Attachment A: Summary of EWMP Amendments

1.0 INTRODUCTION AND PURPOSE

The Rio Hondo/San Gabriel River Revised Enhanced Watershed Management Program (rEWMP) improves upon some parts of the existing Rio Hondo/San Gabriel River Enhanced Watershed Management Program (EWMP), which was approved by the Los Angeles Regional Water Quality Control Board (Water Quality Control Board) on April 21, 2016. To satisfy the requirements of an EWMP, the rEWMP document relies on background material prepared for the original 2016 EWMP. To clearly identify which sections of the original 2016 EWMP apply and which were formally amended by the rEWMP, this Attachment A provides an erratum and a redlined version of the 2016 EWMP is included as Appendix A.1. Any red text in Appendix A.1 represents modified or added content as part of the 2018 rEWMP.

It is anticipated that additional revisions will be made over time through the adaptive management process, so this is considered a living document.

2.0 ERRATUM TO THE 2016 EWMP

The following erratum notes the specific revisions and amendments to the following redlined version of the 2016 EWMP.

Rev. No.	Page	Section	Line	Revision Type/Description
1	ix	Executive Summary	All	The entirety of the Executive Summary is superseded by the rEWMP
2	10	1.1	17	ADDED: “original 2016”
3	10	1.1	17	ADDED: “included”
4	10	1.1	20-22	ADDED: “During revision of the development of the revised EWMP (rEWMP) in 2018, the City of Azusa decided not to participate. Although they are referenced for context in figures throughout this chapter, they are no longer considered a member of the RH/SGRWQG.”
5	10	1.1	27	DELETED: Azusa from Table 1-1 Recalculated percentages in Table 1-1 omitting Azusa
6	12	1.2.1	15	Recalculated values in Table 1-2 omitting Azusa

Rev. No.	Page	Section	Line	Revision Type/Description
7	23	1.3.2	43-51	Deleted: “These complexities warrant development of a LAR Bacteria TMDL Alternative Compliance Strategy (ACS) or Load Reduction Strategy (LRS) for the RH/SGRWQG, which may include uniquely different water conservation concepts specific to the particular characteristics of the RH/SGRWQG area. Representatives of the group continue to meet among themselves and with Regional Board staff to identify a cost effective and timely approach to developing such an ACS/LRS. While this effort proceeds and the more complex implications of potential water conserving alternatives are identified and better understood, the RH/SGRWQG will attempt to follow the primary milestone dates identified during the first cycle LAR Bacteria TMDL Rio Hondo LRS implementation schedule.” ADDED: “Notwithstanding the incidental water quality benefits, Peck Park Lake, San Gabriel River, and spreading grounds are water conservation facilities that provide critical water recharge benefits to the area, and the LACFCD does not consider them to be best management practices.”
8	26	1.3.2	4	DELETED: Azusa from Table 1-5
9	27	1.3.2	1	MODIFIED: Milestone date for 10% metals milestone
10	29	1.5	7	ADDED: “An” DELETED: Regional EWMP projects have been identified and
11	29	1.5	30	DELETED: volume and
12	29	1.5	31	DELETED: 85th percentile volume analysis and the
13	39	2.2	1	DELETED: footnote pertaining to Azusa
14	74	3.2.2	1	DELETED: “Azusa from Table 3.3 and recalculated values”
15	81	3.2.3	3	DELETED: “Azusa River Wilderness Park (City of Azusa)”
16	81	3.2.3	4	DELETED: “Metro Gold Line Infiltration Project (City of Azusa)”

Rev. No.	Page	Section	Line	Revision Type/Description
17	81	3.2.3	10	DELETED: "The City of Azusa also plans on implementing full capture trash source control structural BMPs throughout the City."
18	100	3.2.4.3	27-31	DELETED: "The sites selected for future implementation are identified in the table above the bold line. Not all of the sites will be used for Regional projects, as the costs would be too high. It is recommended that the top ranked sites be implemented in the future and were modeled in the RAA to demonstrate compliance, as detailed further in Section 4. These sites are further discussed in Section 3.4.2."
19	101	3.2.4.3	5-9	DELETED: "The sites selected for future implementation are identified in the table above the bold line. Not all of the sites will be used for Regional projects, as the costs would be too high. It is recommended that the top ranked sites be implemented in the future and were modeled in the RAA to demonstrate compliance, as detailed further in Section 4. These sites are further discussed in Section 3.4.2."
20	102	3.2.5	All	The entirety of Section 3.2.5 is superseded by the analysis presented in 2018 rEWMP, Attachment C.
21	113	3.4	All	The entirety of Section 3.4 is superseded by the 2018 rEWMP Chapter 5, Chapter 6, and Attachment C.
22	114	4	All	The entirety of Section 4 is superseded by the 2018 rEWMP, Attachment C.
23	115	5	All	The entirety of Section 5 is superseded by the 2018 rEWMP Chapter 6 and Attachment C.
24	116	6.1 – 6.4	All	The entirety of Sections 6.1, 6.2, 6.3, and 6.4 are superseded by the 2018 rEWMP Chapter 6 and Attachment C.
25	116	6.5	19	DELETED: are over $1.4 billion and
26	117	6.5	1	The annual implementation costs in Table were updated to reflect the estimated capital costs for recommended projects in the rEWMP.

Rev. No.	Page	Section	Line	Revision Type/Description
27		Attachment Q		THE ENTIRETY OF ATTACHMENT Q IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT B
28		Attachment R		THE ENTIRETY OF ATTACHMENT R IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT B
29		Attachment S		THE ENTIRETY OF ATTACHMENT S IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT B
30		Attachment T		THE ENTIRETY OF ATTACHMENT T IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT B
31		Attachment U		THE ENTIRETY OF ATTACHMENT U IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT C
32		Attachment W		THE ENTIRETY OF ATTACHMENT W IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT C
33		Attachment X		THE ENTIRETY OF ATTACHMENT X IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT C
34		Attachment Y		THE ENTIRETY OF ATTACHMENT Y IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT B
35		Attachment Z		THE ENTIRETY OF ATTACHMENT Z IS SUPERSEDED BY THE 2018 REVISED EWMP, EXCEPT MATERIAL PERTAINING TO THE CITY OF AZUSA – SEE ATTACHMENT B

APPENDIX A.1: REDLINED 2016 EWMP

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Table of Contents

Attachments

Acronyms

AB	Assembly Bill
ACS	Alternative Compliance Strategy
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ATP	Active Transportation Program
BMP	Best Management Practice
BPA	Basin Plan Amendment
BSAF	Biota-Sediment Accumulation Factor
BSI	Bacteria Source Identification
CAMS	Countywide Address Management System
CARE	Community Action for a Renewed Environment
CASQA	California Stormwater Quality Association
CBI	Clean Beaches Initiative
C.C.	Coefficient of Correlation
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
CGP	Construction General Permit
CIMP	Coordinated Integrated Monitoring Program
CMP	Coordinated Monitoring Program
CREST	Cleaner Rivers through Effective Stakeholder-led TMDLs
CTR	California Toxics Rule
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
DO	Dissolved Oxygen
DSA	Division of the State Architect
DTSC	Department of Toxic Substances Control
EEM	Environmental Enhancement and Mitigation
EIR	Environmental Impact Report
EMC	Event Mean Concentration
ESCP	Erosion and Sediment Control Plan
ET	Evapotranspiration
EWMP	Enhanced Watershed Management Program
EWRI	Environmental and Water Resources Institute
FCG	Fish Contaminant Goals
FHWA	Federal Highway Administration
FWC	Flow-Weighted Composite
GIS	Geographic Information System
GLAC	Greater Los Angeles County
HCF	Habitat Conservation Fund
HFS	High Flow Suspension
HRU	Hydrologic Response Unit
HSG	Hydrologic Soil Group

