

**SCRIPPS WATERSHED
FINAL MONITORING PLAN
COMPREHENSIVE LOAD REDUCTION PLAN**

**Submitted to:
City of San Diego
Transportation & Storm Water Department
9370 Chesapeake Drive, Suite 100
San Diego, California 92123**



**Submitted by:
AMEC Environment & Infrastructure, Inc.
San Diego, California**

**With Assistance from:
Larry Walker & Associates
and
Tetra Tech, Inc.**

June 2013

TABLE OF CONTENTS

	Page
ACRONYMS AND ABBREVIATIONS	III
1.0 PROJECT DESCRIPTION	1-1
1.1 Introduction	1-1
1.2 Purpose	1-1
1.3 Watershed Background.....	1-2
1.4 Project Organization and Responsibilities	1-5
1.5 Implementation Schedule.....	1-6
1.6 TMDL Numeric Targets and WLAs	1-8
2.0 MONITORING APPROACH	2-1
2.1 Compliance Monitoring	2-1
2.1.1 Compliance Monitoring Locations.....	2-1
2.1.2 Constituents	2-4
2.1.3 Dry Weather Monitoring	2-4
2.1.4 Wet Weather Monitoring.....	2-4
2.2 Optional Monitoring.....	2-5
2.3 Follow-Up Monitoring	2-6
2.3.1 Initiation of Follow-up Monitoring.....	2-6
2.3.2 Follow-up Monitoring Approach.....	2-7
2.4 Special Studies	2-8
3.0 DATA MANAGEMENT AND REPORTING PROCEDURES	3-1
3.1 Data Management	3-1
3.2 Reporting Procedures	3-1
4.0 REFERENCES.....	4-1

LIST OF TABLES

Table 1-1.	TMDL Pollutants and Other CWA 303(d) Listed Impairments.....	1-3
Table 1-2.	Beneficial Uses for the 303(d) Listed Waterbody.....	1-5
Table 1-3.	Project Schedule for Fiscal Year 2013	1-8
Table 1-4.	Numeric Targets for Bacteria TMDL.....	1-9
Table 1-5.	Indicator Bacteria TMDL for Scripps Shoreline.....	1-10
Table 2-1.	Scope of Compliance Monitoring	2-1
Table 2-2.	Compliance Monitoring Locations	2-2
Table 2-3.	Compliance Analyses for Bacteria TMDL	2-4
Table 2-4.	Optional Field Parameters	2-5

TABLE OF CONTENTS (Cont.)

Page

LIST OF FIGURES

FIGURE 1-1. WATERSHED MAP	1-4
FIGURE 1-2. ORGANIZATIONAL CHART	ERROR! BOOKMARK NOT DEFINED.
FIGURE 1-3. SCRIPPS CLRP MONITORING PROGRAM TIMELINE	1-7

LIST OF APPENDICES

APPENDIX A QAPP	
-----------------	--

ACRONYMS AND ABBREVIATIONS

303(d) List	Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments
AMEC	AMEC Environment & Infrastructure, Inc.
ASBS	Areas of Special Biological Significance
Bacteria TMDL	<i>A Resolution Amending the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Revised Total Maximum Daily Loads for Indicator Bacteria Project I-Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)</i>
Basin Plan	San Diego Region Basin Plan
BMP	Best Management Practice
BPA	Basin Plan Amendment
Caltrans	California Department of Transportation
CFU	Colony Forming Units
CLRP	Comprehensive Load Reduction Plan
CWA	Clean Water Act
EDD	Electronic Data Deliverable
FIB	Fecal Indicator Bacteria
HSA	Hydrologic Sub-Area
LA	Load Allocation
LWA	Larry Walker & Associates
mL	milliliter
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
*.pdf	Portable Document Format
PFEIR	Program Final Environmental Impact Report.
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
REC-1	Water Contact Recreation
SDRWQCB	San Diego Regional Water Quality Control Board
State Board	State Water Resources Control Board
SWAMP	Surface Water Ambient Monitoring Program
TBD	To Be Determined by the Responsible Party
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
WLA	Waste Load Allocation
WQO	Water Quality Objective
WURMP	Watershed Urban Runoff Management Program

This page intentionally left blank

1.0 PROJECT DESCRIPTION

1.1 Introduction

The San Diego Regional Water Quality Control Board (SDRWQCB) issued Resolution No. R9-2010-0001, *A Resolution Amending the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Revised Total Maximum Daily Loads (TMDL) for Indicator Bacteria Project I-Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)*, herein referred to as the Bacteria TMDL. The Bacteria TMDL has identified the Municipal (Phase I and Phase II) Separate Storm Sewer System (MS4s) within the City of San Diego as the primary point sources that have been assigned a Waste Load Allocation (WLA) requiring a reduction. Owners and operators of small MS4s (Phase II MS4s) and controllable nonpoint sources, identified by the San Diego Water Board as significant sources of bacteria discharging to the receiving waters and/or Phase I MS4s, are subject to the Bacteria TMDL, however are not included in this Monitoring Program. The Basin Plan Amendment (BPA), which is Attachment A of the Bacteria TMDL, outlines an Implementation Plan that includes a compliance schedule and a description of minimum monitoring requirements to assess compliance with the TMDLs, WLAs, and Load Allocations (LAs). The Phase I MS4 (hereafter called the Responsible Party) has developed this Monitoring Plan as part of the Comprehensive Load Reduction Plan (CLRP) for the Scripps Watershed. The CLRP provides a comprehensive, watershed approach to management strategies designed to address the approved Bacteria TMDL, draft TMDLs, and other constituents listed on the Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments (herein referred to as the 303(d) List).

1.2 Purpose

The purpose of this Monitoring Plan is to outline a CLRP Monitoring Program designed to fulfill the monitoring requirements of the Bacteria TMDL and generate data to support the Scripps CLRP. This monitoring plan has included provision to meet the TMDL monitoring requirements of the recently adopted National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds Within the San Diego Region Order No. R9-2013-0001, herein referred to as the MS4 Permit (SDRWQCB, 2013). The Scripps CLRP Monitoring Program will collect data to evaluate the approved TMDL pollutants, and other constituents, . A list of the applicable pollutants for the Scripps Watershed is provided in Table 1-1. The goals of the Scripps CLRP Monitoring Program include the following:

- To assess progress toward meeting the Bacteria TMDL numeric targets and WLAs.
- To characterize potential sources of approved TMDL pollutants and other constituents.
- To support the selection and evaluation of potential best management practices (BMPs).

The following four principal types of monitoring will be conducted to address the goals of the Scripps CLRP Monitoring Program.

- Compliance Monitoring is required by the Bacteria TMDL to demonstrate progress toward meeting TMDL requirements including numeric targets and WLAs.
- Optional Monitoring is not required by the Bacteria TMDL; however if sufficient funds are available, it may be implemented by the Responsible Party to better understand water quality conditions in the receiving water and support the goals of compliance monitoring. Optional Monitoring may be added to (and removed from) the compliance monitoring effort as deemed appropriate by the Responsible Party.
- Follow-up Monitoring will be implemented to characterize the source, magnitude, and duration of exceedances of bacteria water quality objectives (WQOs) in the receiving water based on the results of compliance monitoring.
- Special Studies will be implemented based on the available data and resources to address management questions regarding adopted TMDLs, and 303(d) Listed pollutants. Special Studies may require the development of separate agreements and funding opportunities between the Responsible Parties, when applicable.

1.3 Watershed Background

The Scripps Watershed (watershed) is located in La Jolla, California, within the City of San Diego jurisdictional boundary. The watershed is 8,445 acres and is composed of primarily residential and institutional land uses (e.g., the University of California, San Diego campus). Sub-drainages within the watershed's boundaries drain west into two Areas of Special Biological Significance (ASBS): the San Diego–Scripps State Marine Conservation Area (ASBS 31) and the La Jolla State Marine Conservation Area (ASBS 29). The majority of the runoff within the watershed is conveyed through a network of storm drains before it is discharged at several locations along the beach. The central and largest portion of the watershed drains to a single storm drain outfall that discharges at Avenida de la Playa. Since 1983, the California Ocean Plan has prohibited the discharge of waste into ASBS along the California Coast, unless the State Water Resources Control Board (State Board) grants an exception to dischargers. As part of the exception process, the State Board has produced a guidance document for monitoring discharges to ASBS as part of the Program Final Environmental Impact Report (PFEIR). Attachment B of Appendix 1 of the PFEIR is the Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges (Special Protections Document) (SWRCB, 2012). The Special Protections Document is currently in draft form, although it is likely to be finalized in the near future. The Special Protections Document is intended to define the terms and conditions that limit storm water discharge to the 34 ASBS along the California Coast. The City of San Diego is listed as the responsible entity for discharges into ASBS 29, the La Jolla State Marine Conservation Area, and has applied to the State Board for an exception to the ASBS discharge requirements.

The Bacteria TMDL is based on the 2002 303(d) List which indicated that the greatest cause of waterbody impairments in the San Diego Region was due to elevated bacteria levels. Table 1-1

presents the targeted segments identified in the Bacteria TMDL. Figure 1-1 presents the water bodies in the Scripps Watershed that have been placed on the 2010 State Board's Section 303(d) List. Only 5 of the 13 segments identified in the Bacteria TMDL are included on the 2010 303(d) List. Only segments included on the 2010 303(d) list will be monitored. Per the Bacteria TMDL, impaired waters were given a priority number of 1, 2, or 3 with 1 being the highest priority. Scripps is listed as Priority 1. The ultimate goal of the Bacteria TMDL analysis is to achieve the necessary pollutant load reductions to restore and protect designated beneficial uses, particularly water contact recreation (REC-1). Beneficial uses within the Scripps Watershed, as designated by the State Water Resources Control Board's (State Board) San Diego Region Basin Plan (Basin Plan) for surface waters, are provided in Table 1-2.

**Table 1-1.
 TMDL Pollutants and Other CWA 303(d) Listed Impairments**

Waterbody	TMDL Pollutants^(a)	Other 303(d) Listed Constituents^(b)
Pacific Ocean Shoreline, La Jolla Shores Beach at Avenida de la Playa (HU 906.30) ^(c)	Total coliform, fecal coliform, <i>Enterococcus</i>	None
Pacific Ocean Shoreline, at Casa Beach, Childrens Pool (HU 906.30) ^(c)	Total coliform, fecal coliform, <i>Enterococcus</i>	None
Pacific Ocean Shoreline, Whispering Sands Beach at Ravina Street (HU 906.30) ^(c)	Total coliform, fecal coliform, <i>Enterococcus</i>	None
Pacific Ocean Shoreline, La Jolla Shores Beach at Vallecitos (HU 906.30) ^(c)	Total coliform, fecal coliform, <i>Enterococcus</i>	None

Notes:

- (a) Source: California RWQCB, San Diego Region. Resolution No. R9-2010-0001
- (b) Source: USEPA, 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report)
- (c) Listed on the 2010 303(d) list and identified as a targeted segment in the Bacteria TMDL
- (d) Identified as a targeted segment in the Bacteria TMDL only.



Figure 1-1. Watershed Map

**Table 1-2.
 Beneficial Uses for the 303(d) Listed Waterbody**

Hydrologic Unit	Waterbody Type	Beneficial Use													
		I N D	N A V	R E C 1	R E C 2	C O M M	B I O L	E S T	W I L D	R A R E	M A R	A Q U A	M I G R	S P W N	W A R M
Shoreline															
Scripps (906.30)	Pacific Ocean	•	•	•	•	•	•		•	•	•	•	•	•	•

Notes:

Source: Water Quality Control Plan for the San Diego Basin (9) (Basin Plan) (SDRWQCB, 2007).

- Existing Beneficial Use

1.4 Project Organization and Responsibilities

The Bacteria TMDL identifies the Responsible Party and Lead Agency for the Scripps Watershed. The Responsible Party is working on implementation of the monitoring programs for their watershed. The Responsible Party, excluding owners and operators of small MS4s, is:

- City of San Diego

For compliance monitoring, roles and responsibilities of the Responsible Party, Consultants, and Laboratory staff are described in the QAPP.

1.5 Implementation Schedule

The effective date of the Bacteria TMDL is April 4, 2011. The CLRP provides a compliance timeline outlining the interim reduction milestones over the 20 year compliance period. Figure 1-3 provides an overall timeline for the Scripps CLRP Monitoring Program. The monitoring plan and QAPP have been revised based on the approved MS4 Permit.

- **Compliance Monitoring** is scheduled to begin June 27, 2013 60 days after approval of the MS4 Permit.
- **Follow-up Monitoring** will be implemented after the Dry Weather Exceedance Reduction Milestone, which is scheduled seven years after the effective date of the TMDL.
- **Special Studies** will be implemented based on the available data and resources. Each study will have a different project schedule that will be provided in a separate QAPP.

For Fiscal Year 2013 (July 2013 through June 2014), Table 1-3 provides the schedule of program activities for the Scripps CLRP Monitoring Program including work plans, monitoring, and reporting. Program deliverables are described in Section 3 of this document. Note that follow-up monitoring does not begin until 2018, and thus is not reflected in the project schedule. The Responsible Party is funding a San Diego Regional Reference Stream Study that began in Fiscal Year 2012 and will be completed in Fiscal Year 2014.

