of the EWMP WMG cities has water conservation regulations which will reduce dry weather runoff at its source. Collectively, by controlling dry weather MS4 flows prior to entering Dominguez Channel using the proposed suite of BMPs, bacteria will be addressed. If necessary, the EWMP Group agencies retain the option of installing low flow diversions sized to effectively eliminate discharges to the receiving water year-round dry weather days. Therefore, reasonable assurance of meeting the applicable RWLs was demonstrated in this EWMP through a qualitative assessment of the proposed BMPs and their overall approach of eliminating or substantially reducing MS4 discharges during dry weather.

Table ES-11. Dominguez Channel Watershed – Reasonable Assurance Analysis Results – Interim and Final Compliance

Pollutant	Date	Implementation Benefits (average load reduction as % of baseline for the critical condition ¹)							TLR	Compliance (TLR Met)?
		Non-Structural BMPs (Non-Modeled)	Public Retrofit Incentives + Redevelopment	Non-MS4	Regional BMPs	Distributed BMPs	Distributed BMP Implementation Level	Estimated Load Reduction		
Analysis Region DC-RB/MB										
Zinc	2032 (Final)	5%	9%	6%	39%	20%	14% SFR, MFR, COM, IND	79%	76%	Yes
Copper	2032 (Final)	24% ²	0%	5%	30%	26%		85%	62%	Yes
Fecal coliform	2022 (Interim)	2.1%	1.5%	0.7%	0%	4.1%	3% SFR, MFR, COM, IND	8.4%	8.3%	Yes
	2027 (Interim)	3.5%	2.4%	1.3%	0%	10%	7% SFR, MFR, COM, IND	17%	17%	Yes
	2032 (Final)	5%	3.2%	1.8%	45%	20%	14% SFR, MFR, COM, IND	74%	33%	Yes
Analysis Region DC-Torrance										
Zinc	2032 (Final)	5%	0%	0%	0%	75% per filter	Catch basin inlet filters	See note 3	76%	See note 3
Copper	2032 (Final)	14% ²	0%	0%	0%	75% per filter	Catch basin inlet filters	See note 3	62%	See note 3
Fecal coliform	2022 (Interim)	2.1%	0%	0%	0%	33% per filter	Catch basin inlet filters	See note 3	8.3%	See note 3
	2027 (Interim)	3.5%	0%	0%	0%	33% per filter	Catch basin inlet filters	See note 3	17%	See note 3
	2032 (Final)	5%	0%	0%	0%	33% per filter	Catch basin inlet filters	See note 3	33%	See note 3

¹ The critical condition is TMDL year 1995 for fecal coliform, 11/30/2007 for copper, 2/5/2010 for lead, and 2/26/2006 for zinc.

² Load reduction attributable to copper brake pad phase-out, after accounting for other BMPs, up to 55%.

³ Load reduction sum cannot be estimated at this time. The individual load reduction for each inlet filter's drainage area is shown under the "Distributed BMPs" column. Initially, 200 of 643 catch basins are planned to be retrofitted in high priority catchments. Therefore, the total load reduction from inlet filters will be evaluated in the future through monitoring, and the BMPs will be modified through the adaptive management process, with additional filters installed as necessary to meet the TLRs by the compliance deadlines.

Schedule – Dominguez Channel

In order to meet the compliance deadlines for the water body-pollutant combinations based on load reduction projections in the Reasonable Assurance Analysis, the proposed structural BMPs within the Dominguez Channel Watershed would be implemented per the timeline provided in **Figure ES-5**.

Figure ES-5 Project Sequencing in the Dominguez Channel Watershed

Project Name	Timeline															
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Catch basin inlet filters in DC-Torrance																
Green streets application in DC-RB/MB																
Powerline Easement Filtration*																
Artesia Boulevard and Hawthorne Boulevard Filtration																

*Alternative project location has also been identified

COMPLIANCE SCHEDULE

Table ES-12 summarizes the existing and proposed implementation actions and dates within the Santa Monica Bay and Dominguez Channel watersheds, for each identified water body-pollutant combination. The compliance schedule for Category 1 water body-pollutant combinations is consistent with the associated TMDLs. The compliance schedule for the Category 2 water body-pollutant combinations has been selected to achieve the proposed wet and dry weather bacteria milestones, with implementation actions not exceeding one year, in accordance with the Permit (Section ii(5)9B). As described in **Table ES-12**, the compliance schedule for the Category 3 water body-pollutant combinations will be dependent on the results of the CIMP.