HSIP	Highway Safety Improvement Program
HSPF	Hydrologic Simulation Program-FORTRAN
IBD	International BMP Database
IC/ID	Illicit Connection/Illicit Discharge
IGP	Industrial General Permit
IPM	Integrated Pest Management
IRWMP	Integrated Regional Water Management Plan
ISRF	Infrastructure State Revolving Fund
JPA	Joint Powers Authority
LAC	Los Angeles County
LACSD	Los Angeles County Sanitation Districts
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LADPW	Los Angeles Department of Power and Water
LAR	Los Angeles River
LARWQCB	Los Angeles Regional Water Quality Control Board
LID	Low Impact Development
LRP	Local Resources Program
LRS	Load Reduction Strategy
LSPC	Loading Simulation Program in C++
LUST	Leaking Underground Storage Tank
LWCF	Land and Water Conservation Fund
MCM	Minimum Control Measure
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
MTA	Metropolitan Transportation Authority
MWD	Metropolitan Water District
NCDC	National Climatic Data Center
NDMA	N-Nitrosodimethylamine
NOI	Notice of Intent
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPS	Non-Point Source
O&M	Operation and Maintenance
OWTS	Onsite Wastewater Treatment System
P2	Pollution Prevention
PAH	Polycyclic Aromatic Hydrocarbons
PET	Pan Evapotranspiration
PIPP	Public Information and Participation Program
POC	Pollutant of Concern
POTW	Publicly Owned Treatment Works
PTMISEA	Public Transportation Modernization, Improvement, and Service Enhancement Account
QA/QC	Quality Assurance/Quality Control
RAA	Reasonable Assurance Analysis

RCP	Reinforced Concrete Pipe
RH/SGRWQG	Rio Hondo/San Gabriel River Water Quality Group
RMSE	Root Mean Square Error
ROS	Regression-on-Order Statistics
ROWD	Report of Waste Discharge
RPA	Reasonable Potential Analysis
RTP	Recreational Trails Program
RWL	Receiving Water Limitation
SB	Senate Bill
SBPAT	Structural BMP Prioritization and Analysis Tool
SCCWRP	Southern California Coastal Water Research Project
SGR	San Gabriel River
SIC	Standard Industrial Classification
SLOD	Sample Limits of Detection
SMARTS	Storm Water Multiple Application and Report Tracking System
SMB	Santa Monica Bay
SRPE	Steel Reinforced Polyethylene
SSO	Site-Specific Objectives
SUSMP	Standard Urban Stormwater Mitigation Plan
SUSTAIN	System for Urban Stormwater Treatment and Analysis Integration
SWAMP	Surface Water Ambient Monitoring Program
SWGP	Stormwater Grant Program
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TDS	Total Dissolved Solids
TEC	Threshold Effect Concentration
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
VOC	Volatile Organic Compound
WBPC	Water Body-Pollutant Combination
WCB	Wildlife Conservation Board
WDR	Waste Discharge Requirement
WER	Water Effects Ratios
WERF	Water Environment Research Foundation
WLA	Waste Load Allocation
WMA	Watershed Management Area
WMMS	Watershed Management Modeling System
WMP	Watershed Management Program
WQBEL	Water Quality-Based Effluent Limitation
WQO	Water Quality Objective
WRP	Water Reclamation Plant

WRRDA	Water Resources Reform and Development Act

Executive Summary

The executive summary of the 2016 Enhanced Watershed Management Program (EWMP) is superseded by the content of the 2018 revised EWMP (rEWMP). See the rEWMP Main Report for an executive summary of the program.

1. Introduction

This document describes how the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) developed an Enhanced Watershed Management Program (EWMP) per the requirements set forth in the Los Angeles County (LAC) National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit (Permit), Order No. R4-2012-0175. This document also describes the path Permittees utilized to complete the EWMP process required in the MS4 Permit. The EWMP addresses water quality priorities in portions of the Rio Hondo and San Gabriel River, and their respective tributaries. A comprehensive stormwater management plan that optimizes stormwater and financial resources has been produced through this EWMP process. The EWMP integrates existing planning efforts and identifies additional opportunities for water quality enhancement through both programmatic and structural controls. In addition, the EWMP incorporates multi-benefit projects that not only improve water quality, but also provide aesthetic, recreational, water supply, and/or community enhancements.

1.1 Applicability of EWMP

Permittees participating in the original 2016 RH/SGRWQG EWMP included the County of Los Angeles, Los Angeles County Flood Control District (LACFCD), and the Cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, and Sierra Madre, several of which are in both the Los Angeles River (LAR) and San Gabriel River (SGR) Watersheds. During development of the revised EWMP (rEWMP) in 2018, the City of Azusa decided not to participate. Although they are referenced for context in figures throughout this chapter, they are no longer considered a member of the RH/SGRWQG. A description of the LACFCD and their involvement in the EWMP process is provided in **Attachment A**. **Figure 1-1** provides a map illustrating the LAR and SGR Watersheds and the jurisdictional boundaries of the RH/SGRWQG members participating in this EWMP. **Table 1-1** describes the size and percentage of each participating member's jurisdiction within the group and the percent contribution to the LAR and SGR Watersheds.

Table 1-1 Jurisdictions within RH/SGRWQG

RH/SGRWQG Member	Area Inside RH/SGRWQG (square miles)	Total Percent of RH/SGRWQG	Percent in LAR Watershed	Percent in SGR Watershed
Arcadia	11.1	35%	98%	2%
Bradbury	1.9	6%	41%	59%
Duarte	3.6	11%	37%	63%
Monrovia	7.9	25%	99%	1%
Sierra Madre	2.8	9%	100%	0%
Los Angeles County	4.6	14%	54%	46%