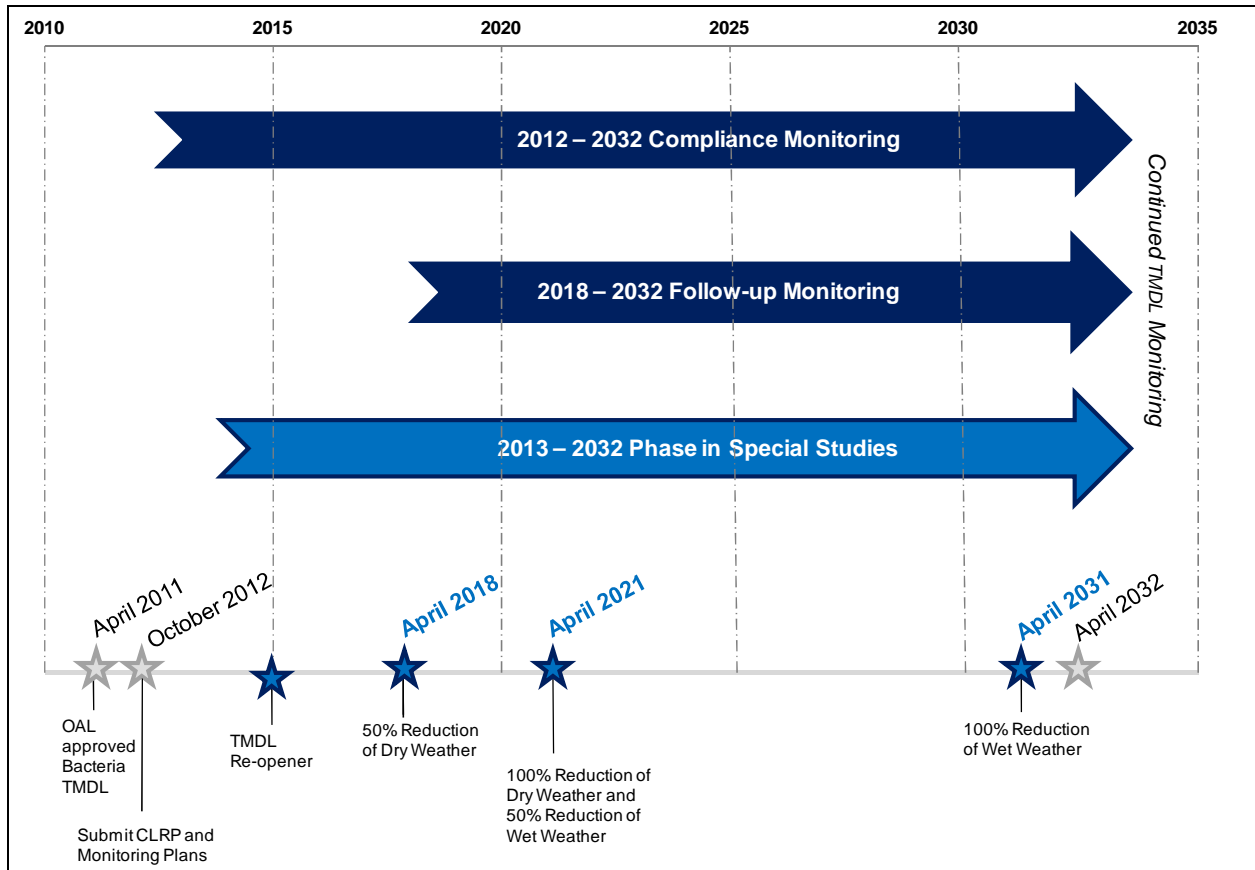


Figure 1-3. Scripps CLRP Monitoring Program Timeline

**Table 1-3.
 Project Schedule for Fiscal Year 2013**

Activity	Date (MM/DD/YY)		Deliverable
	Anticipated Date of Initiation	Anticipated Date of Completion	
TMDL Monitoring			
Revised QAPP/Monitoring Plan	Submitted herein	Submitted herein	QAPP/Monitoring Plan
Compliance Monitoring	7/1/13	6/30/14	NA
Special Studies			
San Diego Regional Reference Stream Study ^(a)	11/1/11	11/1/15	Project Report will be completed in Fiscal Year 2016
Reporting	NA	6/1/15	Annual CLRP Monitoring Summary to be included in the WURMP Annual Report

Notes:

NA = Not applicable

WURMP = Watershed Urban Runoff Management Program

^(a) This study began in Fiscal Year 2012 and will be completed in Fiscal Year 2015.

1.6 TMDL Numeric Targets and WLAs

The TMDL defines the numeric targets and WLAs for the Responsible Party. Data collected during the Scripps CLRP Monitoring Program will be utilized to evaluate progress and attainment of TMDL targets and WLAs. Tables 1-4 and 1-5 provide the numeric targets, WLAs, and LAs for the Scripps Watershed per the Bacteria TMDL. The Compliance Monitoring Program will be updated to reflect requirements of newly approved and adopted TMDLs as well as any delisted segments and/or constituents, as appropriate. This Monitoring Plan addresses draft TMDL and/or other 303(d) Listed constituents via additional monitoring under the Special Studies Program.

Attainment of the TMDLs in the receiving water is based on the frequency that the dry or wet weather days in any given year exceed the respective numeric objective. For dry weather, the TMDL numeric target is based on the geometric mean water quality objective and a 0 percent allowable exceedance frequency as presented in Table 1-4. The “existing” dry weather exceedance frequencies for impaired waterbodies will be calculated using the available historical data from the years 1996 to 2002 per the Bacteria TMDL. For wet weather, the TMDL numeric target is based on the single-sample maximum and an allowable exceedance frequency of 22 percent as well as the geometric mean as presented in Table 1-4. The Bacteria TMDL provides a modeled estimate of the “existing” wet weather exceedance frequency for Scripps Watershed. The Responsible Party will compare the “existing” exceedance frequencies for dry and wet weather to the mandated frequency reductions in order to evaluate progress toward attaining the TMDL.

**Table 1-4.
 Numeric Targets for Bacteria TMDL**

Parameter	Dry Weather ^(a)		Wet Weather ^(b)	
	WQO (MPN/100mL) ^(c)	Allowable Exceedance ^(c)	WQO (MPN/100mL) ^(d)	Allowable Exceedance ^(e)
<i>Enterococcus</i>	35	0%	104	22%
Fecal Coliform	200	0%	400	22%
Total Coliform	1,000	0%	10,000	22%

Notes:

mL milliliters

MPN Most Probable Number

Source: California RWQCB, San Diego Region. Resolution No. R9-2010-0001 (SDRWQCB, 2010).

^(a) Dry weather days defined as days with less than 0.2 inch of rainfall observed on each of the previous 3 days.

^(b) Wet weather days defined as days with rainfall events of 0.2 inches or greater and the following 72 hours.

^(c) Dry weather numeric objectives based on the 30-day geometric mean water quality objectives in the California Ocean Plan (2005). Compliance with the dry weather TMDLs in the receiving water is based on the frequency that the dry weather days in any given year exceed the dry weather numeric objective. The TMDL set a zero percent (%) allowable exceedance frequency of the REC-1 geometric mean WQOs.

^(d) Wet weather numeric objectives based on the single sample maximum water quality objectives in the California Ocean Plan (2005). Compliance with the wet weather TMDLs in the receiving water is based on the frequency that the wet weather days in any given year exceed the wet weather numeric objective, but 30-day geometric mean must also be met.

^(e) The wet weather allowable exceedance frequency is set at 22%. In the calculation of the wet weather TMDLs, the San Diego Regional Board chose to apply the 22% allowable exceedance frequency as determined for Leo Carillo Beach in Los Angeles County. At the time the wet weather watershed model was developed, the 22% exceedance frequency from Los Angeles County was the only reference beach exceedance frequency available. The 22% allowable exceedance frequency used to calculate the wet weather TMDLs is justified because the San Diego Region watersheds' exceedance frequencies will likely be close to the value calculated for Leo Carillo Beach, and is consistent with the exceedance frequency that was applied by the Los Angeles Regional Board.

**Table 1-5.
 Indicator Bacteria TMDL for Scripps Shoreline**

Pollutant	TMDLs, WLAs & LAs for Controllable Sources (Billion MPN/Year)				
	Total Watershed TMDL ^(a)	MS4 WLA ^(b)	Caltrans WLA ^(c)	Agriculture LA ^(d)	Open LA ^(e)
Dry Weather					
<i>Enterococcus</i>	21	21	0	0	0
Fecal Coliform	119	119	0	0	0
Total Coliform	594	594	0	0	0
Wet Weather					
<i>Enterococcus</i>	324,032	232,035	0	0	91,997
Fecal Coliform	176,907	101,253	0	0	0
Total Coliform	4,356,973	3,447,764	0	0	909,209

Notes:

Source: California RWQCB, San Diego Region. Resolution No. R9-2010-0001.

- ^(a) TMDLs, WLAs, and LAs calculated based on numeric targets and% allowable exceedance frequency. Meeting the numeric targets in the discharge and/or receiving water indicate the TMDLs, WLAs, and/or LAs have been met.
- ^(b) MS4 WLA = Point source WLA for discharges from Municipal MS4 land uses.
- ^(c) Caltrans WLA = Point source WLA for discharges from Caltrans land uses, assumed to be equal to the Caltrans Existing Load.
- ^(d) Agriculture LA = Non-point source LA for discharges from Agriculture land uses, assumed to be equal to the Agriculture Existing Load.
- ^(e) Open Space LA = Point source WLA for discharges from Open Space land uses, assumed to be equal to the Open Space Existing Load.

This page intentionally left blank

2.0 MONITORING APPROACH

This section describes the purpose, scope, and type of sampling conducted for each monitoring program including Compliance Monitoring, Optional Monitoring, Follow-Up Monitoring, and Special Studies. Additional details of the sampling and analytical methodology and data quality objectives are described in the QAPP, provided as Appendix A.

2.1 Compliance Monitoring

Compliance monitoring is designed to meet the receiving water monitoring requirements of the Bacteria TMDL. Compliance monitoring, including wet and dry weather sampling, will be conducted each year at the compliance monitoring locations. The data generated will be used to address the following questions:

- Are TMDL numeric targets for bacteria indicators being met at the compliance monitoring locations?
- Are bacteria levels improving at the compliance monitoring locations?

The scope of compliance monitoring accounts for the frequency and type of sampling activities of the existing Health and Safety Code Section 115880 of the Assembly Bill 411 (AB411) Monitoring Program in order to facilitate overlap of monitoring efforts and resources. Table 2-1 provides the general scope of Compliance Monitoring Program.

**Table 2-1.
 Scope of Compliance Monitoring**

Number of Monitoring Locations	Wet Weather Monitoring		Dry Weather Monitoring 10/01/13 to 03/31/14		Dry Weather Monitoring 06/24/13 to 9/30/13 and 04/1/14-9/30/14	
	Grab Samples Per Site Per Event	Event Frequency	Grab Samples Per Event Per Site	Event Frequency	Grab Samples Per Event Per Site	Event Frequency
4	1	1	1	monthly	1	weekly

2.1.1 Compliance Monitoring Locations

The Bacteria TMDL identifies thirteen points along the Pacific Ocean shoreline within the Scripps Watershed as the targeted segments. The Bacteria TMDL requires the receiving water monitoring to occur at the same location monitored under the current AB411 beach monitoring program and/or the City of San Diego MS4 monitoring program. The AB411 monitoring locations are considered representative of the segments of pacific shoreline listed in the Bacteria TMDL. These locations will provide a historical dataset that will allow for an evaluation of the effectiveness of TMDL implementation. Figure 2-1 presents a map of the compliance monitoring locations within the Scripps Watershed. Table 2-2 provides the location names and coordinates for the compliance monitoring locations.

**Table 2-2.
Compliance Monitoring Locations**

Site ID	Site Name	Site Type	Latitude	Longitude
EH-320	La Jolla Shores Beach at Vallecitos	Pacific Ocean Shoreline	32.8556	-117.2581
FM-080	La Jolla Shores Beach at Ave de la Playa	Pacific Ocean Shoreline	32.8546	-117.2589
EH-310	Children's Pool at Casa Beach	Pacific Ocean Shoreline	32.8475	-117.2782
EH-300	Whispering Sands Beach at Ravina Street	Pacific Ocean Shoreline	32.8394	-117.2817

Notes:

^(a) City ID number reflected since County ID number is unavailable. All other site IDs are County ID numbers.



2-1. Map of Compliance Monitoring Locations

Figure

2.1.2 Constituents

Fecal indicator bacteria (FIB) are the target constituents for the Pacific Ocean Shoreline within the Scripps Watershed, as indicated by the TMDL. Grab samples will be collected in a manner consistent with the AB411 program. Samples collected during wet and dry weather monitoring will be analyzed for FIB in accordance with Surface Water Ambient Monitoring Program (SWAMP) requirements provided in the QAPP (Appendix A). Table 2-3 presents the constituents, reporting limits, and analytical methods.