Table ES-12. Compliance Schedule for the Santa Monica Bay and Dominguez Channel Watersheds

Category	Watershed	Pollutant(s)	Wet/Dry Weather	Date	Implementation Action
1: Highest Priority	Dominguez Channel	Toxicity Total Copper Total Lead Total Zinc	Wet	Current	Interim: Comply with the interim water quality-based effluent limitations as listed in the TMDL
				March 2032	Final: Comply with the final water quality-based effluent limitations as listed in the TMDL
	Santa Monica Bay	Bacteria	Dry	N/A	Final compliance in effect and attained through diversions and non-structural BMPs.
			Wet	July 2018	Interim: 50% single sample ED reduction
				July 2021	Final: Geometric Mean [GM] targets met Final: Single sample AED targets met
		Trash/Debris	N/A	March 2016	Interim: 20% load reduction met through implementation of trash excluders
				March 2017	Interim: 40% load reduction met through implementation of trash excluders
				March 2018	Interim: 60% load reduction met through implementation of trash excluders
				March 2019	Interim: 80% load reduction met through implementation of trash excluders
				March 2020	Final: 100% load reduction met through implementation of trash excluders
		DDTs	N/A	N/A	Since the TMDL effectively implements an anti-degradation approach (i.e., historic low MS4 concentrations or loads must be kept the same or lower), and the Beach Cities EWMP Agencies are currently presumed to be achieving the WLAs (thus negating the need for Reasonable Assurance Analysis), no compliance schedule is proposed.
		PCBs	N/A	N/A	
2: High Priority	Dominguez Channel	Bacteria	Dry	December 2023	Interim: 50% load reduction
				December 2025	Final: 100% compliance may be demonstrated by the Permittee in one of three ways: 1. Meeting the allowed exceedance days (5 days during the dry weather period); or 2. Meet the allowed exceedance percentage (1.6% during a dry weather period) within the total drainage area served by the MS4. 3. Diversions are in place such that they are consistently operational, well maintained, and sized to effectively eliminate discharges to the receiving water year-round dry weather days.
			Wet	December 2016	Provide documentation supporting minimum control measure (MCM) enhancements implemented over the past year
				December 2017	Provide documentation supporting MCM enhancements implemented over

Category	Watershed	Pollutant(s)	Wet/Dry Weather	Date	Implementation Action
					the past year
				December 2018	Identify planned green streets locations to treat runoff from 3% of SFR, MFR, COM, and IND land uses in cities of Redondo Beach and Manhattan Beach.
				December 2019	City Council approval of Plans & Specifications for green streets to treat runoff from 3% of SFR, MFR, COM, and IND land uses in cities of Redondo Beach and Manhattan Beach. Begin installation of catch basin inlet filters in the DC-Torrance analysis region.
				December 2020	Develop concept reports for regional BMPs in the cities of Redondo Beach and Manhattan Beach. Begin construction on green streets to treat runoff from 3% of SFR, MFR, COM, and IND land uses in cities of Redondo Beach and Manhattan Beach.
				December 2021	Submit grant application for any one of the proposed regional projects in the cities of Redondo Beach and Manhattan Beach.
				December 2022	Interim Milestone: 25% of target load reduction
				December 2023	Identify planned green streets locations to treat runoff from an additional 4% (7% total) of SFR, MFR, COM, and IND land uses in cities of Redondo Beach and Manhattan Beach.
				December 2024	Begin construction on planned green streets to treat runoff from an additional 4% (7% total) of SFR, MFR, COM, and IND land uses in cities of Redondo Beach and Manhattan Beach. Continue installation of catch basin inlet filters in the DC-Torrance analysis region.
				December 2025	Release Request for Proposals for regional BMP designs in Redondo Beach and/or Manhattan Beach
				December 2026	Complete construction on planned green streets to treat runoff from an additional 4% (7% total) of SFR, MFR, COM, and IND land uses in cities of Redondo Beach and Manhattan Beach.
				December 2027	Interim Milestone: 50% of target load reduction
				December 2028	Produce regional BMP design reports; identify locations for green streets implementation to treat runoff from an additional 7% (14% total) of SFR, MFR, COM, and IND land uses in the cities of Redondo Beach and Manhattan Beach.
				December 2029	Begin regional BMP permitting process for project in Redondo Beach or Manhattan Beach.
				December 2030	Begin construction on planned green streets to treat runoff from an additional 7% (14% total) of SFR, MFR, COM, and IND land uses in the cities

Category	Watershed	Pollutant(s)	Wet/Dry Weather	Date	Implementation Action
					of Redondo Beach and Manhattan Beach.
				December 2031	Begin regional BMP construction of project in Redondo Beach or Manhattan Beach.
				December 2032 ¹	Final Milestone: 100% compliance may be demonstrated by the Permittee in one of three ways: 1. Meeting the allowed exceedance days (10 days during a wet weather period, plus high flow suspension days) 2. Meeting the target load reduction (33%); or 3. Meeting the allowed exceedance percentage (19% during a wet weather period) within the total drainage area served by the MS4.
3: Medium Priority	Dominguez Channel	Cyanide pH Selenium Mercury Cadmium	N/A	N/A	As required by the Permit, monitoring for these pollutants will occur under the CIMP. If monitoring data suggest that the Beach Cities Agencies' MS4s may cause or contribute to exceedances of these pollutants in the receiving water, ² these contributions will be addressed through modifications to the EWMP as a part of the adaptive management process, as described in Permit section VI.C.2.a.iii.