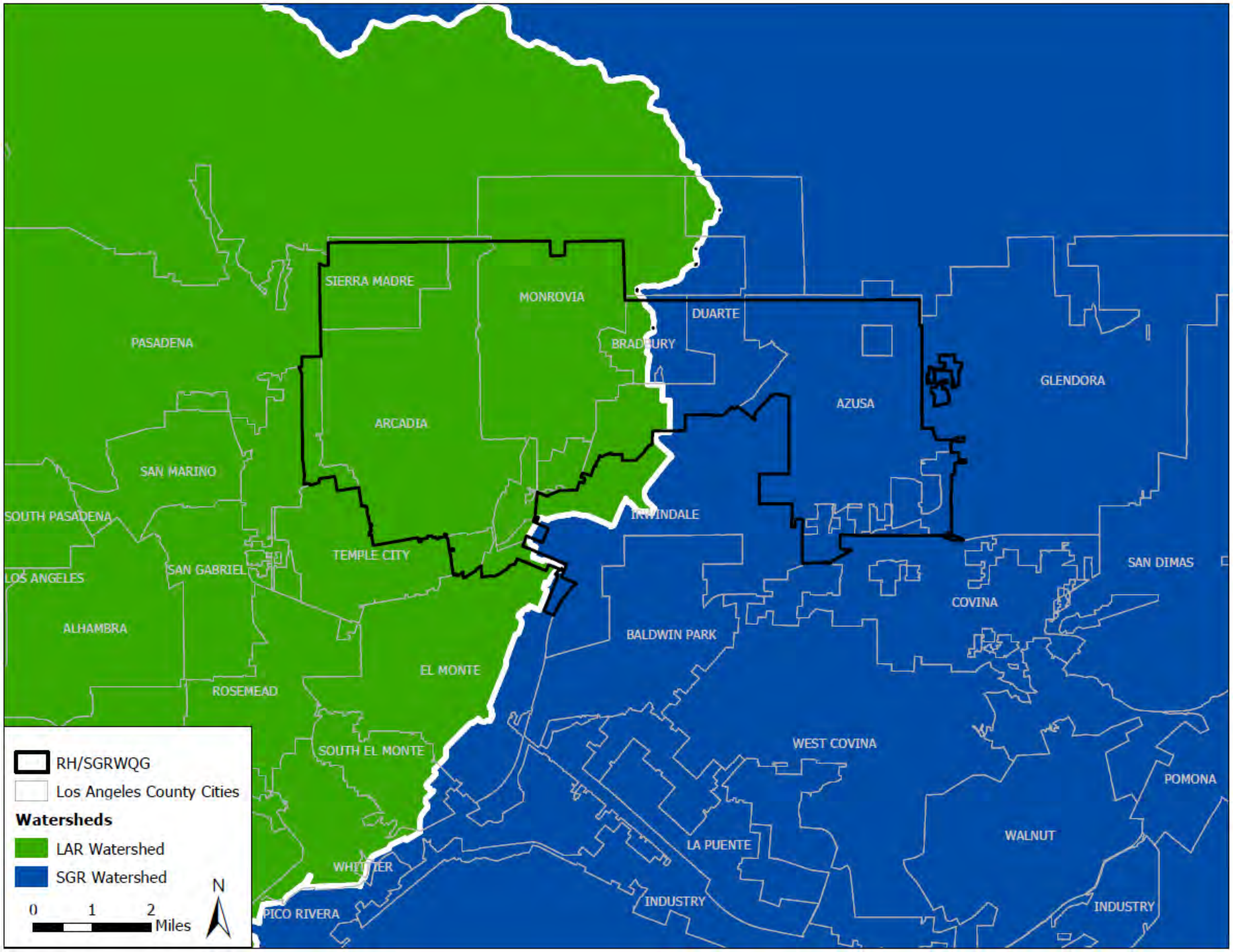


Figure 1-1 RH/SGRWQG and Major Watersheds (Azusa shown for watershed context – no longer a member of the WQG)

1.2 Geographic Scope and Characteristics

The RH/SGRWQG watershed characteristics, including the physical and hydrological conditions, are unique to the area and are presented below, including the extent of the MS4 and receiving waters addressed by this EWMP.

1.2.1 Watershed Characteristics

The RH/SGRWQG is located in the eastern portion of the LAR Watershed and the upper portion of the urban SGR Watershed. The area included in the RH/SGRWQG EWMP encompasses approximately 41 square miles of predominately residential and open space land use and excludes areas in the Angeles National Forest. The RH/SGRWQG members have jurisdiction over four and three percent of the total LAR and SGR Watersheds, respectively. **Table 1-2** depicts the watershed land use categories within the RH/SGRWQG area, corresponding with **Figure 1-2**.

Table 1-2 RH/SGRWQG Land Use Summary

Land Use Category	Area (square miles)	Percentage
Agriculture	0.3	1%
Commercial	2.0	6%
Education	1.1	4%
Industrial	1.3	4%
Multi-Family (MF) Residential	2.4	7%
Single Family (SF) Residential	13.8	44%
Transportation	5.3	17%
Vacant	5.2	17%
Water	0.2	1%
Total	**31.5**	**100%**

The hydrologic characteristics of the RH/SGRWQG include:

- Soil types based on the LAC Hydrology Manual (2006), (**Figure 1-3**);
- Storm depth that increases from south to north and has higher depths in the center of the RH/SGRWQG area with a peak in the City of Bradbury, as indicated by the 85th percentile, 24-hour rainfall depth distribution (**Figure 1-4**);
- Storm intensity that increases from south to north, as indicated by the 50-year, 24-hour rainfall intensity distribution (**Figure 1-5**); and
- MS4 outfalls along the Rio Hondo and SGR being identified and investigated through Coordinated Integrated Monitoring Program (CIMP) efforts (**Figure 1-6**).