**Table 2-3.
 Compliance Analyses for Bacteria TMDL**

Parameter	Project Reporting Limit ^(a) (per 100mL)	Analytical Method ^(b)
<i>Enterococcus</i>	1 CFU	EPA 1600
Fecal Coliform	2 MPN/CFU	SM 9221D (3 or 5 dilutions) or SM9222D (3 dilutions)
Total Coliform	2 MPN/CFU	SM9221B (3 or 5 dilutions) or SM9222B (3 dilutions)

Notes:

CFU Colony Forming Units

(a) The reporting limits are consistent with the existing AB411 program to facilitate overlap with that program. However, reporting limits may be lower depending on the laboratory used to conduct the analysis.

(b) Membrane filtration is the preferred method.

2.1.3 Dry Weather Monitoring

Dry weather monitoring will be conducted monthly during the wet season and weekly during the dry season at the compliance monitoring locations listed in Table 2-2. Samples are to be collected on dry weather days, after an antecedent dry period of 72 hours with less than 0.1 inches of rainfall. During each dry-weather monitoring event, field observations will be recorded and a grab water sample will be collected at the compliance monitoring locations. Methodology for field observations and sample collection is described in the QAPP (Appendix A).

2.1.4 Wet Weather Monitoring

Wet weather monitoring will be conducted at the compliance monitoring locations during three storm events each wet season (October 1 to April 30). Per the MS4 Permit Appendix E.6, a minimum of one storm is required to be monitored. Storms resulting in greater than 0.2 inches of precipitation will be targeted for analysis. One grab sample will be collected per storm within 24 hours of the end of precipitation. The monitored storm events will be spread throughout the wet season to the maximum extent practicable as follows:

- Storm Event 1 (October - November)

- Storm Event 2 (December to January)
- Storm Event 3 (February to April)

The NOAA NWS website will be used to track the forecast and initiate mobilization based on recorded rainfall amounts at Lindbergh Field. During each wet-weather monitoring event, field observations will be recorded and a grab water sample will be collected at the compliance monitoring locations. Grab samples will be collected using the same sample collection technique as during a dry weather monitoring event, taking additional safety precautions as needed. Methodology for field observations and sample collection is described in the QAPP (Appendix A).

2.2 Optional Monitoring

Optional monitoring is not mandatory to meet TMDL monitoring requirements and may be suspended at any time. Optional monitoring is presented in the Monitoring Plan so that the procedures are available should the Responsible Party decide to conduct the monitoring. The Watershed Responsible Party will determine when any optional monitoring elements will be implemented. The Watershed Responsible Party will determine each year whether the optional monitoring will be initiated, modified, or eliminated (although optional monitoring may be revised more frequently if approved by the Watershed Responsible Party). Modifications to optional monitoring elements will be documented in the Annual CLRP Monitoring Summary. The decision to initiate, modify, or eliminate optional monitoring will be communicated to the SDRWQCB Project Manager to clearly inform the SDRWQCB whether the monitoring is to occur. Optional monitoring is being considered for this watershed. One variable option is making visual observations and/or collecting concurrent samples from outfalls, if flowing, during compliance monitoring sample collection. Flow at outfalls and water quality field measurements at all locations are also being considered for optional monitoring. The field parameters in Table 2-4 are considered optional for Scripps:

**Table 2-4.
 Optional Field Parameters**

Field Parameter	Reporting Limit	Method
Flow ^(a)	Per equipment range	Field Meter
Dissolved Oxygen	Per equipment range	Field Meter
pH	NA	Field Meter
Specific Conductivity	2 µS/cm	Field Meter
Temperature	NA	Field Meter
Turbidity	5 NTU	Field Meter

Notes:

µS/cm microsiemens per centimeter

NTU nephelometric turbidity units

^(a) Flow will only be collected at outfalls, when/if the outfall is flowing.

2.3 Follow-Up Monitoring

Per the TMDL, if exceedances of the numeric targets are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. Additionally, the locations and/or other source identification methods must also be used to demonstrate that the bacteria loads have been addressed. The Responsible Party has designed the Follow-up Monitoring Program to be implemented prior to the end of the compliance period in order to facilitate compliance with the interim reduction milestones. The Follow-up Monitoring Program should address both expected exceedances and sources limiting the attainment of the milestone. Implementation of follow-up monitoring, if necessary, is scheduled to begin after the first milestone requiring 50 percent reduction of dry or wet weather exceedances.

The Follow-up Monitoring Program will utilize an adaptive monitoring approach to determine the sources contributing to exceedances in the receiving water. Each year, the program will evaluate compliance data to determine if follow-up monitoring is needed and the monitoring approach would be modified to address the pattern of exceedances. The data generated will be used to address the following questions:

- What are the potential sources/areas causing exceedances in the receiving water?
- Are MS4 discharges contributing to WQO exceedances in the receiving water?
- What is the magnitude and duration of the exceedance condition?

2.3.1 Initiation of Follow-up Monitoring

Follow-up monitoring will be implemented based on exceedances of receiving water numeric targets and allowable frequencies recorded each year at the compliance monitoring locations. Follow-up monitoring is designed to address persistent exceedances and to assess the frequency of exceedances over relatively long-term periods. Compliance dates will be consistent with dates presented in the CLRP. Under the Compliance Monitoring Program, FIB results will be compared to TMDL numeric targets and mandated frequency reductions, as described in Section 1.6.

Follow-up monitoring will occur when:

- Allowable exceedance frequency of dry weather data has not been reduced by at least 50 percent by year seven (2018).
- Allowable exceedance frequency of wet weather data has not been reduced by at least 50 percent by year ten (2021).
- After the 100 percent reduction milestones for both wet and dry weather (i.e., the respective final compliance dates), the initiation criteria will be updated to reflect the most applicable 'trigger' based on the available data and possible revisions to the TMDL.

2.3.2 Follow-up Monitoring Approach

The approach implemented for the Follow-up Monitoring Program will be adaptive based on the type of exceedance (wet or dry weather), the frequency of exceedances, and watershed specific data. Four types of follow-up monitoring options were identified in the Copermittee Compliance Framework (LWA, 2011) and are summarized below. These options are designed to assist with source identification and TMDL compliance and more than one type of monitoring may be implemented per monitoring year.

- Upstream Monitoring: Upstream monitoring may be implemented in watersheds with clear jurisdictional boundaries, hydrologic breaks, or to isolate non-point source inputs along the receiving water. This option will characterize sources throughout the extent of the receiving water and will require additional monitoring to further isolate and identify sources. This option may provide useful data for watersheds where pollutant sources are largely unknown. Follow-up monitoring locations would be located in the receiving water and in the MS4, upstream of the compliance monitoring location.
- Representative Land Use Monitoring: Representative land use monitoring may be implemented in hydrologic sub-areas (HSAs) where homogenous land uses are present and discharge to the MS4. It may provide useful data for distinguishing between non-MS4 land uses and MS4 land uses that may be contributing to receiving water objective exceedances. This data may also be used to further calibrate and validate the watershed model and facilitate selection of management measures and/or BMPs. Follow-up monitoring locations would be selected to be representative of the major land use types present in the watershed.
- Localized Outfall Monitoring: Localized outfall monitoring may be implemented at monitoring stations adjacent to the receiving water in which objective exceedances were detected. It may provide useful data for identification of MS4 discharges to the receiving water in the direct vicinity of the objective exceedance. Monitoring may be employed in watersheds or HSAs that have a limited number of outfalls and may assist in determining whether the MS4 is causing or contributing to particular receiving water exceedances. If WQO exceedances are recorded at the follow-up monitoring locations then additional actions must be taken to bring the location into compliance. This may lead to additional monitoring in the immediate area or an evaluation of management measures and/or BMPs.
- Source Identification Monitoring: Microbial source testing may be added to any of the monitoring options described in the previous sections including both compliance monitoring and follow-up monitoring locations. This will assist in identification of pollutant sources that contribute to exceedances that may or may not be the result of MS4 discharges. Specifically, if no human sources are identified then it is possible to report that controllable sources are not causing the exceedances of WQOs at the monitoring location. This may lead to a potential special study to further identify sources of human fecal bacteria or natural sources.

Follow-up monitoring locations will be identified after compliance year six and will be updated each year after that, to reflect the most recent compliance data set. Therefore, monitoring

locations are not provided in this Monitoring Plan. Aerial imagery, GIS, and field surveys may be utilized to assist with determination of appropriate sampling locations.

Follow-up monitoring will be unique to each location and monitoring condition, therefore the monitoring approach for each specific case will be determined at that time.

A summary of follow-up monitoring will be provided in the Annual CLRP Monitoring Program Summary. The summary will include the monitoring approach, monitoring locations, sampling protocols, summary of results, and planned actions.

2.3.3 Annual Paired Outfall Monitoring

During each monitoring season, the paired outfalls at the compliance locations may be sampled to characterize dry weather flows as they occur. During dry weather monitoring, if a paired outfall is flowing and the flow reaches the receiving waters then collect a sample to be analyzed for the same suite of FIB. Spend some time to track and identify the potential source of the flow. Do not compromise the holding time of the other samples. If necessary, return the following day or week. Make necessary arrangements with the laboratory if you want to submit additional samples.

2.4 Special Studies

Special studies will be utilized to support the CLRP implementation strategies for the other 303(d) Listed constituents, draft TMDL pollutants, and potentially approved TMDL pollutants. To support CLRP implementation, special studies may be designed to further characterize pollutants in receiving waters or watershed and/or evaluate the effectiveness of the CLRP. A detailed QAPP will be needed for special studies to detail the monitoring approach, sampling and analytical methods, sample location information, and other pertinent study information.

The Scripps Responsible Party will determine each year whether a special study should be initiated, modified, or eliminated based on available funding (although special study monitoring may be revised more frequently if approved by the Responsible Party). Initiation or completion of special studies will be noted in the Annual CLRP Monitoring Summary. The decision to initiate, modify, or eliminate special studies will be communicated to the Regional Board so they are clearly informed of planned monitoring.

Currently the Scripps Responsible Party is participating in a regional special study to evaluate natural sources of bacteria in reference streams in San Diego County. The goal of the San Diego Regional Reference Stream Study is to determine the exceedance frequency of bacteria due to natural sources. The Study will help inform strategies that address the Bacteria TMDL. The Scripps Responsible Party has determined that sufficient information is available to develop the CLRP and initiate management actions on TMDL and non-TMDL constituents. Additionally, as water quality conditions are not expected to change until a series of management actions are initiated/completed, no additional special studies are currently scheduled for the first year of monitoring.

3.0 DATA MANAGEMENT AND REPORTING PROCEDURES

This section describes the management of field and analytical data and reporting procedures for the Scripps CLRP Monitoring Program.

3.1 Data Management

Field Data Records and Analytical Data Reports will be sent to and kept by the designated Lead Agency Project Manager. Data will be submitted in a standardized SWAMP-compatible format. The Lead Agency will compile the monitoring data and provide an annual CLRP Monitoring Summary to SDRWQCB.

The Sampling Agency will review all Field Data Log Sheets for completeness, maintain the original hardcopies, and scan electronic copies (*.pdf) for storage in the project file. Copies of Field Data Log Sheets and photographs for each event will be submitted to the Lead Agency on a quarterly basis. The field crew shall retain the original Field Data Log Sheets.

The laboratories will provide data in electronic format: both *.pdf copies of lab reports and a SWAMP-compatible Electronic Data Deliverable (EDD). Analytical results will be submitted to the Sampling or Lead Agency in *.pdf format and as a SWAMP-compatible EDD within three (3) weeks of submittal of samples. A SWAMP-compatible template will ensure that the data files can be uploaded to the SWAMP regional database. The Sampling or Lead Agency will review all lab reports and EDDs for accuracy, completeness, and compatibility with SWAMP. The contract laboratory shall retain original chain of custody (COC) forms. The contract laboratory will retain copies of the preliminary and final data reports.

3.2 Reporting Procedures

The Sampling Agency will provide quarterly sampling summaries to the Lead Agency as a status of monitoring activities. The update will include a brief summary of activities completed in the previous quarter and the field observations recorded.

The Lead Agency will generate an Annual CLRP Monitoring Summary, which will be included in the Watershed Urban Runoff Management Program (WURMP) Annual Report as an appendix. The CLRP Monitoring summary will describe the sample collection methods, sampling events, and present key findings of the analytical results. As part of the first year's assessment, the "existing" dry weather exceedance frequency will be calculated based on the 1996 to 2002 data set which will be used to evaluate progress toward attaining the TMDL. Any deviations from protocols listed in the Monitoring Plan and/or QAPP and the implications of those deviations on the interpretation of the data will be included in the report.

This page intentionally left blank

4.0 REFERENCES

AMEC Environment and Infrastructure, Inc. March 2012. Expanded Prop 84 Monitoring Final Work Plan. Prepared for the City of San Diego.

Assembly Bill 411, Chapter 765. October 1997. An Act to Amend Sections 115880, 115885, and 115915 of the Health and Safety Code, Relating to Public Beaches. Sacramento, California.

Bight'08 Estuaries and Coastal Wetlands Committee. December 2008. Southern California Bight 2008 Regional Marine Monitoring Survey (Bight'08): Coastal Wetlands and Estuaries Eutrophication Assessment Workplan. Prepared for Southern California Coastal Water Research Project (SCCWRP). Costa Mesa, California.

California Regional Water Quality Control Board, Los Angeles Region (LARWQCB). July 2010. Los Angeles River Watershed Bacteria Total Maximum Daily Load. Los Angeles, California.