¹ The final compliance date for wet weather bacteria was selected to be consistent with the Dominguez Channel and Greater Los Angeles and Long Beach Harbor waters Toxic Pollutants TMDL (RWQCB, 2011).

² This will be assumed to be the case if monitoring data show that outfall concentrations and receiving water concentrations are in excess of the applicable water quality criteria for the same monitoring event.

PLANNING LEVEL COST OPINION

Planning-level cost opinions associated with implementation of the proposed structural best management practices within the Beach Cities WMG area are provided based on results from the Reasonable Assurance Analysis for the Beach Cities EWMP. Cost opinions are presented as an aid for decision makers, and contain considerable uncertainties. Given the iterative and adaptive nature of the EWMP and the many variables associated with the projects, the budget forecasts are order-of magnitude opinions, and are subject to change based on site-specific BMP feasibility assessment findings, preliminary and final BMP designs and landscaping, BMP effectiveness assessments, results of outfall and receiving water monitoring, and special studies such as those that might result in site specific objectives which could modify water quality objectives or TMDL Waste Load Allocations for a specific water body-pollutant combination.

EWMP planning-level cost opinions were developed for the proposed structural BMPs in addition to programmatic costs. Costs approximated for structural BMPs include “hard” costs for tangible assets and “soft” costs, which include considerations such as design and permitting. **Table ES-13** summarizes the total 20-year life-cycle costs for each proposed structural BMP, which are composed of the cost to construct or implement each structural BMP plus the associated annual O&M costs over 20 years. In order to account for possible variations in BMP design, BMP configurations, and site-specific constraints, as well as for uncertainties in available BMP unit costs from literature or estimated BMP unit costs, a range of costs is presented. These cost opinions are provided for information only, and it is recognized that should monitoring information demonstrate that alternative, less-expensive BMPs are equally (or superior) to those described herein, that these alternative BMPs may be implemented at the discretion of the WMG agencies. Not included in these costs are the annual monitoring costs for implementing the CIMP or the costs associated with implementing baseline and enhanced MCMs.

Table ES-13. Cost Opinion for Proposed Structural BMPs in Santa Monica Bay and Dominguez Channel Watersheds

Watershed/ Analysis Region		Location of BMP	Project Name	Construction Cost Range		Annual O&M Range		Total 20-Year Life- Cycle ¹ Range	
				Low	High	Low	High	Low	High
Santa Monica Bay Watershed	SMB-5-02, Alternative 1	Manhattan Beach	Manhattan Beach Infiltration Trench ²	\$3.7M	\$6.8M	\$140K	\$190K	\$6.5M	\$11M
		Manhattan Beach	Distributed Green Streets	\$2.4M	\$6.5M	\$110K	\$220K	\$4.6M	\$11M
		SMB-5-02 Alternative 1 Combined Costs		\$6.1M	\$13M	\$250K	\$410K	\$11M	\$22M
	SMB-6-01	Hermosa Beach	Hermosa Beach Infiltration Trench	\$500K	\$1.1M	\$18K	\$32K	\$860K	\$1.7M
		Hermosa Beach	Hermosa Beach Greenbelt Infiltration ²	\$5.5M	\$8.0M	\$81K	\$90K	\$7.1M	\$9.8M
		Redondo Beach	Park #3	\$1.9M	\$3.0M	\$28K	\$33K	\$2.5M	\$3.7M
		Hermosa Beach	Distributed Green Streets	\$7.0M	\$19M	\$310K	\$640K	\$13M	\$32M
		SMB-6-01 Combined Costs		\$15M	\$31M	\$440K	\$800K	\$23M	\$47M
	All Analysis Regions	Hermosa Beach	Trash exclusion devices	\$160K	\$430K	\$50K	\$64K	\$1.1M	\$1.7M
		Redondo Beach	Trash exclusion devices	\$1.1M	\$3.1M	\$360K	\$460K	\$8.3M	\$12M
		Manhattan Beach	Trash exclusion devices	\$590K	\$1.7M	\$210K	\$270K	\$4.8M	\$7.1M
	Combined Costs in Santa Monica Bay Watershed			\$23M	\$50M	\$1.3M	\$2.0M	\$49M	\$90M
Dominguez Channel Watershed	DC-RB/MB	Redondo Beach	Powerline Easement Infiltration ²	\$11M	\$16M	\$160K	\$180K	\$14M	\$20M
		Redondo Beach	Artesia Blvd Infiltration	\$2.0M	\$3.1M	\$30K	\$35K	\$2.6M	\$3.8M
		Redondo Beach + Manhattan Beach	Distributed Green Streets	\$7.4M	\$20M	\$330K	\$670K	\$14M	\$33M
		DC-RB/MB Combined Costs		\$20M	\$39M	\$520K	\$890K	\$31M	\$57M
	DC-Torrance	Torrance	Catch basin inlet filters	\$240K	\$360k	\$130K	\$170k	\$2.8M	\$3.7M
		DC-Torrance Combined Costs		\$240K	\$360k	\$130K	\$170k	\$2.8M	\$3.7M
	Combined Costs in Dominguez Channel Watershed			\$20M	\$39M	\$650K	\$1.1M	\$33M	\$61M
Combined Costs of All Proposed Structural BMPs			\$43M	\$89M	\$2.0M	\$3.1M	\$82M	\$150M	