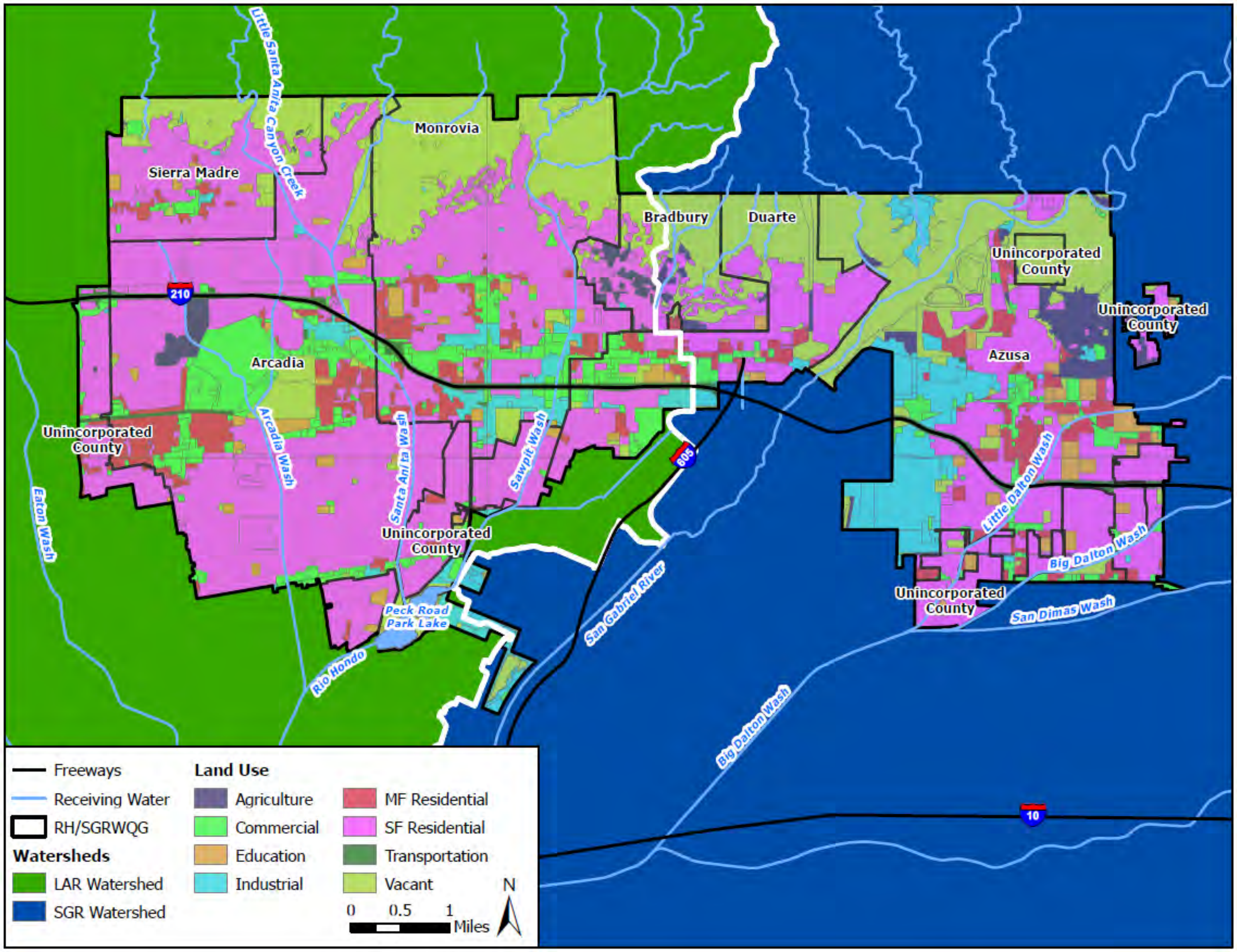


Figure 1-2 RH/SGRWQG Land Use (Azusa shown for watershed context – no longer a member of the WQG)

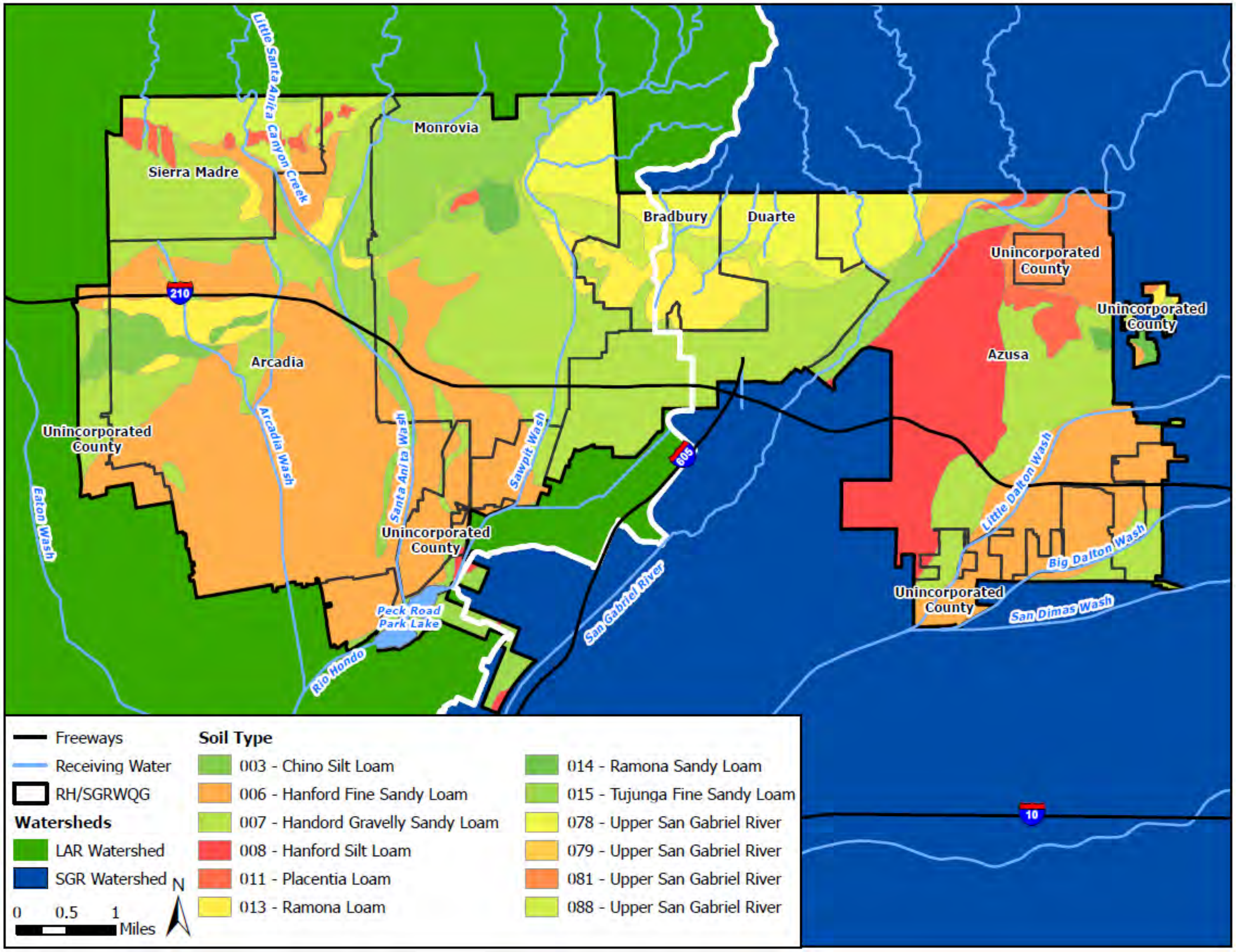
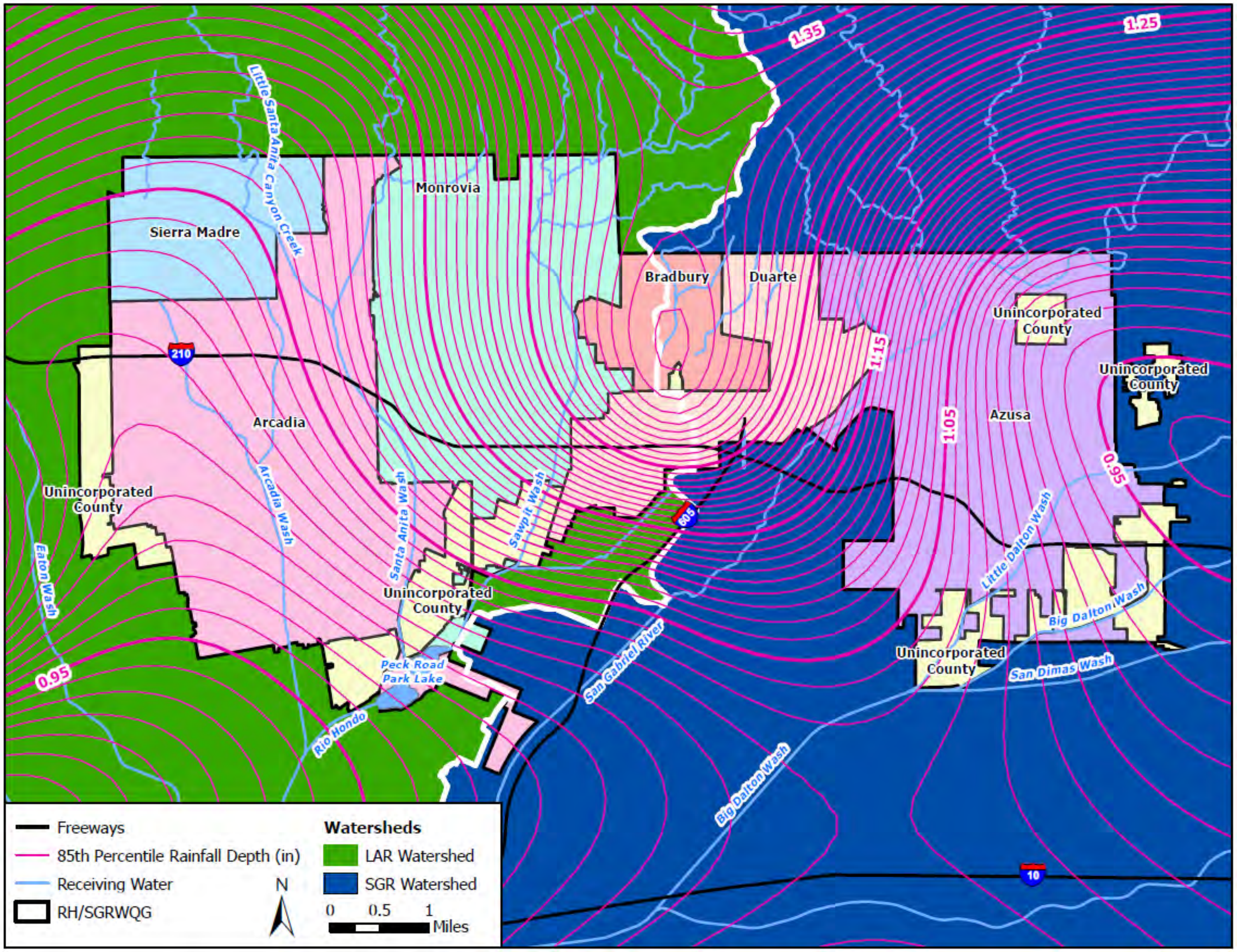