California Regional Water Quality Control Board, Los Angeles Region (LARWQCB). July 2010. Attachment A to Resolution No. R10-007. Amendment to the Water Quality Control Plan - Los Angeles Region to Incorporate a Total Maximum Daily Load for Indicator Bacteria in the Los Angeles River Watershed. Los Angeles, California.

California Regional Water Quality Control Board, Santa Ana Region (SARWQCB). October 1998. Attachment to Resolution No. 98-9, as Amended by Resolution No. 98-100 Resolution Amending the Water Quality Control Plan for the Santa Ana River Basin to Incorporate a Nutrient TMDL for the Newport Bay/San Diego Creek Watershed. Santa Ana, California.

California Regional Water Quality Control Board, Santa Ana Region (SARWQCB). 2008. Established Nutrient-Related Water Quality Standards for the Newport Bay Watershed. Santa Ana, California.

California Regional Water Quality Control Board, San Diego Region (SDRWQCB). February 2010. Resolution No. R9-2010-0001. A Resolution Amending the Water Quality Control Plan for the San Diego Basin (9) To Incorporate Revised Total Maximum Daily Loads for Indicator Bacteria, Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek). San Diego, California.

California Regional Water Quality Control Board, San Diego Region (SDRWQCB). February 2010. Attachment A to Resolution No. R9-2010-0001. Amendment to the Water Quality Control Plan for the San Diego Basin (9) To Incorporate Revised Total Maximum Daily Loads for Indicator Bacteria, Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek). San Diego, California.

California Regional Water Quality Control Board, San Diego Region (SDRWQCB). February 2010. Revised Total Maximum Daily Loads for Indicator Bacteria Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek). Final Technical Report. San Diego, California.

California Regional Water Quality Control Board, San Diego Region (SDRWQCB). April 2007. Water Quality Control Plan for the San Diego Basin (9). San Diego, California.

California Regional Water Quality Control Board, San Diego Region (SDRWQCB). May 2008. Resolution No. R9-2008-0028 A Resolution Amending the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Implementation Provisions for Indicator Bacteria Water Quality Objectives to Account for Loading from Natural Uncontrollable Sources Within the Context of a Total Maximum Daily Load. San Diego, California.

Gilb, P. April 2009. San Diego County Beach Water Monitoring Map. County of San Diego Department of Environmental Health. San Diego, California.

Larry Walker & Associates (LWA). 2008. Draft Report: Calleguas Creek Watershed Urban Runoff Management Plan Quality Assurance Project Plan (QAPP): Total Maximum Daily Load Monitoring and Reporting Program Plan for the Nitrogen, OC and PCBs, Toxicity, and Metals and Selenium TMDLs. Los Angeles, California.

Larry Walker & Associates. 2011. Draft Report: Load Reduction Plan Framework Section 2 – Compliance Assessment Monitoring.

MACTEC Engineering and Consulting, Inc. November 2011. Addendum: *La Jolla Area of Special Biological Significance Compliance Monitoring Final Work Plan*. Prepared for the City of San Diego. San Diego, California.

Santa Monica Bay Beaches Bacterial TMDLs Coordinated Shoreline Monitoring Plan. 2004. The Technical Steering Committee Co-Chairs City and County of Los Angeles. Los Angeles, California.

Southern California Coastal Water Research Project. Coastal Wetlands and Estuaries Eutrophication Assessment Workplan. Southern California Bight 2008 Regional Marine Monitoring Survey (Bight'08). Bight'08 Estuaries and Coastal Wetlands Committee. Prepared for Southern California Coastal Water Research Project. December 2008.

Southern California Coastal Water Research Project (SCCWRP) and AMEC. February 2012. San Diego Regional Reference Stream Quality Assurance Project Plan. San Diego, California.

State Water Resources Control Board (SWRCB). February 2012. Program Final Environmental Impact Report (PFEIR), SCH# 2011012042, Exception to the California Ocean Plan for Areas of Special Biological Significance Waste Discharge Prohibition for Storm Water and Nonpoint Source Discharges, with Special Protections. Sacramento, California.

Tetra Tech, Inc. September 2011. CLRP Phase I Development Subtask 2.1: Data Inventory and Data Gaps to Support Pollutant Source Characterizations. Prepared for: CLRP Responsible Parties. San Diego, California.

Tetra Tech, Inc. November 2011. Comprehensive Load Reduction Plan. Subtask 2.1: Data Summary Report. Prepared for: CLRP Responsible Parties. San Diego, California.

Tetra Tech, Inc. 2011. Draft Report: Los Peñasquitos Comprehensive Load Reduction Plan. Subtask 2.2: Pollutant Source Characterization Report. San Diego, California.

Tetra Tech, Inc. February 2012. Draft Report: San Diego Region Comprehensive Load Reduction Plan Task 5: Development and Structural Solutions. San Diego, California.

United States Environmental Protection Agency (USEPA). 2011. Draft Recreational Water Quality Criteria. EPA-820-P-11-001. USEPA Office of Water. Washington, D.C.

United States Environmental Protection Agency (USEPA). July 2003. Final 2002 Integrated Report (CWA Section 303(d) List / 305(b) Report). Washington, D.C.

United States Environmental Protection Agency (USEPA). October 2011. Final 2010 Integrated Report (CWA Section 303(d) List / 305(b) Report). Washington, D.C.

United States Environmental Protection Agency (USEPA). Water: Use Attainability Analysis. March 2012. <water.epa.gov/scitech/swguidance/standards/uses/uaa/about_uuas.cfm>.

Wade, T.J., A.P. Dufour, E. Sams, K. Brenner, R. Haugland, L. Wymer, R. Calderon, M. Beach, and K. Oshima. 2011. Epidemiology Studies. USEPA: Office of Research and Development, National Environmental Health Effects Research Laboratory, and National Exposure Research Laboratory. Cincinnati, Ohio.

This page intentionally left blank

APPENDIX A

**SCRIPPS WATERSHED
FINAL QUALITY ASSURANCE PROJECT PLAN**

GROUP A ELEMENTS: PROJECT MANAGEMENT

1.0 TITLE AND APPROVAL SHEETS

**Scripps Watershed
FINAL Quality Assurance Project Plan
Comprehensive Load Reduction Plan (CLRP)**

June 2013

**Submitted to:
City of San Diego
Transportation and Storm Water Department**

**Submitted by:
AMEC Environment & Infrastructure, Inc.
San Diego, California**

QAPP Revision Number: 2.0

APPROVAL SIGNATURES

PROJECT ORGANIZATION:

Title:	Name:	Signature:	Date*:
City of San Diego Contract Manager	Andre Sonksen	_____	_____
AMEC Project QA Officer	Jay Shrake	_____	_____
AMEC Project Manager	Roshan Christoph	_____	_____
Laboratory Project Manager	Hai Van	_____	_____
Insert Title of Person Here	Insert Name of Person	_____	_____
Insert Title of Person Here	Insert Name of Person	_____	_____
Insert Title of Person Here	Insert Name of Person	_____	_____

REGIONAL BOARD (SWRCB):

Title:	Name:	Signature:	Date*:
NA	NA	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

* This is a contractual document. The signature dates indicate the earliest date when the project can start.

TABLE OF CONTENTS

	Page
ACRONYMS AND ABBREVIATIONS	V
1.0 TITLE AND APPROVAL SHEETS.....	I
2.0 DISTRIBUTION LIST.....	2-1
3.0 PROJECT/TASK ORGANIZATION	3-1
3.1 Involved Parties and Roles	3-1
3.2 Quality Assurance Officer Role	3-2
3.3 Persons Responsible for QAPP Update and Maintenance.....	3-2
3.4 Organizational Chart and Responsibilities.....	3-2
4.0 PROBLEM DEFINITION/BACKGROUND	4-1
4.1 Problem Statement	4-1
4.2 Decisions or Outcomes.....	4-2
4.3 Water Quality or Regulatory Criteria.....	4-2
5.0 PROJECT/TASK DESCRIPTION	5-1
5.1 Work Statement and Products	5-1
5.1.1 Compliance Monitoring.....	5-1
5.1.2 Optional Monitoring	5-1
5.1.3 Reporting.....	5-1
5.2 Monitored Constituents and Measurement Techniques	5-1
5.3 Project Schedule.....	5-2
5.4 Geographical Setting	5-2
5.5 Constraints.....	5-5
6.0 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA.....	6-1
7.0 SPECIAL TRAINING NEEDS/CERTIFICATION	7-1
7.1 Specialized Training or Certifications	7-1
7.2 Training and Certification Documentation	7-1
7.3 Training Personnel.....	7-1
8.0 DOCUMENTS AND RECORDS	8-1
9.0 SAMPLING DESIGN	9-1
9.1 Project Description and General Design	9-1
9.2 Monitoring Locations.....	9-1
9.3 Wet Weather Sampling.....	9-5
9.4 Dry Weather Sampling.....	9-5
9.5 Monitoring Logistics	9-5
9.6 Laboratory Distribution.....	9-6
10.0 SAMPLING METHODS	10-1
10.1 Field Observations and Documentation	10-1
10.2 Wet and Dry Weather Grab Sampling.....	10-2
10.2.1 Sample Handling.....	10-2
11.0 SAMPLE HANDLING AND CUSTODY.....	11-1
12.0 ANALYTICAL METHODS.....	12-5
13.0 QUALITY CONTROL.....	13-1
13.1 Quality Control Types	13-1
13.2 Field Quality Control Samples.....	13-1
13.3 Laboratory Quality Control	13-2

14.0	INSPECTION/ACCEPTANCE OF CONSUMABLES AND SUPPLIES.....	14-1
15.0	INSTRUMENT CALIBRATION	15-1
16.0	NON-DIRECT MEASUREMENTS	16-1
17.0	DATA MANAGEMENT	17-1
17.1	Field Observations.....	17-1
17.2	Analytical Data.....	17-1
18.0	ASSESSMENT AND RESPONSE ACTIONS	18-1
19.0	REPORTS TO MANAGEMENT.....	19-1
20.0	DATA REVIEW, VERIFICATION, AND VALIDATION.....	20-1
21.0	VERIFICATION AND VALIDATION METHODS	21-1
21.1	Data Verification and Validation Responsibilities.....	21-1
21.2	Process for Data Verification and Validation	21-1
22.0	RECONCILIATION WITH USER REQUIREMENTS.....	22-1
23.0	REFERENCES.....	23-1

LIST OF TABLES

Table 3-1.	Personnel Responsibilities.....	3-2
Table 5-1.	Master List of Analytical Constituents	5-2
Table 5-2.	Project Schedule for Fiscal Year 2013.....	5-2
Table 6-1.	Data Quality Objectives	6-1
Table 6-2.	Measurement Quality Objectives for Laboratory Data.....	6-2
Table 7-1.	Specialized Personnel Training or Certification.....	7-1
Table 8-1.	Documents and Record Retention, Archival, and Disposition Information....	8-1
Table 9-1.	Scope of Compliance Monitoring	9-1
Table 9-2.	Sampling Sites	9-2
Table 10-1.	Sampling Locations and Sampling Methods	10-1
Table 11-1.	Sample Handling and Custody	11-1
Table 12-1.	Laboratory Analytical Methods.....	12-5
Table 13-1.	Field QC	13-2
Table 13-2.	Laboratory Quality Control.....	13-2
Table 14-1.	Inspection/Acceptance Testing Requirements for Consumables and Supplies	14-1
Table 18-1.	Management Reports	19-1

LIST OF FIGURES

FIGURE 3-1.	ORGANIZATIONAL CHART.....	3-3
FIGURE 5-1.	SCRIPPS WATERSHED.....	5-4
FIGURE 9-1.	SCRIPPS WATERSHED MONITORING LOCATIONS	ERROR! BOOKMARK NOT DEFINED
FIGURE 9-1.	SCRIPPS WATERSHED MONITORING LOCATIONS (CONTINUED)	9-3
FIGURE 9-2.	MONITORING LOCATIONS.....	9-4

ACRONYMS AND ABBREVIATIONS

µs/cm	Microsiemens Per Centimeter
303(d) List	Clean Water Act (CWA) Section 303(D) List Of Water Quality Limited Segments
AB411	Assembly Bill 411
Bacteria TMDL	<i>A Resolution Amending The Water Quality Control Plan For The San Diego Basin (9) To Incorporate Revised Total Maximum Daily Loads For Indicator Bacteria Project I-Twenty Beaches And Creeks In The San Diego Region (Including Tecolote Creek)</i>
Basin Plan	State Water Resources Control Board's San Diego Region Basin Plan
BMP	Best Management Practice
BPA	Basin Plan Amendment
Caltrans	California Department Of Transportation
CFS	Cubic Feet Per Second
CLRP	Comprehensive Load Reduction Plan
COC	Chain-of-Custody
CWA	Clean Water Act
DHS	Department Of Health Services
DQO	Data Quality Objective
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
ft	Feet
ft ²	Square Feet
ft/s	Feet Per Second
FIB	Fecal Indicator Bacteria
ID	Identification
JPEG	Joint Photographic Experts Group
LA	Load Allocation
MES	Mass Emission Station
mL	Millimeter
MLS	Mass Loading Station
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
*.pdf	Portable Document Format
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
SDRWQCB	San Diego Regional Water Quality Control Boards
SOP	Standard Operating Procedure
SWAMP	Surface Water Ambient Monitoring Program

TBD	To Be Determined
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WAS	Watershed Assessment Station
WLA	Waste Load Allocation
WQO	Water Quality Objective
WURMP	Watershed Urban Runoff Management Program

This page intentionally left blank

2.0 DISTRIBUTION LIST

Title:	Name (Affiliation):	Tel. No.:	QAPP No.:
Contract Manager	Andre Sonksen (City of San Diego)	858-	
Project QA Officer	Jay Shrake (AMEC)	858-514-6459	
Project Manager	Roshan Christoph (AMEC)	858-514-6475	
Laboratory Project Manager	Hai Van		

Laboratory Managers will receive an electronic copy of the QAPP.