M = Million dollars, K = Thousand dollars

¹ Life-cycle costs include construction costs and 20 years of annual O&M (in 2015 dollars) and are not discounted.² Alternative project locations have also been identified, but are not included in combined cost opinion

FINANCING DISCUSSION

The availability of funds will be critical for the implementation of the EWMP. Section 7 of this EWMP provides an overview of potentially available funding sources to pay for programs proposed in the EWMP. Examples show that a multi-pronged funding strategy using multiple sources rather than rely on a single storm drain fee may be the most prudent approach. A list of potential fees and charges has been developed, which will be further considered and explored by the Beach Cities WMG in the future:

- Vehicle license and vehicle rental fees
- Solid waste management surcharge
- Water service surcharge (under AB850)
- Property assessment
- Fines (not a stable source, it is an exemption under Proposition 26)
- Financial subsidy to encourage private sector participation to develop local and district projects
- One time capital recovery fee
- Dedicated storm drain fee
- Taxes (e.g. fuel taxes)
- A TMDL fee / tax could be developed based on the pollutant contribution from polluters / activities

In addition, Public Private Partnerships and alternative delivery and financing methods may facilitate and streamline implementation, and could result in program cost reductions.

From the analysis of potential costs in this section as summarized in **Table ES-13**, it is clear that projected costs of implementing the EWMP are substantial and orders of magnitude higher than have previously been expended by the agencies under the previous MS4 Permit. Thus availability of funds will be critical for the implementation of the EWMP. Currently, the Beach Cities do not have sufficient funds or dedicated funding streams to construct and maintain the projects proposed in this EWMP.

The Beach Cities agencies are working with the Los Angeles County Division of the League of California Cities and the California Contract Cities Association to partner with other affected agencies to collectively influence State policies, pursue changes in legislation and lobby high level officials for additional stormwater funding. Working together with the other cities will increase effectiveness, communication, collaboration, and reduce redundant efforts. The LACFCD will also work with the Beach Cities in their efforts to address source controls; assess, develop, and pursue funding for structural BMPs, and promote the use of water reuse and infiltration. As regional project scopes are further refined, the LACFCD will determine on a case-by-case basis their contribution to the projects.

In addition to working with other affected cities on a regional level, the Beach Cities WMG individually and collaboratively are committed to pursue funding sources at a local level including but not limited to:

- *Grants* - Collaboration and coordination between the Beach Cities will be important to increase accessible grant funding opportunities for stormwater projects, however alternative funding sources will also be needed to provide stable O&M revenues since grants typically do not provide for O&M.
- *Interagency Partnerships* – Interagency partnerships, like the Beach Cities WMG, can allow agencies to leverage local funding resources to make cost intensive projects possible.
- *Local Bond Issuance* - Two types of local bonds can be utilized. General Obligation (GO) bonds are issued by local governments and repaid through a property tax surcharge. Revenue bonds are tax-exempt securitized bonds repaid through utility rate increases charged directly to customers.
- *Local Stormwater Assessments* - Stormwater charges are potentially the most critical local funding source to finance stormwater programs. These charges include stormwater fees and taxes.
- *Direct Subsidies* - Direct financial subsidies to local projects do not contribute to cash revenue generation. However, subsidies can create a financial incentive to encourage local participation without providing the full cost for project implementation. Such an approach can increase financial efficiency by leveraging financial input from communities.

These potential sources of funding are discussed in greater detail in Section 7.