Figure 1-3 RH/SGRWQG Soil Types **(Azusa shown for watershed context – no longer a member of the WQG)**

1



2
3 **Figure 1-4 85th Percentile, 24-Hour Rainfall Depths (Azusa shown for watershed context – no longer a member of the WQG)**
4

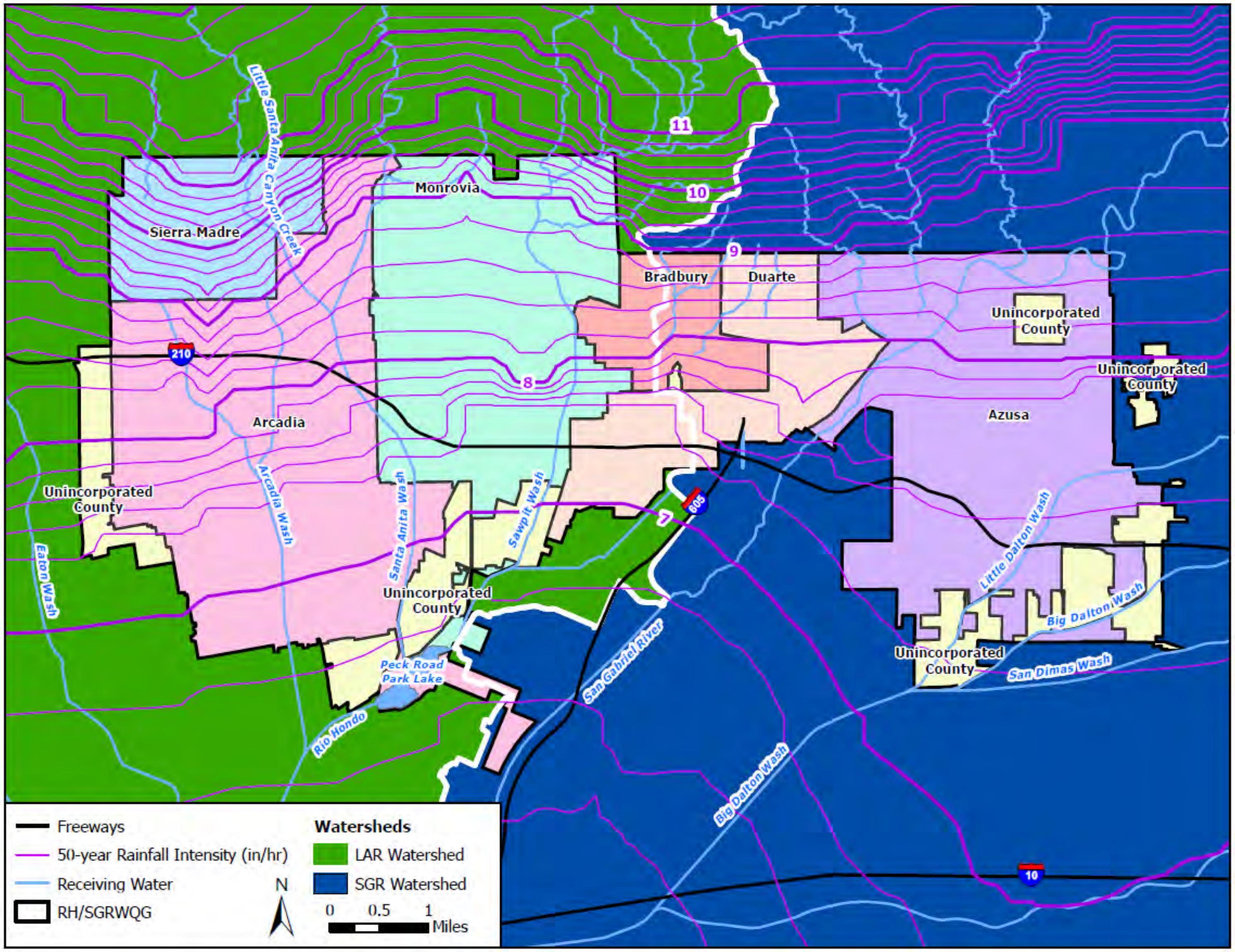


Figure 1-5 50-Year, 24-Hour Rainfall Intensity (Azusa shown for watershed context – no longer a member of the WQG)