This page intentionally left blank

3.0 PROJECT/TASK ORGANIZATION

3.1 Involved Parties and Roles

The SDRWQCB issued Resolution No. R9-2010-0001, *A Resolution Amending the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Revised Total Maximum Daily Loads (TMDL) for Indicator Bacteria Project I-Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)*, herein referred to as the Bacteria TMDL. The Bacteria TMDL identifies the Responsible Party for the Scripps Watershed as the City of San Diego (excluding owners and operators of small MS4s and controllable nonpoint sources). The City of San Diego will implement the Consolidated Load Reduction Plan (CLRP) Monitoring Program.

The City of San Diego, consultants, and laboratory staff will have the following roles and responsibilities (Table 3-1):

- **Contract Manager:** Andre Sonksen is the Contract Manager for the City of San Diego. The Contract Manager will be responsible for establishing contracts with the selected consultants and/or laboratories to implement the Compliance Monitoring Program and act as the liaison between the Responsible Parties and consultants. He will oversee dry weather monitoring activities conducted by the City and act as QA Officer for the dry weather program.
- **AMEC Quality Assurance (QA) Officer:** Jay Shrake is the AMEC Project QA Officer. The AMEC Project QA Officer will be responsible for overseeing the project QA activities independently from the Project Manager to ensure that project implementation is being conducted in accordance with this QAPP.
- **Wet Weather Sampling Project Manager:** Roshan Christoph is the AMEC Project Manager. The AMEC Project Manager will be responsible for overseeing the day-to-day activities of implementing the San Diego River CLRP Compliance Monitoring Program.
- **Weck Laboratories Laboratory QA Officer/Project Manager:** Hai Van Nguyen is the Laboratory Project Manager as well as the QA Officer. Hai Van Nguyen holds a position independent of data generation with Weck Laboratories. Weck Laboratories will be performing wet weather sample analyses.
- **City of San Diego Laboratory QA Officer/Project Manager:** Laila Othman is the Laboratory Project Manager as well as the QA Officer. Laila Othman holds a position independent of data generation with the City of San Diego Public Utilities Department, Wastewater Operations, Environmental Monitoring & Technical Services, Marine-Microbiology Laboratory (herein referred to as the City of San Diego EM&TS Laboratory). Laila oversees the laboratory staff at the City's EM&TS laboratory that will be performing dry weather sample analyses.

**Table 3-1.
 Personnel Responsibilities**

Name	Organizational Affiliation	Role/Responsibility	Contact Information
Andre Sonksen	City of San Diego	Contract Manager	
Roshan Christoph	AMEC	Project Manager	
Jay Shrake	AMEC	Project QA Officer	
Hai Van	Weck	Laboratory QA Officer	

3.2 Quality Assurance Officer Role

The Project QA Officer position is independent of data generation. The QA officer will ensure that the QA and quality control (QC) procedures set in place in this document will be properly applied throughout the sampling activities and analysis. The Project QA Officer will coordinate with the project managers and QA officers of participating laboratories to ensure all QA and QC procedures within this QAPP are understood and followed by participating labs.

3.3 Persons Responsible for QAPP Update and Maintenance

The Project Manager and Project QA Officer are responsible for maintaining this QAPP. Changes and updates to this QAPP may be made by the Project Manager and Project QA Officer. The Project Manager will be responsible for making the changes and ensuring these updates are provided to each of the participating agencies and the SDRWQCB as listed in Table 3-1. Previous versions of the QAPP should be removed so as to avoid any confusion with the most current version of the QAPP.

3.4 Organizational Chart and Responsibilities

Figure 3-1 presents the organization chart for the Scripps CLRP Monitoring Program.

Figure 3-1. Organizational Chart

To be determined at a later date by the Responsible Party.

This page intentionally left blank

4.0 PROBLEM DEFINITION/BACKGROUND

4.1 Problem Statement

The Bacteria TMDL has identified MS4s and Caltrans as point sources that have been assigned Waste Load Allocations (WLAs). The Basin Plan Amendment (BPA), which is Attachment A of the Bacteria TMDL, outlines an implementation plan that includes a compliance schedule and a description of minimum monitoring requirements to assess compliance with the TMDLs, WLAs, and Load Allocations (LAs). The City of San Diego has developed this QAPP as part of the CLRP for the Scripps Watershed.

The CLRP Monitoring Program is designed to fulfill the monitoring requirements of the TMDL and generate data to support the Scripps CLRP. The CLRP Monitoring Program is described in detail in the Monitoring Plan. The goals of the CLRP Monitoring Program include the following:

- To assess progress toward meeting the Bacteria TMDL numeric targets and WLAs.
- To characterize potential sources of approved TMDL pollutants and other constituents.
- To support the selection and evaluation of potential best management practices (BMPs).

The following four principal types of monitoring will be conducted to address the goals of the Scripps CLRP Monitoring Program.

- Compliance Monitoring is required by the Bacteria TMDL to demonstrate progress toward meeting TMDL requirements including numeric targets and WLAs.
- Optional Monitoring is not required by the TMDL; however if sufficient funds are available, it may be implemented by the Responsible Party to better understand water quality conditions in the receiving water and support the goals of compliance monitoring. Optional Monitoring may be added to (and removed from) the compliance monitoring effort as deemed appropriate by the Responsible Party.
- Follow-up Monitoring will be implemented to characterize the source, magnitude, and duration of exceedances of bacteria water quality objectives (WQOs) in the receiving water based on the results of compliance monitoring.
- Special Studies will be implemented based on the available data and resources to address management questions regarding adopted TMDLs, and 303(d) Listed pollutants. Special Studies may require the development of separate agreements and funding opportunities between the Responsible Parties, when applicable.

The purpose of this QAPP is to outline the methodology and data requirements to meet the goals of the Scripps CLRP Monitoring Program and address specific monitoring requirements of the Compliance Monitoring and Optional Monitoring components scheduled to be implemented during Fiscal Year 2013.

4.2 Decisions or Outcomes

The data generated by this project will be used to track water quality at the compliance monitoring locations during wet and dry weather conditions. Compliance monitoring is designed to meet the receiving water monitoring requirements of the BPA. Compliance monitoring will evaluate data collected including the approved Bacteria TMDL pollutants and other optional field parameters.

The general approach and specific design elements of the project are driven by the following monitoring questions.

- Are TMDL numeric targets being met at the compliance monitoring locations?
- Are bacteria levels improving at the compliance monitoring locations?

4.3 Water Quality or Regulatory Criteria

The TMDL defines the numeric targets and WLAs for the Responsible Party. Data collected as part of the Scripps CLRP Monitoring Program will be utilized to evaluate progress and attainment of TMDL targets and WLAs. The receiving water limitation, WLAs, and LAs for the Scripps Watershed are provided in Tables 1-5 and 1-6 of the Monitoring Plan per the Bacteria TMDL.

5.0 PROJECT/TASK DESCRIPTION

5.1 Work Statement and Products

This QAPP reflects the compliance monitoring, optional monitoring, and reporting components of the Scripps CLRP Monitoring Program.

5.1.1 Compliance Monitoring

The TMDL identifies thirteen points along the pacific shoreline within the Scripps HA as the targeted segment for indicator bacteria. Compliance monitoring is designed to meet the receiving water monitoring requirements of the TMDL. Compliance monitoring, including wet and dry weather sampling, will be conducted each year at the compliance monitoring locations. The wet and dry weather monitoring components are described below:

- Wet weather monitoring will be conducted to characterize the bacteria concentrations and loading during representative storm events. Wet weather monitoring will be conducted for three storm events each wet season (October 1 – April 30).
- Dry weather monitoring will be conducted throughout the year to characterize non-storm flow conditions. Dry weather monitoring will occur at the compliance monitoring locations monthly during the wet season and weekly during the dry season (May 1 – September 30).

5.1.2 Optional Monitoring

All optional monitoring is considered above and beyond the requirements of the BPAs and the data needed to answer the compliance monitoring questions. Optional monitoring is presented in the QAPP so that the procedures are available should the Responsible Party decide to conduct the monitoring. If optional monitoring is conducted, it would be implemented concurrently with the compliance monitoring to supplement that data set.

5.1.3 Reporting

The Lead Agency will compile the project data and provide an annual CLRP Monitoring Summary to SDRWQCB.

5.2 Monitored Constituents and Measurement Techniques

Samples will be analyzed for fecal indicator bacteria (FIB). Analysis of FIB, including *Enterococcus*, fecal coliform, and total coliform, are required for compliance with the TMDL. Table 5-1 provides a master list of analytical constituents as well as SWAMP requirements. The Lead Agency will select an Environmental Laboratory Accreditation Program (ELAP)-certified laboratory to conduct FIB analysis. Common methods for FIB analysis include multi-tube fermentation, membrane filtration, and Enterolert® by IDEXX Laboratories (for *Enterococcus* only).

The laboratory shall conduct the appropriate dilutions to generate results and avoid greater than values. The following ranges are applicable to all methods and are obtained by performing dilutions, when appropriate.

**Table 5-1.
 Master List of Analytical Constituents**

Constituents	Method	Target Reporting Limit ^(a)	Sampling Type
<i>Indicator Bacteria</i>			
<i>Enterococcus</i>	SM 9230B*/ Enterolert ^(b)	1 colonies/100 mL	D,W
Fecal coliform	SM 9222D	2 MPN/100 mL	D,W
Total coliform	SM 9222B	2 MPN/100 mL	D,W

Notes:

^(a) The target reporting limits are consistent with methodology of the Assembly Bill 411 program to facilitate overlap with that program. However, reporting limits may be lower depending on the lab used to conduct the analysis.

TBD To be determined by the Responsible Party.

D designates dry weather sampling.

W designates wet weather sampling.

5.3 Project Schedule

Compliance monitoring is scheduled to begin June 27, 2013, 60 days after adoption of the MS4 Permit. Table 5-2 provides the schedule for the annual activities for the Scripps CLRP Monitoring Program to be implemented in Fiscal Year 2014 including work plans, monitoring, and reporting. Program deliverables are described in Section 3 of the Monitoring Plan.

**Table 5-2.
 Project Schedule for Fiscal Year 2014**

Activity	Date (MM/DD/YY)		Deliverable
	Anticipated Date of Initiation	Anticipated Date of Completion	
QAPP/Monitoring Plan	Submitted herein	Submitted herein	QAPP/Monitoring Plan
Compliance Monitoring	6/27/13	6/30/14	NA
Reporting	NA	6/1/14	Annual CLRP Monitoring Summary to be included in the Annual Report

Notes:

NA Not applicable

5.4 Geographical Setting

The Scripps Watershed (Figure 5-1) is located in La Jolla, California, within the City of San Diego jurisdictional boundary. The watershed is 8,445 acres and is composed of primarily residential and institutional land uses (e.g., the University of California, San Diego campus). Sub-drainages within the watershed's boundaries drain west into two Areas of Special Biological Significance (ASBS): the San Diego–Scripps State Marine Conservation Area (ASBS 31) and the La Jolla State Marine Conservation Area (ASBS 29).

The majority of the runoff within the watershed is conveyed through a network of storm drains before it is discharged at several locations along the beach. The central and largest portion of the watershed drains to a single storm drain outfall that discharges at Avenida de la Playa. Since 1983, the California Ocean Plan has prohibited the discharge of waste into ASBS along the California Coast, unless the State Water Resources Control Board (State Board) grants an exception to dischargers. As part of the exception process, the State Board has produced a guidance document for monitoring discharges to ASBS as part of the Program Final Environmental Impact Report (PFEIR). Attachment B of Appendix 1 of the PFEIR is the Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges (Special Protections Document) (SWQCB, 2012). The Special Protections Document is currently in draft form, although it is likely to be finalized in the near future. The Special Protections Document is intended to define the terms and conditions that limit storm water discharge to the 34 ASBS along the California Coast. The City of San Diego is listed as the responsible entity for discharges into ASBS 29, the La Jolla State Marine Conservation Area, and has applied to the State Board for an exception to the ASBS discharge requirements.

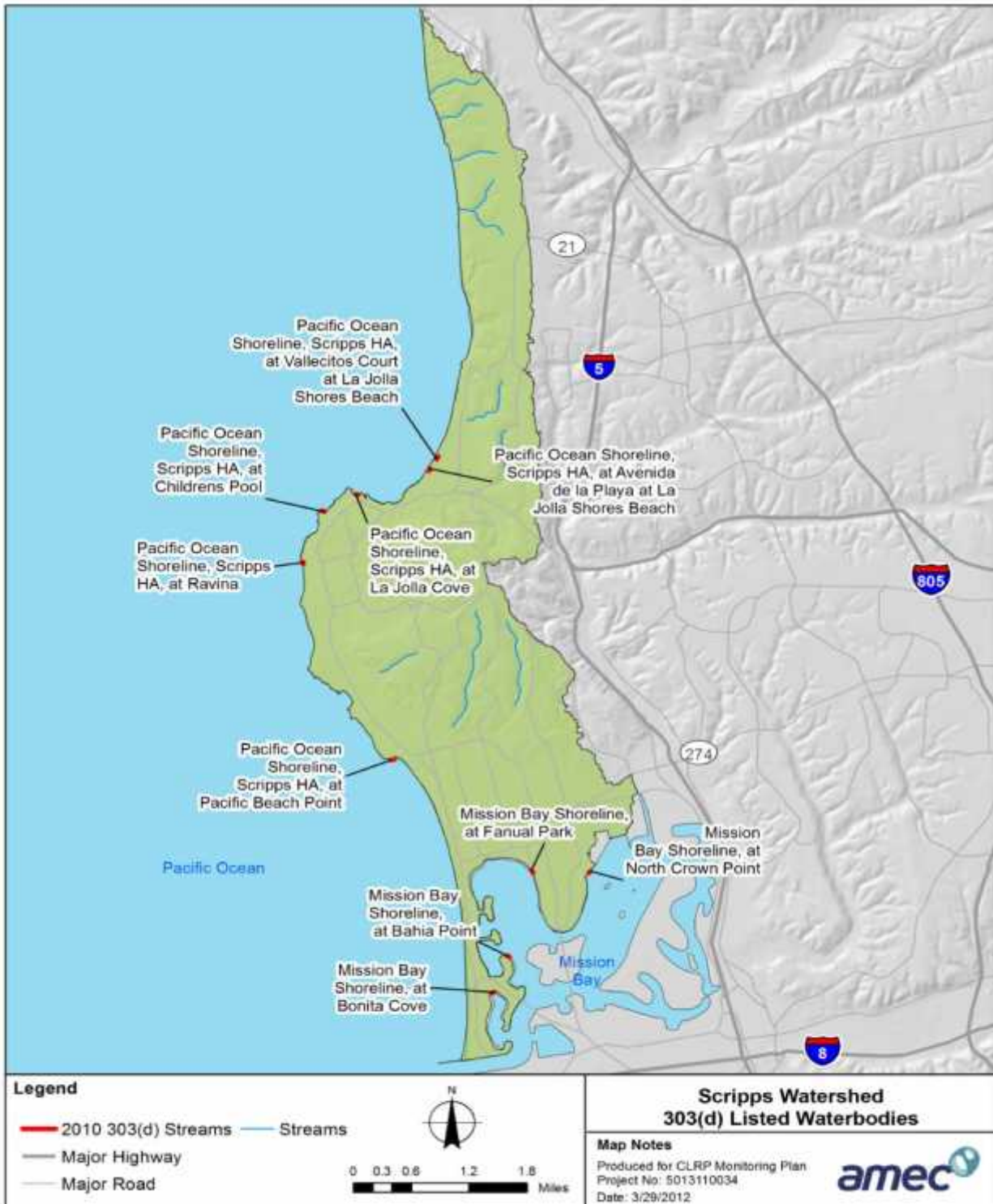


Figure 5-1. Scripps Watershed

5.5 Constraints

This program has the following procedural and logistical constraints:

- Laboratories will employ multiple dilutions in an effort to meet lower detection limits. However, method detection limits (MDLs) and reporting limits (RLs) may increase as a result of those dilutions.
- Wet weather monitoring will occur within 24 hours of the end of the majority of precipitation. AMEC will use precipitation data as recorded for Lindbergh Field station by the National Oceanographic and Atmospheric Administration (NOAA) National Weather Service (NWS) to initiate sample collection.
- During wet weather, AMEC will use an AMEC runner or laboratory courier in order to meet holding time requirements.
- Field teams will not be mobilized during or near certain holidays if the mobilization or laboratory analyses should continue through that holiday. This includes the following dates:

2013

- Independence Day: July 4, 2013
- Labor Day: September 2, 2013
- Thanksgiving: November 28 and 29, 2013
- Christmas: December 24 and 25, 2013
- New Year's Eve: December 31, 2013

2014

- New Year's Day: January 1, 2014
- Memorial Day: May 26, 2014

This page intentionally left blank

6.0 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Data quality will be assessed using data quality objectives (DQOs) such as accuracy, precision, and completeness. The applicable DQOs are provided for each analysis type in Table 6-1. Measurement quality objectives for laboratory analyses are provided in Table 6-2. Details on DQOs and how they are measured are provided below.

**Table 6-1.
 Data Quality Objectives**

Measurement or Analysis Type	Applicable Data Quality Indicators
Laboratory – Bacteria (Required)	Accuracy, Precision, Completeness

Accuracy is a measurement of the closeness of a test value to the true or reference value. Accuracy can be measured in the laboratory using positive and negative controls.

Precision is a measurement of the repeatability of test measurements. Precision can be measured in the laboratory using laboratory replicates. Precision can be measured in the field using field duplicates. Relative percent differences (RPDs) will be calculated to determine the precision between duplicate samples. This calculation is shown below:

$$RPD = \frac{abs[x_1 - x_2]}{0.5 \times (x_1 + x_2)} \times 100$$

Where: x_1 is the primary sample concentration; x_2 is the duplicate sample concentration. However, it has been suggested in USEPA studies that a RPD of less than or equal to 50% for field duplicates would be more appropriate for bacteriological methods given the spatial variability of bacteria concentrations in surface waters.

Completeness is a measurement of the percentage of project-specific data that are valid. Percent completeness will be calculated by dividing the number of useable sample results by total number of sample results planned. This calculation is shown below:

$$Completeness = \frac{\text{ActualNumberofSamplesCollected(ValidResults)}}{\text{ProjectRequiredTotalSamplesPlanned(NumberofSampleResultsPlanned)}} \times 100$$

Representativeness describes the degree to which the results of analyses represent the samples collected and the samples represent the environment from which they were taken. Sites were selected to best represent the TMDL listed segment. Samples will be collected to be representative of the water body by following the sample collection procedures described in Section 10.

**Table 6-2.
 Measurement Quality Objectives for Laboratory Data**

Group	Parameter	Accuracy	Precision ^(a)	Target Reporting Limit ^(b)	Completeness
Bacteria	<i>Enterococcus</i>	Positive control and reference material = 80-120% recovery. Negative control = no growth on filter.	Lab Replicate RPD<25%	10 colonies/ 100 mL	90%
Bacteria	Fecal coliform	Positive control and reference material = 80-120% recovery. Negative control = no growth on filter.	Lab Replicate RPD<25%	20 MPN/ 100 mL	90%
Bacteria	Total coliform	Positive control and reference material = 80-120% recovery. Negative control = no growth on filter.	Lab Replicate RPD<25%	20 MPN/ 100 mL	90%

Notes:

^(a) Not applicable, if native concentration of either sample is less than Reporting Limit (RL).

^(b) The target reporting limits are consistent with methodology of the Assembly Bill 411 program to facilitate overlap with that program. However, reporting limits may be lower depending on the lab used to conduct the analysis.

RPD Relative Percent Difference

mL milliliters

7.0 SPECIAL TRAINING NEEDS/CERTIFICATION

7.1 Specialized Training or Certifications

All project field staff members are required to receive training on sampling standard operation procedures (SOP) and safety procedures prior to engaging in any field activities. Field staff will annually review the following:

- Sampling in accordance with the QAPP
- Safety procedures, site hazards, and safety awareness in accordance with the Sampling Agency's Health and Safety Plan.

The bacteria analysis will be performed by a California DHS ELAP-certified analytical laboratory.

7.2 Training and Certification Documentation

The Sampling Agency will maintain records of training as detailed in Table 7-1. Documentation includes the date of training, the topic, the instructor name, and list of trainees.

**Table 7-1.
 Specialized Personnel Training or Certification**

Specialized Training Course Title or Description	Training Provider	Personnel Receiving Training/Organizational Affiliation	Location of Records & Certification ^(a)
Sampling SOPs and Health and Safety Training	Sampling Agency	Sampling Agency Field Staff	City of San Diego for dry weather and AMEC San Diego for wet weather

Notes:

^(a) If training records and/or certification are on file elsewhere, then document their location.

7.3 Training Personnel

Field staff will be trained on proper procedures for sampling, post-sampling processing, and sample handling in accordance with the QAPP and Monitoring Plan. The Sampling Agency's Project Manager are responsible for training employees prior to the start of sampling, and to conduct any training sessions as needed throughout the course of the program.

Trained laboratory analysts will perform sample analysis for this program

This page intentionally left blank

8.0 DOCUMENTS AND RECORDS

Documentation and record keeping are essential to project organization, consistency, and data verification. There are many types of documents and records required by this project. Table 8-1 identifies the document and record types, where they will be retained and archived, and what will be their respective dispositions. Final and revised versions of the QAPP will be distributed to the Responsible Party (Section 3.0), analytical laboratory, and the sampling agency.

Table 8-1.
Documents and Record Retention, Archival, and Disposition Information

Documentation Category	Identify Type Needed	Retention	Archival	Disposition
Project Plans	QAPP	Project Manager /SDRWQCB	Document/Portable Document Format (*.pdf)	Minimum 5 years
	Monitoring Plan	Project Manager /SDRWQCB	Document/*.pdf	Minimum 5 years
Sampling Records	Water Sampling Field Data Sheets/ Electronic Data Deliverable (EDD)	Sampling Agency	Field Notebook/ *.pdf/ Excel Spreadsheet	Minimum 5 years
	Training Records	Sampling Agency	Field Notebook/ *.pdf	Minimum 5 years
	Photographs	Sampling Agency	Field Notebook/ Joint Photographic Experts Group (JPEG)	Minimum 5 years
Analytical Records	Chain-of-Custody	Analytical Laboratory	Field Notebook/ *.pdf	Minimum 5 years
	Laboratory Reports	Analytical Laboratory	*.pdf /Microsoft Excel spreadsheet	Minimum 5 years
	EDD	Analytical Laboratory	Excel spreadsheet or Database	Minimum 5 years
Data Records	Corrective Action Forms	Sampling Agency/ Analytical Laboratory	*.pdf	Minimum 5 years
CLRP Monitoring Summary	Final Report	Sampling Agency, Responsible Party, SDRWQCB	Document/*.pdf	Minimum 5 years

This page intentionally left blank

GROUP B: DATA GENERATION AND ACQUISITION

9.0 SAMPLING DESIGN

This section provides an overview of the sampling design. The sampling design is provided in detail within the Monitoring Plan.

9.1 Project Description and General Design

The scope of compliance monitoring accounts for the frequency and type of sampling activities of the existing Health and Safety Code Section 115880 monitoring program required by Assembly Bill 411 (AB411) in order to facilitate overlap of monitoring efforts and resources. Table 9-1 provides the general scope of Scripps Compliance Monitoring Program.

**Table 9-1.
 Scope of Compliance Monitoring**

Number of Monitoring Locations	Wet Weather Monitoring		Dry Weather Monitoring 06/24/13 to 9/30/13 and 04/1/14-10/31/13		Dry Weather Monitoring 10/01/13 to 03/31/14	
	Grab Samples Per Event Per Site	Monitoring Frequency	Grab Samples Per Event Per Site	Monitoring Frequency	Grab Samples Per Event Per Site	Monitoring Frequency
13	1	3 storms	1	Weekly (minimum 5 events per month)	1	monthly

9.2 Monitoring Locations

The Bacteria TMDL requires receiving water compliance monitoring to occur at the same thirteen sites monitored under the AB411 Monitoring Program or under the City of San Diego's Coastal Storm Drain Monitoring Program. Table 9-2 provides monitoring location information and Figure 9-1 provides photographic images of the thirteen Scripps Watershed monitoring locations. A watershed overview map of the monitoring locations is provided in Figure 9-2

**Table 9-2.
 Sampling Sites**

Site ID	Site Name	Site Type	Latitude	Longitude
EH-320	La Jolla Shores Beach at Vallecitos	Pacific Ocean Shoreline	32.8556	-117.2581
FM-080	La Jolla Shores Beach at Ave de la Playa	Pacific Ocean Shoreline	32.8546	-117.2589
EH-310	Children's Pool at Casa Beach	Pacific Ocean Shoreline	32.8475	-117.2782
EH-300	Whispering Sands Beach at Ravina Street	Pacific Ocean Shoreline	32.8394	-117.2817

Notes:

(a) City ID number reflected since County ID number is unavailable. All other site IDs are County ID numbers.