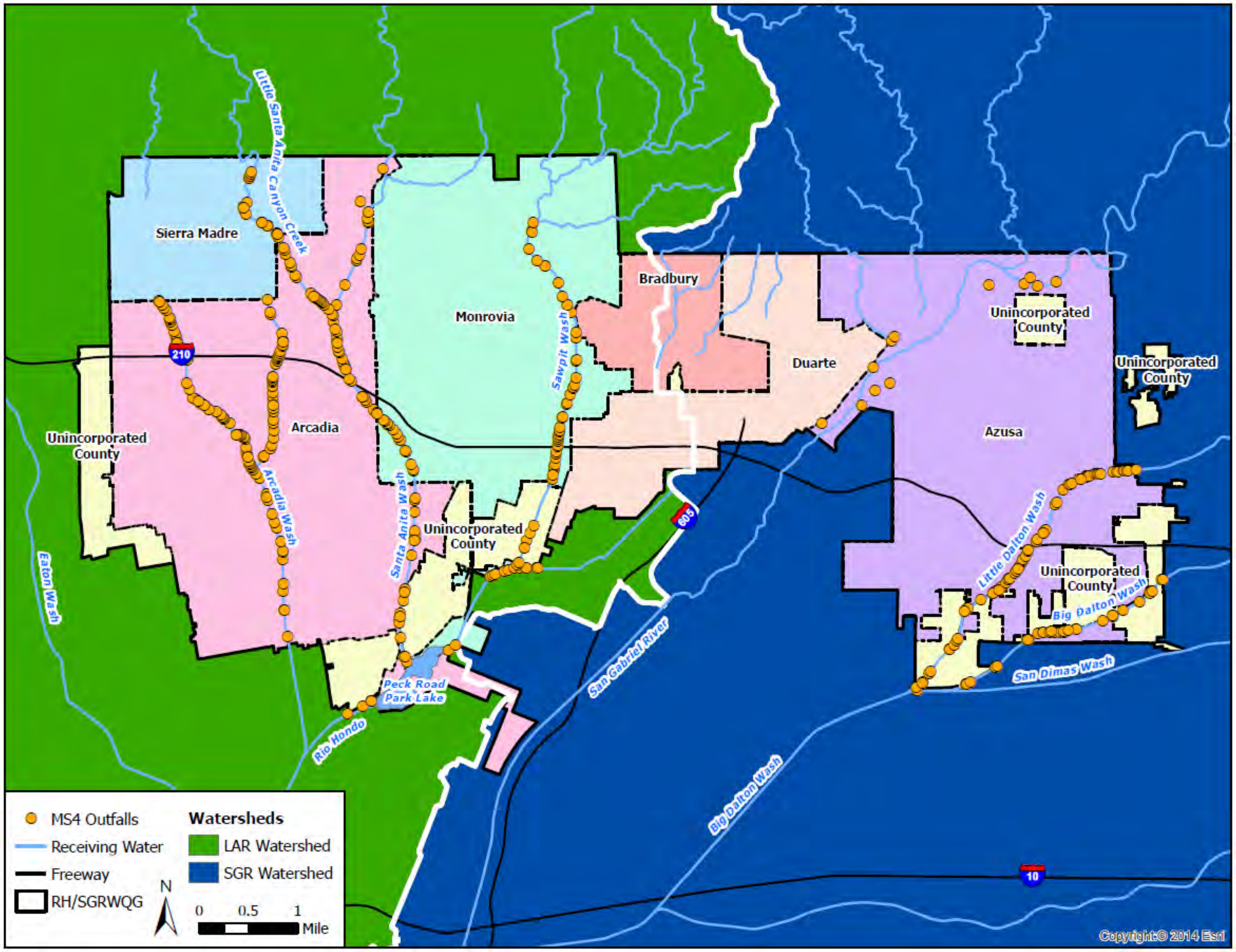


Figure 1-6 MS4 Outfalls (Azusa shown for watershed context – no longer a member of the WQG)

1.2.2 Water Body Characteristics

The RH/SGRWQG area is in both the LAR and SGR Watersheds. Major receiving water bodies located in the RH/SGRWQG area are identified in **Figure 1-7**. The RH/SGRWQG area is hydraulically connected to the downstream reaches in wet-weather, but disconnected in dry-weather as a result of water conservation efforts by the LACFCD at various groundwater recharge facilities and natural infiltration in the soft bottom reaches of the SGR. Future monitoring as part of the CIMP will provide additional evidence as to the level of connection between the RH/SGRWQG area and downstream reaches. Receiving waters within the RH/SGRWQG area include:

- LAR Watershed Water Bodies (tributary to Rio Hondo)
  - Arcadia Wash
  - Little Santa Anita Canyon Creek
  - Santa Anita Wash
  - Monrovia Canyon Wash
  - Sawpit Wash
  - Rio Hondo Reach 3
- SGR Watershed Water Bodies (tributary to SGR)
  - SGR Reach 5
  - Little Dalton Wash
  - Big Dalton Wash
  - San Dimas Wash

Lakes and reservoirs in the EWMP area include:

- LAR Watershed Lake
  - Peck Road Park Lake
- SGR Watershed Lake
  - Santa Fe Dam Park Lake

The Santa Fe Dam Park Lake is included in the list of major water bodies in the RH/SGRWQG area; however, there are no MS4 discharges to the lake, thus it will not be included in the EWMP. The water quality associated with these water bodies is discussed in **Section 2**.

The beneficial uses for the applicable water bodies are summarized in **Table 1-3**. The Basin Plan for LAC identifies the following applicable beneficial uses:

1. **Municipal and Domestic Supply (MUN)** – Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
2. **Industrial Service Supply (IND)** – Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
3. **Industrial Process Supply (PROC) –** Uses of water for industrial activities that depend primarily on water quality.
4. **Agricultural Supply (AGR) –** Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
5. **Groundwater Recharge (GWR)** – Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
6. **Water Contact Recreation (REC-1)** – Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

7. **Non-contact Water Recreation (REC-2)** – Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
8. **Warm Freshwater Habitat (WARM) –** Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
9. **Wildlife Habitat (WILD) –** Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
10. **Rare, Threatened, or Endangered Species (RARE) –** Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.
11. **Wetland Habitat (WET) –** Uses of water that support wetland ecosystems including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife and other unique wetland functions which enhance water quality.