<p data-bbox="240 310 743 340">EH-320 – La Jolla Shores at Vallecitos</p> 	<p data-bbox="850 273 1406 340">FM-080 – La Jolla Shores at Avenida de la Playa</p> 
<p data-bbox="328 718 659 747">EH-310 – Children’s Pool</p> 	<p data-bbox="834 718 1425 747">EH-300 – Whispering Sands at Ravina Street</p> 

Figure 9-1. Scripps Watershed Monitoring Locations (continued)



Figure 9-2. Monitoring Locations

9.3 Wet Weather Sampling

Wet weather monitoring will target three storms with a trigger rainfall of 0.2 inches or greater between October 1 and April 30. The NOAA NWS website will be used to track the forecast and initiate mobilization based on recorded rainfall amounts at Lindbergh Field. One grab sample will be collected per storm at each site within 24 hours of the end of precipitation. The grab sample will be collected at the compliance monitoring locations listed in Table 10-1 and analyzed for FIB analysis. Per the MS4 Permit Appendix E.6, a minimum of the first storm of the season is required to be monitored. The three storms will be targeted to occur during the early, mid, and late-season of the wet weather season to characterize seasonal changes, or during the following months to the maximum extent practicable:

- Storm 1 (Early season): October – November
- Storm 2 (Mid-season): December – January
- Storm 3 (Late-season): February – April

9.4 Dry Weather Sampling

Dry weather monitoring will occur at the compliance monitoring locations listed in Table 10-1 once per month during the wet season and weekly during the dry season. Dry weather sampling will occur on a dry weather day, which is defined as having an antecedent dry period of 72 hours with less than 0.1 inches of rainfall. Sampling may be conducted on any day of the month as long as the criterion for a dry weather day is met. One grab sample will be collected and analyzed for FIB during each dry weather event.

It should be noted when paired outfalls at the compliance locations are flowing and they may be sampled to characterize dry weather flows as they occur. During dry weather monitoring, if a paired outfall is flowing and the flow reaches the receiving waters then collect a sample to be analyzed for the same suite of FIB. Spend some time to track and identify the potential source of the flow. Do not compromise the holding time of the other samples. If necessary, return the following day or week. Make necessary arrangements with the laboratory if you want to submit additional samples.

9.5 Monitoring Logistics

Wet weather and dry weather sampling will consist of one staff team with two field scientists collecting one grab sample for each sampling event. Field staff will deliver samples to the laboratory courier at a designated meeting location or directly to the laboratory within the 6-hour holding time. Sample runners independent of the sampling team may be used instead of the sampling field staff during wet weather monitoring to deliver samples to the courier or laboratory. If samples are delivered to couriers during dry or wet weather events, meeting locations will be utilized to exchange samples between the couriers and sampling field staff (or runners). After receiving samples, the couriers will deliver samples to the laboratory to meet bacteria holding times.

9.6 Laboratory Distribution

Laboratories will be ready to receive, preserve, and analyze bacteria samples as necessary according to this QAPP as they are delivered during wet weather and dry weather sampling. Sample delivery times for wet weather events may include weekends and 24-hour delivery (holidays excluded). However, sample collection may be timed by the Sampling Agency so that sample collection and delivery will occur during daylight hours. Timing of sample collection and delivery during the daytime is possible since sampling may occur within any time during the 24 hours of the end of precipitation. Dry weather samples will be delivered to the laboratory during business hours Monday through Friday (holidays excluded). Additional details regarding the sampling handling and distribution is provided in Section 11.

This page intentionally left blank

10.0 SAMPLING METHODS

Table 10-1 presents the sampling locations and methods for the monitoring site. Samples will be collected and analyzed for the bacterial analysis listed in Table 5-1. The collection of samples will adhere to sampling protocols outlined in “Standard Operating Procedures (SOP) for the Collection of Bacteria Samples from Storm Drains and Receiving Waters (Creeks, Lagoons, Bays, and Ocean)” used by the San Diego Copermittees for the Coastal Storm Drain and Lagoon Monitoring (County of San Diego, 2007).

**Table 10-1.
 Sampling Locations and Sampling Methods**

Sampling Type	Number of Sites	Station Code	Matrix	Depth (inches)	Constituent Category	Maximum # Samples per Site ^(a)	Sample Type	Sampling SOP #
Wet Weather	4	EH-300	Salt-water	4 to 8	Bacteria	5 ^(b)	Grab	(d)
		EH-310						
		EH-320						
		FM-080						
Dry Weather	4	EH-300	Salt-water	4 to 8	Bacteria	14 ^(c)	Grab	(d)
		EH-310						
		EH-320						
		FM-080						

Notes:

^(a) Maximum number of samples includes field duplicates and field blanks.

^(b) One sample per storm (3 storms per year), 1 field blank, 1 field duplicate.

^(c) One sample per month during the wet season (6 months per year) and weekly sampling during dry season (6 months), 1 field blank, 1 field duplicate.

^(d) Standard Operating Procedures (SOP) for the Collection of Bacteria Samples for Storm Drains and Receiving Waters (Creeks, Lagoons, Bays, and Oceans)” (County of San Diego, 2007).

10.1 Field Observations and Documentation

Field observations will be recorded during each monitoring event to record site conditions and actions taken during sampling. Field data sheets will be used to record general observations and potential sources of bacteria located within the vicinity of the site. General observations include weather, debris/trash observed, color and clarity of the water, odor, and any other conditions of interest. Potential sources of bacteria will be identified, including human-related sources, activities, and natural sources.

The following general information should be recorded on a field data sheet during each site visit:

- Site identification (ID)
- Monitoring project name
- Water quality observations
- Grab sample IDs

- Field team personnel
- Weather conditions
- Runoff characteristics
- Grab sample date/time
- Swell direction
- Miscellaneous comments

10.2 Wet and Dry Weather Grab Sampling

Grab samples will be representative of the environmental conditions of the site and will adhere to the sampling protocols outlined in “Standard Operating Procedures (SOP) for the Collection of Bacteria Samples from Storm Drains and Receiving Waters (Creeks, Lagoons, Bays, and Ocean)” (County of San Diego, 2007). Grab samples will be collected at the surf line at a location that is approximately 1 foot in water height, or at a level between the ankle and knee of the sampler. Prior to sampling, the field staff should observe the direction of the ocean swell. The direction of the ocean swell should be documented on the field data sheet.

The field staff will wade into the surf carefully in a manner that does not disturb the sediment until he or she reaches approximately 1 foot in water column height, or a level that reaches the middle of sampler’s shinbone. During an incoming wave, not outgoing wave, the sampling staff will extend the sampling pole as far as practicable to avoid collection of suspended sediment caused by the sampler. The sample container will be submersed into the water column, facing downward, to mid-depth (approximately 4 to 8 inches) and turned slightly upwards while moving the bottle horizontally through the water until full to eliminate cross contamination from the sampling equipment. Sampling will occur at mid-depth of the water column, just below the water surface, so as to avoid surface scum and sediment from the bottom. If surface residue, sediment, or debris enters the sample bottle, the sample will be discarded and re-sampled with a new, sterile bottle.

10.2.1 Sample Handling

The following sample handling protocols will be followed when collecting samples to minimize the possibility of contamination. Further information regarding sample handling and custody is provided in Table 11-1.

- Field personnel will be thoroughly trained in the proper use of sample collection gear.
- Unused (new), clean, powder-free nitrile gloves will be worn while collecting samples and will be replaced with new, clean gloves between samples and sites.
- Previously unused (new) sample bottles of the recommended type will be employed. Sample bottles and bottle caps will be protected from contact with solvents, dust, or other contaminants during storage and bottle handling.
- Field personnel will make an effort, within reason, to prevent large gravel and uncharacteristic floating debris from entering the sample containers. Personnel will also make an effort to not disturb sediments that may be at the bottom of the channel.
- The inside of the sampling container and lids will not be touched during preparation and sampling activities.

- New bags of previously unopened ice will be used to cool samples following sample collection.
- FIB samples will be collected directly into a sterilized polyethylene or polypropylene container.

Once sample containers are filled, they will be promptly placed on ice, in a clean cooler (maximum temperature of 6 degrees Celsius), in the dark and transported to the laboratory for processing to meet holding times.

This page intentionally left blank

11.0 SAMPLE HANDLING AND CUSTODY

All bottles will be pre-labeled with the following information:

- Project name
- Date
- Time
- Sampling location name and number
- Sample matrix
- Collector's initials
- Sample ID number
- Analysis name.

Grab samples will be marked with a unique sample ID that will be used to track the sample throughout its analyses. These sample IDs are also entered directly on to field and laboratory data sheets. All field observations and processed sample information will be recorded and transcribed to Microsoft Excel spreadsheets. Hard copies of these field and laboratory data sheets will be maintained by the responsible agency.

Once sample containers are filled, they will be placed on ice, in a cooler, in the dark and transported to the laboratory for processing. The Chain-of-Custody (COC) will accompany the collected water samples. Sampled water will be kept below 6 degrees Celsius and transferred to an analytical laboratory within holding times. COC forms for the samples will be completed and transported with the samples to the analytical laboratory. Transportation will be coordinated to ensure that all samples are handled and analyzed within the proper holding time. Sample holding times are in table 11-1. Custody of all samples will be transferred from the field personnel to laboratories.

**Table 11-1.
 Sample Handling and Custody**

Analysis	Container	Minimum Sample Volume ^(a)	Initial Preservation	Holding Time
<i>Enterococcus</i>	Factory-sealed, pre-sterilized, 150 mL sterile plastic (high density polyethylene or polypropylene) container	150 mL	< 6°C in the dark ^(b)	6 hours
Fecal coliform				
Total coliform				

Notes:

- ^(a) Minimum sample volume is representative of total volume needed to analyze all three FIB.
- ^(b) Sodium thiosulfate may be used if chlorine is suspected in the water. Sodium thiosulfate is used for chlorine elimination.

This page intentionally left blank

12.0 ANALYTICAL METHODS

The laboratory analyses and the analytical methods are provided in Table 12-1. The laboratory will be certified by the California DHS ELAP.

**Table 12-1.
 Laboratory Analytical Methods**

Analyte	Laboratory	Project Action Limits- MPN/100mL ^{(a)(b)}		Project Reporting Limit (per 100mL) ^(c)	Analytical Method	
		Dry Weather	Wet Weather		Analytical Method/SOP	Modified for Method (yes/no)
Enterococcus	EM&TS and Weck	35(0%)	104(22%)	10 colonies	SM 9230B*/Enterolert ^(b)	No
Fecal Coliform	EM&TS and Weck	200(0%)	400(22%)	20 MPN	SM 9222D	No
Total Coliform	EM&TS and Weck	1,000(0%)	10,000(22%)	20 MPN	SM 9222B	No

Notes:

^(a) Indicator Bacteria TMDL, Receiving Water Limitation for Scripps Watershed

^(b) The number preceding the parenthesis is the water quality objective. The number in parenthesis is the allowable exceedance frequency.

^(c) The target reporting limits are consistent with methodology of the Assembly Bill 411 program to facilitate overlap with that program. However, reporting limits may be lower depending on the lab used to conduct the analysis.

This page intentionally left blank

13.0 QUALITY CONTROL

This section addresses QA/QC activities associated with both field sampling and laboratory analyses. The field QC samples are used to evaluate potential contamination and sampling error introduced prior to submittal of samples to the analytical laboratory. Laboratory QA/QC activities provide information needed to assess laboratory contamination, analytical precision, and analytical accuracy. If any QA/QC standards are not met, the appropriate corrective actions will be taken in accordance with Section 22 of this document and the laboratories' QA Manuals. The Project Manager is responsible for making decisions on corrective actions pertaining to laboratory analysis. If issues are identified by Sampling Agency's staff, the Laboratory Project Manager or Sampling Agency's Project Manager will be notified immediately and documentation of the issue and the corrective action will be made.

13.1 Quality Control Types

A set of QC samples will be submitted to the laboratory based on the frequencies noted in Table 10-1. The analytical laboratory may also require more QC samples if one type of analysis is to be run in more than one batch. The main types of QC samples that will be utilized for this study include field blanks, field duplicates, laboratory replicates, and positive and negative controls.

The field blanks, duplicate samples, and laboratory replicates may be collected from different sites during a particular sampling event. The number and frequency of field QC samples to be collected are presented in Table 13-1. Field QC samples will be submitted blind to the analytical laboratory. For laboratory replicates, additional sample volumes will be collected and it will be clearly identified on the COC.

13.2 Field Quality Control Samples

Field Blanks

Field blanks are samples of reagent-grade, analyte-free, deionized water collected in the field to verify the field conditions and air deposition are non-contaminating during field sampling activities. Field blanks will be analyzed for the same suite of analyses as regular samples. The project frequency for field blanks is 5 percent of the total sample count. Concentrations of field blanks should be below the Reporting Limit (RL) for each analyte.

Field Duplicates

Duplicate samples consist of two distinct samples (an original and a duplicate) of the same matrix collected at the same time and location using the same sampling technique. Field duplicate samples will be collected by filling two grab sample containers at the same time, or in rapid sequence. The purpose of field duplicates is to measure the consistency of field sampling. The project frequency for field duplicates is 5 percent of samples. The result for each field duplicate will be compared to the sample result to estimate a RPD between the two sample results. The RPD between the two results will be calculated using the RPD equation provided in Section 6.0.

Table 13-1 presents summary of field quality control criteria.

**Table 13-1.
 Field QC**

Field QC	Frequency	Acceptance Limits
Field Blank	5% of all project samples	Concentrations should be below the RL.
Field Duplicate	5% of all project samples	RPD range of 0-25% ^(a) ^(b)

Notes:

^(a) For coliforms: within 95% confidence interval as defined by IDEXX Laboratories.

^(b) NA if native concentration of either sample is less than the RL.

13.3 Laboratory Quality Control

Laboratory QC samples include laboratory duplicates, positive and negative controls as described below. Laboratory QC sample results will be provided in a laboratory report and SWAMP compatible electronic data deliverable (EDD) with a batch ID number to correlate with the corresponding environmental sample data set. Table 13-2 describes the frequency and types of quality control samples for each constituent category.

- **Laboratory Replicate** – For a laboratory replicate, a sample is prepared and analyzed twice to assess the repeatability (precision). The results are evaluated by calculating the RPD between the two sets of results. This serves as a measure of the reproducibility, or precision, of the sample analysis. A minimum of one laboratory replicate will be analyzed per batch.
- **Positive and Negative Controls** – A negative control is created as a separate plate count after the buffered rinse water is filtered and incubated the same way as a sample. There should be no bacteria growth on the filter after incubation. It is used to detect laboratory bacterial contamination of the sample. A positive control is created as a separate plate count after a water sample known to contain bacteria (such as wastewater treatment plant influent) is filtered and incubated the same way as a sample. There should be bacteria growth on the filter after incubation. It is used to detect procedural errors or the presence of contaminants in the laboratory analysis that might inhibit bacteria growth (USEPA, 2012).

**Table 13-2.
 Laboratory Quality Control**

Constituent Category	Method Blanks	
	Frequency	Acceptance Limits
Laboratory Replicate	One per 20 samples or analytical batch, whichever is more frequent	RPD < 25% ^(a)
Positive and Negative Controls	Per batch of bottles or reagents	Positive Control = 80-120% Recovery; Negative Control = No growth on filter

Note:

^(a) Not applicable if native concentration of either sample is less than reporting limits.

14.0 INSPECTION/ACCEPTANCE OF CONSUMABLES AND SUPPLIES

All glassware, sample bottles, and collection equipment will be inspected prior to use. All ordered supplies will be examined for damage as they are received. Bottles and caps will be inspected for damage prior to sampling, and only sound bottles with intact threads will be used. The container caps will be tested for tightness prior to transport of samples.

The Sampling Agency will ensure sufficient field supplies are on hand prior to the start of sampling for each period. Field supplies will be stored at the Sampling Agency's offices. Laboratory supplies will be stored at the laboratories conducting the work. Table 14-1 presents the acceptance criteria for consumables and supplies that will be used for this study.

Table 14-1.
Inspection/Acceptance Testing Requirements for Consumables and Supplies

Project-Related Supplies/Consumables	Inspection/Testing Specifications	Acceptance Criteria	Frequency	Responsible Individual
Pre-cleaned sample containers	Open container	Lids screwed on bottles	100%	Sampling Agency
Laboratory glassware	Dirty	Clean	100%	Laboratories

This page intentionally left blank

15.0 INSTRUMENT CALIBRATION

There are no field measurements included in the Scripps Compliance Monitoring Program or under optional monitoring at this time. This section is included as a place holder for future optional monitoring.

This page intentionally left blank

16.0 NON-DIRECT MEASUREMENTS

There are no non-direct measurements that will be fundamental to the success of this study.

This page intentionally left blank

17.0 DATA MANAGEMENT

Data will be submitted in a standardized SWAMP-compatible format. The Sampling Agency will compile the monitoring data and the Laboratory will compile analytical data. A final data will be provided to the Responsible Party.

17.1 Field Observations

The Sampling Agency will review all Field Data Sheets for completeness, maintain the original hardcopies, and scan electronic copies to portable document format (*.pdf) for storage in the project file. Field data sheets will be transcribed into an electronic spreadsheet. Photographs of the monitoring sites taken by field personnel will be uploaded into the project file within three business days of field visits. Field team members will name the photographs using the site ID and the date the photo was taken. Copies of field data sheets and photographs for each event will be submitted to the Project Manager with the quarterly sampling summary.

17.2 Analytical Data

Laboratories will provide data in *.pdf, hardcopy, and SWAMP-compatible EDD. A SWAMP-compatible EDD will ensure that the data files can be uploaded to the SWAMP regional database. The Project Manager will review all lab reports and EDDs for accuracy, completeness, and SWAMP compatibility. Analytical results will be submitted to the Project Manager within three weeks of submittal of samples.

Within two weeks of receipt, the Project Manager will screen preliminary data deliverables for the following major items:

- A 100-percent check between electronic data provided by the laboratory and the hard copy reports.
- Conformity check between the COC Forms and laboratory reports.
- A check for laboratory data report completeness.
- A check for typographical errors on the laboratory reports.
- A check for suspect values, data qualifiers, and review of laboratory QC data.

This page intentionally left blank

GROUP C: ASSESSMENT AND OVERSIGHT

18.0 ASSESSMENT AND RESPONSE ACTIONS

The Project Manager will be responsible for the day-to-day oversight of monitoring activities, laboratory analyses, and/or data reporting. Any failures (e.g., instrument failures) that occur during data collection and/or laboratory analyses will be the responsibility of the field crew or laboratory conducting the work, respectively. It is the responsibility of the Laboratory's QA Officer and Sampling Agency's Project Manager to report any assessments and proposed corrective actions to the Lead Agency's Project Manager. The Project Manager will relay deviations to the Project's QA Officer. The Project's QA Officer has the authority to stop all sampling and analytical work if the deviations noted are considered detrimental to data quality. The following section describes how deviations from the QAPP will be identified.

Three types of assessments will be performed as part of this project to ensure that the sampling and analysis activities are in accordance with the approved QAPP. Assessment activities and results will be documented in writing first by field or laboratory reports, then in final reporting. They are as follows:

- **Surveillance of Sample Collection Activities:** The Sampling Agency's Project Manager will be responsible for oversight of sampling activities and will review field datasheets to verify that the samples were collected in accordance with QAPP requirements. If the Sampling Agency identifies any of the field activities to be in violation of QAPP requirements, the Project Manager will be contacted immediately. The Project Manager has the authority to stop field activities until corrective actions are successfully implemented. Corrective actions may include additional training to improve field team performance and QAPP compliance, or appropriate re-sampling of sites, as needed. Any corrective actions will be documented. Any actions necessary will be communicated to the Project Manager. Assessment of wet weather sample collection will occur by the Sampling Agency's Project Manager once per field season; while assessment of dry weather sample collection will occur at the beginning and end of dry weather collection.
- **Data Quality Assessment:** Each Laboratory Manager will be responsible for providing a summary of QC data to the Sampling Agency's Project Manager. If it is determined that the precision and accuracy objectives were not met, the Sampling Agency's Project Manager will notify the Laboratory Manager. Laboratory techniques will be reviewed to minimize errors, and samples will be re-analyzed, if possible.
- **Assessment of Data Entry:** Once the performance criteria are met, the Sampling Agency's Project Manager will review data files to ensure that errors are detected and corrected. The Project Manager will retain original data files and qualified data will be retained in the Stakeholder's database. Data are qualified in the database according to SWAMP protocols.

This page intentionally left blank

19.0 REPORTS TO MANAGEMENT

AMEC will provide post-wet event sampling summaries to the the City of San Diego Project Manager as a status of monitoring activities.

The City of San Diego will generate an Annual CLRP Monitoring Summary, which will be included in the following WURMP Annual Report as an appendix.

The project reports are detailed within the Monitoring Plan. Table 18-1 presents the management reports.

**Table 18-1.
 Management Reports**

Type of Report	Frequency (Daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Dates	Person(s) Responsible for Report Preparation	Report Recipients^(a)
Wet Weather Sampling Summary	Post-event Summary	Post-event Summary	Project Manager, AMEC	City of San Diego
CLRP Monitoring Summary	Annual	June 30, 2014	Project Manager, AMEC	City of San Diego

This page intentionally left blank

GROUP D: DATA VALIDATION AND USABILITY

20.0 DATA REVIEW, VERIFICATION, AND VALIDATION

All analytical data will be reviewed and compared to the DQOs described in Section 6 of this QAPP, along with the applicable QA/QC practices. If results fail to meet any DQO, the Sampling Agency's Project Manager will flag them for further review. Batch QC samples will be reviewed to determine the potential cause of failure to meet the DQO. Data will be separated into three categories: data meeting all DQOs (acceptable data), data failing precision or recovery criteria (further investigation warranted), and data failing to meet accuracy criteria (further investigation warranted).

If further investigation is warranted based on data failing precision or recovery criteria, all aspects of the data will be assessed for data quality by the Project Manager. At that point, the data will either be accepted or rejected. If accepted, the data will be flagged with a "J" qualifier per the United States Environmental Protection Agency (USEPA) specifications (USEPA, 2002). If data fails to meet accuracy criteria, or the cause of the failure cannot be identified and rectified, the data will be excluded from the results. All rejected data will be retained in the Project database, and qualified as "rejected". The ultimate decision of whether to accept or reject a data point will be made by the Project Manager in consultation with the Project QA Officer.

If the analysis for more than ten percent of data fails to meet the DQO, the Project Manager and Project QA Officer will meet to discuss the appropriateness of the DQO and any potential modifications. All proposed modifications of DQOs will require a reissuance of the QAPP.

This page intentionally left blank

21.0 VERIFICATION AND VALIDATION METHODS

Data verification is the process of evaluating the completeness, correctness, and conformance of the dataset against the method, procedural, or contractual requirements. The goal of data validation is to evaluate whether the data quality goals established during the planning phase have been achieved. Data quality indicators will be continuously monitored by the analyst producing the data (i.e., field and lab personnel), as well as the Laboratory or Sampling Agency's Project Manager throughout the project to ensure that corrective actions are taken in a timely manner. Data validation is an analyte-specific and sample-specific process that extends verification to determine the analytical quality of the dataset. Laboratory and field personnel responsible for conducting QC analysis will be responsible for documenting when data do not meet measurement quality objectives as determined by data quality indicators.

21.1 Data Verification and Validation Responsibilities

Data collected in the field will be verified by the Project Manager. The laboratories will maintain COCs and sample manifests.

Verification and validation of laboratory data is the responsibility of the laboratory section supervisor and Project Manager. Laboratories will maintain analytical reports including QC documentation. The Laboratory QA Officer will perform checks of all of its records.

The Project QA Officer and Project Manager are responsible for oversight of field data and laboratory data obtained from the contracted laboratory and sampling agency. All data records will be checked visually and recorded as checked by initials and dates.

Reconciliation and correction of any data that fails to meet the DQOs will be done by the Project Manager in consultation with the Laboratory QA Officer and/or Sampling Agency's Project Manager. Any corrections require a unanimous agreement that the correction is appropriate.

21.2 Process for Data Verification and Validation

Data verification and validation for sample collection and handling activities will consist of the following tasks:

- Verification that the sampling activities, sample locations, number of samples collected, and type of analysis performed is in accordance with QAPP requirements.
- Documentation of any field changes or discrepancies.
- Verification that the field activities and field data (including sample location, sample type, sample date and time, name of field personnel, etc.) were properly documented.
- Verification of proper completion of sample labels and COC forms, and secure storage of samples.
- Verification that all samples recorded on COC forms were received by the laboratory.

Data verification and validation for the sample analysis activities will include all of the following:

- Verification that appropriate methodology has been followed.
- Verification that instrument calibrations have been adequately conducted.
- Verification that QC samples meet performance criteria.
- Verification that analytical results are complete.
- Verification that documentation is complete.

Verification and validation of data entry includes:

- Sorting data to identify missing or mistyped (too large or too small) values.
- Double-checking all typed values.
- Verification that correct data types correspond to database fields (i.e., text for text, integers for integers, number for numbers, dates for dates, times for times, etc.).

22.0 RECONCILIATION WITH USER REQUIREMENTS

Water quality data collected during this project will provide a means of determining compliance with the Bacteria TMDL. The results of this project will provide valuable information for evaluating compliance with numeric targets and load allocations defined in the TMDL. Data from this study will also be used to support decisions regarding possible amendments to the TMDL and implementation of management measures and best management practices.

The data will be qualified if QA issues are identified. Statistics and reporting of standard deviation and relative error will be used to quantify the uncertainty associated with the data. Uncertainty and limitations on data use will be described in the Annual CLRP Monitoring Summary.

This page intentionally left blank

23.0 REFERENCES

County of San Diego, 2011. San Diego County Municipal Copermittees 2009-2010 Receiving Waters and Urban Runoff Monitoring. Final Report. Prepared by Weston. Prepared for County of San Diego. January 2011.

San Diego County Municipal Copermittees 2005-2006 Coastal Storm Drain Monitoring. Appendix C: Sample Collection Standard Operating Procedures: Standard Operating Procedures (SOP) for the Collection of Bacteria Samples from Storm Drains and Receiving Waters (Creeks, Lagoons, Bays, and Ocean). Final Report. January 2007.

State Water Resources Control Board (SWQCB), 2012. Program Final Environmental Impact Report (PFEIR): Attachment B of Appendix I- Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges. February, 2012.

USEPA, 2002. Guidance on Environmental Data Verification and Data Validation. U.S. Environmental Protection Agency Quality System Series: EPA QA/G-8. November 2002.

USEPA, 2012. Water Monitoring and Assessment: Quality Assurance, Quality Control, and Quality Assessment Measures. <<http://water.epa.gov/type/rsl/monitoring/132.cfm>> March 2012.

This page intentionally left blank