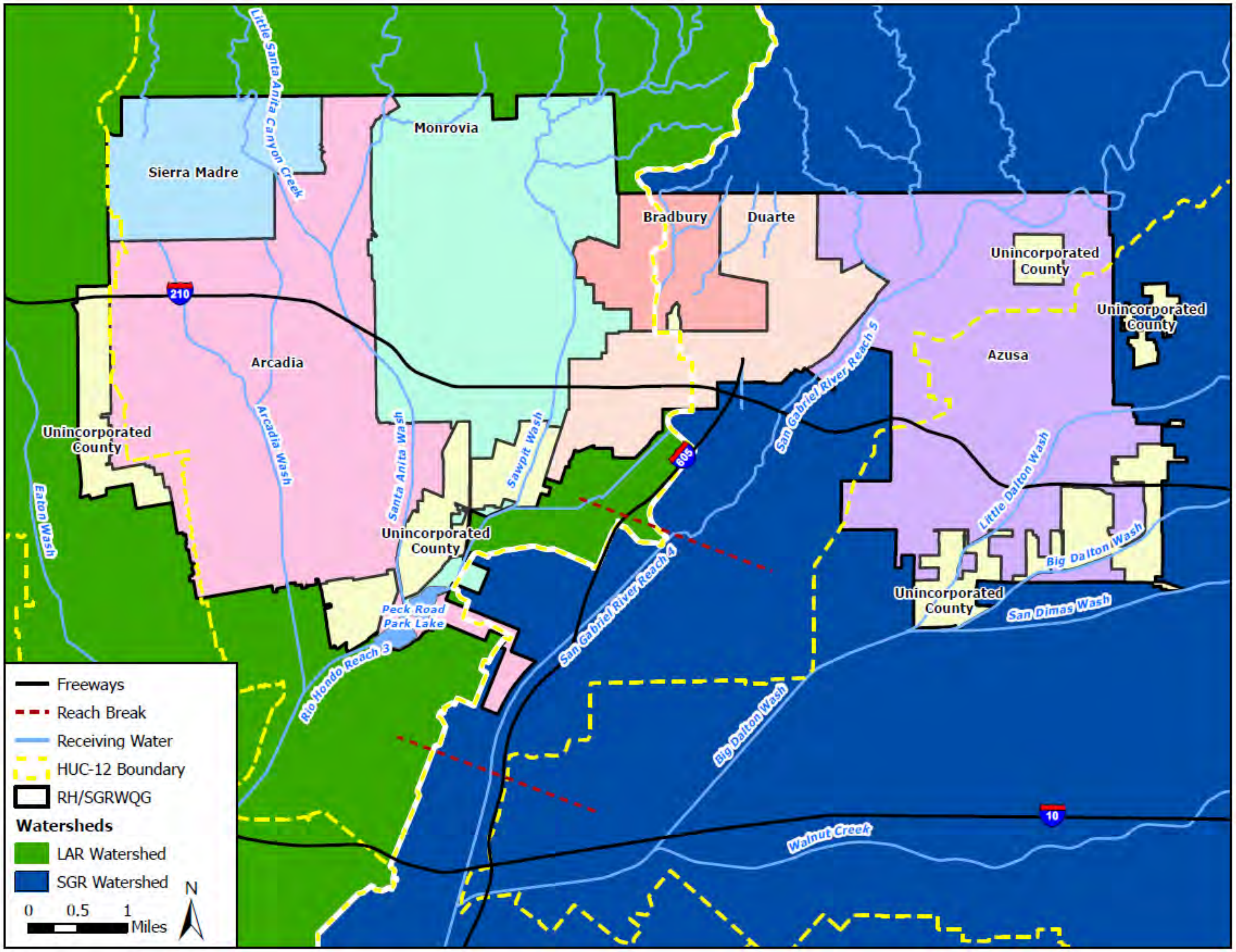


Figure 1-7 RH/SGRWQG Nearby Water Bodies and Regional Board Reaches **(Azusa shown for watershed context – no longer a member of the WQG)**

Table 1-3 Beneficial Use Summary of RH/SGRWQG Water Bodies

Water Body		Existing Beneficial Uses	Intermittent Beneficial Uses	Potential Beneficial Uses
LAR Watershed Water Bodies	Arcadia Wash	---	GWR, REC-2	MUN*, REC-1, WARM, WILD
	Little Santa Anita Canyon Creek	WILD	GWR, WARM	MUN*
	Santa Anita Wash	GWR[1], REC-1[1], REC-2, WARM[1], WILD[1], RARE	GWR[2]	MUN*, REC-1[2], WARM[2], WILD[2]
	Monrovia Canyon Wash	WILD, WET	MUN, GWR, REC-1, REC-2, WARM	---
	Sawpit Wash	WILD	MUN, GWR, REC-1, REC-2, WARM	---
	Rio Hondo Reach 3	REC-2, RARE, WET	GWR, REC-1, WILD	MUN*, WARM
LAR Watershed Lake	Peck Road Park Lake[4]	REC-2	GWR, WILD	MUN*, REC-1[3], WARM
SGR Watershed Water Bodies	SGR Reach 5	MUN, IND, PROC, AGR, GWR, REC-1, REC-2, WILD, WARM, COLD	---	---
	Little Dalton Wash	---	GWR, REC-2	MUN*, REC-1[3], WARM, WILD
	Big Dalton Wash	---	GWR, REC-2	MUN*, REC-1[3], WARM, WILD
	San Dimas Wash	GWR[1], WILD, RARE[2]	GWR[2], REC-1[3], REC-2, WARM	MUN*
SGR Watershed Lake	Santa Fe Dam Park Lake	WILD, WET	GWR, REC-2, WARM	REC-1, MUN*

*MUN designations are designated under SB 88-63 and RB 89-03. Some designations may be considered for exemptions at a later date.
[1] Only applies to upper portion of the corresponding water body.
[2] Only applies to lower portion of the corresponding water body.
[3] Access prohibited by Los Angeles County Department of Public Works in concrete-channelized areas.
[4] Beneficial uses were not identified in the Basin Plan for Peck Road Park Lake. Therefore the downstream segment's uses (Rio Hondo Reach 1) apply based on Regional Board input (USEPA, 2012b).

1.3 Regulatory Framework

In 1972, provisions of the Federal Water Pollution Control Act, referred to as the Clean Water Act (CWA), were amended so that the discharge of pollutants to Waters of the United States from any point source is effectively prohibited, unless the discharge is in compliance with an NPDES permit. In 1987, the CWA was amended, also called the Water Quality Act of 1987, to require the United States Environmental Protection Agency (USEPA) to establish a program to address stormwater discharges. In response, USEPA promulgated the NPDES stormwater permit application regulations. These regulations required that facilities with stormwater discharges "…from a large or medium municipal storm sewer system; or (3) a discharge which USEPA or the state/tribe determines to contribute to a violation of a water quality standard…" apply for an NPDES permit. On November 16, 1990, the USEPA published final regulations that established application requirements for stormwater permits for MS4s serving a population of over

100,000 (Phase I communities) and certain industrial facilities, including construction sites greater than five acres. On December 8, 1999, the USEPA published the final regulations for communities under 100,000 (Phase II MS4s) and operators of construction sites between one and five acres.

The State of California Porter-Cologne Water Quality Control Act (Water Code 13000, et seq.) is the principal legislation for controlling stormwater pollutants in California, requiring the development of Basin Plans for drainage basins within the state. Each plan serves as a blueprint for protecting water quality within the various watersheds. These basin plans are used in turn to identify more specific controls for discharges (e.g., wastewater treatment plant effluent, urban runoff, and agriculture drainage). Under Porter-Cologne, specific controls are implemented through permits called Waste Discharge Requirements (WDRs) issued by the nine Regional Water Quality Control Boards. For discharges to surface waters, the WDRs also serve as an NPDES permit.

The Los Angeles Regional Water Quality Control Board (LARWQCB or Regional Board) adopted WDRs for MS4 discharges within the Coastal Watersheds of LAC, except those discharges originating from the City of Long Beach MS4 (Order No. R4-2012-0175; NPDES Permit No. CAS004001) on November 8, 2012. The MS4 Permit became effective on December 28, 2012. The MS4 Permit contains effluent limitations, Receiving Water Limitations (RWLs), minimum control measures (MCMs), Total Maximum Daily Load (TMDL) provisions, and outlines the process for developing Watershed Management Programs (WMPs), including the EWMP. The MS4 Permit incorporates the TMDL Waste Load Allocations (WLAs) applicable to dry- and wet-weather as Water Quality-Based Effluent Limitations (WQBELs) and/or RWLs. Part V.A of the MS4 Permit requires compliance with the WQBELs as outlined by the respective TMDLs.

1.3.1 MS4 Permit Requirements

Part VI.C.1.g of the MS4 Permit states that Permittees may elect to develop an EWMP that comprehensively evaluates opportunities within the participating watershed management area (WMA) for collaboration among Permittees and other partners on multi-benefit regional projects, referred to as regional EWMP projects, that wherever feasible retain all non-stormwater and stormwater runoff from the 85th percentile, 24-hour storm event for drainage areas tributary to the project. These regional EWMP projects are also to incorporate other benefits including flood control and water supply enhancements. In the drainage areas where regional EWMP projects are not feasible, a Reasonable Assurance Analysis (RAA) is to be included to demonstrate that applicable Water Quality Objectives (WQOs), including WQBELs and RWLs, will be achieved through the implementation of watershed control measures. According to Parts VI.C.1.g.i.-ix of the MS4 Permit the EWMP must:

i. Be consistent with the provisions in Part VI.C.1.a.-f and VI.C.5-C.8;
ii. Incorporate applicable State agency input on priority setting and other key implementation issues;
iii. Provide for meeting water quality standards and other CWA obligations by utilizing provisions in the CWA and its implementing regulations, policies, and guidance;
iv. Include multi-benefit regional projects to ensure that MS4 discharges achieve compliance with all final WQBELs set forth in Part VI.E of the MS4 Permit and do not cause or contribute to exceedances of RWLs in Part V.A of the MS4 Permit by retaining through infiltration or capture and reuse the stormwater volume from the 85th percentile, 24-hour storm for the drainage areas tributary to the multi-benefit regional projects;
v. In drainage areas where retention of the stormwater volume from the 85th percentile, 24-hour storm event is not technically feasible, include other watershed control measures to ensure that MS4 discharges achieve compliance with all interim and final WQBELs set forth in Part VI.E of the MS4 Permit with compliance deadlines occurring after approval of an EWMP and to ensure that MS4 discharges do not cause or contribute to exceedances of RWLs in Part V.A of the MS4 Permit;

vi. Maximize the effectiveness of funds through analysis of alternatives and the selection and sequencing of actions needed to address human health and water quality related challenges and non-compliance;
vii. Incorporate effective innovative technologies, approaches and practices, including green infrastructure;
viii. Ensure that existing requirements to comply with technology-based effluent limitations and core requirements (e.g., including elimination of non-stormwater discharges of pollutants through the MS4, and controls to reduce the discharge of pollutants in stormwater to the maximum extent practicable [MEP]) are not delayed; and
ix. Ensure that a financial strategy is in place.

Part VI.C.4.c.iv of the MS4 Permit states that Permittees that elect to collaborate and develop an EWMP, shall submit the Work Plan for development of the EWMP no later than June 28, 2014, 18 months from the effective date of the MS4 Permit. The draft EWMP is to be submitted no later than June 28, 2015, 30 months from the effective date of the MS4 Permit. These deadlines stand true if the conditions described in Parts VI.C.4.c.iv.(1)-(3) of the MS4 Permit are met in greater than 50 percent of the land area in the watershed. In summary, the conditions require demonstrating there are Low Impact Development (LID) ordinances in place and/or commence development of LID ordinances that meet the requirements of the Planning and Land Development Program as described by Part VI.D.7 of the MS4 Permit, demonstrating that green streets policies are in place and/or commence development of a policy, and a Notice of Intent (NOI) to develop an EWMP is submitted, all within six months of the MS4 Permit's effective date. The RH/SGRWQG NOI is provided in **Attachment B**.

1.3.2 Relevant TMDLs

TMDLs applicable to the RH/SGRWQG are listed in **Table 1-4**. The resolutions and effective dates reflect the most recent amendments to the LAR nitrogen and metals TMDLs. Revised WQBELs and RWLs are incorporated into the MS4 Permit by the Regional Board after adoption and approval of the TMDL amendment. TMDL impacted reaches are highlighted in **Figure 1-8** and a detailed summary of the numeric WLAs specified in the MS4 Permit is in **Attachment C**.

The LAR bacteria TMDL is complex, considering dry- and wet-weather conditions, differing implementation strategies, many river segments, allowing for tributary based diversion strategies, and differing implementation schedules that accompany each permutation. Within the RH/SGR area, water operations and management are equally complex and varied. Much of the dry-weather base flow appears to have its origin in rising groundwater or spring flows, which commingle with permitted and non-permitted non-stormwater discharge flows. When these comingled base flows generated in the LAR Watershed portion of the group arrive at Peck Road Park Lake, they are understood to infiltrate and not contribute to the downstream dry-weather impairments that resulted in the adoption of the TMDL. Similarly, base flows emanating from Arcadia Wash, are understood to comingle with flows from other Permittees along the Rio Hondo, primarily members of the Upper Los Angeles River Watershed Group, then infiltrate in unlined river sections behind the western Whittier Narrows Dam or at the downstream County operated Rio Hondo Spreading Grounds. Notwithstanding the incidental water quality benefits, Peck Park Lake, San Gabriel River, and spreading grounds are water conservation facilities that provide critical water recharge benefits to the area, and the LACFCD does not consider them to be best management practices. Noting that base flows and dry-weather discharges from the group are unlikely to have contributed to the impairments identified in the TMDL, nearly all water bodies within the greater Los Angeles region, have periodic exceedances for bacteria and it is likely that this pollutant can be best addressed along with other impairments.

Table 1-4 TMDLs Applicable to the RH/SGRWQG and Downstream Areas

TMDL	LARWQCB Resolution	Effective Date and/or USEPA Approval Date
Los Angeles River Nitrogen Compounds and Related Effects TMDL	2003-009	March 23, 2004
	2012-010	August 7, 2014
Los Angeles River Trash	2007-012	September 23, 2008
	R15-006	June 11, 2015[1]
Los Angeles River Metals TMDL	2007-014	October 29, 2008
	2010-003	November 3, 2011
	R15-004	April 9, 2015[1]
Los Angeles River Bacteria TMDL	2010-007	March 23, 2012
Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL	2011-008	March 23, 2012
TMDL for Indicator Bacteria in San Gabriel River, Estuary, and Tributaries	R15-005	June 10, 2015[1]
Los Angeles Area Lakes TMDLs for Peck Road Park Lake	N/A (USEPA TMDL)	March 26, 2012
San Gabriel River Metals and Impaired Tributaries Metals and Selenium TMDL		March 26, 2007

[1] Approved by the LARWQCB (effective date not identified)

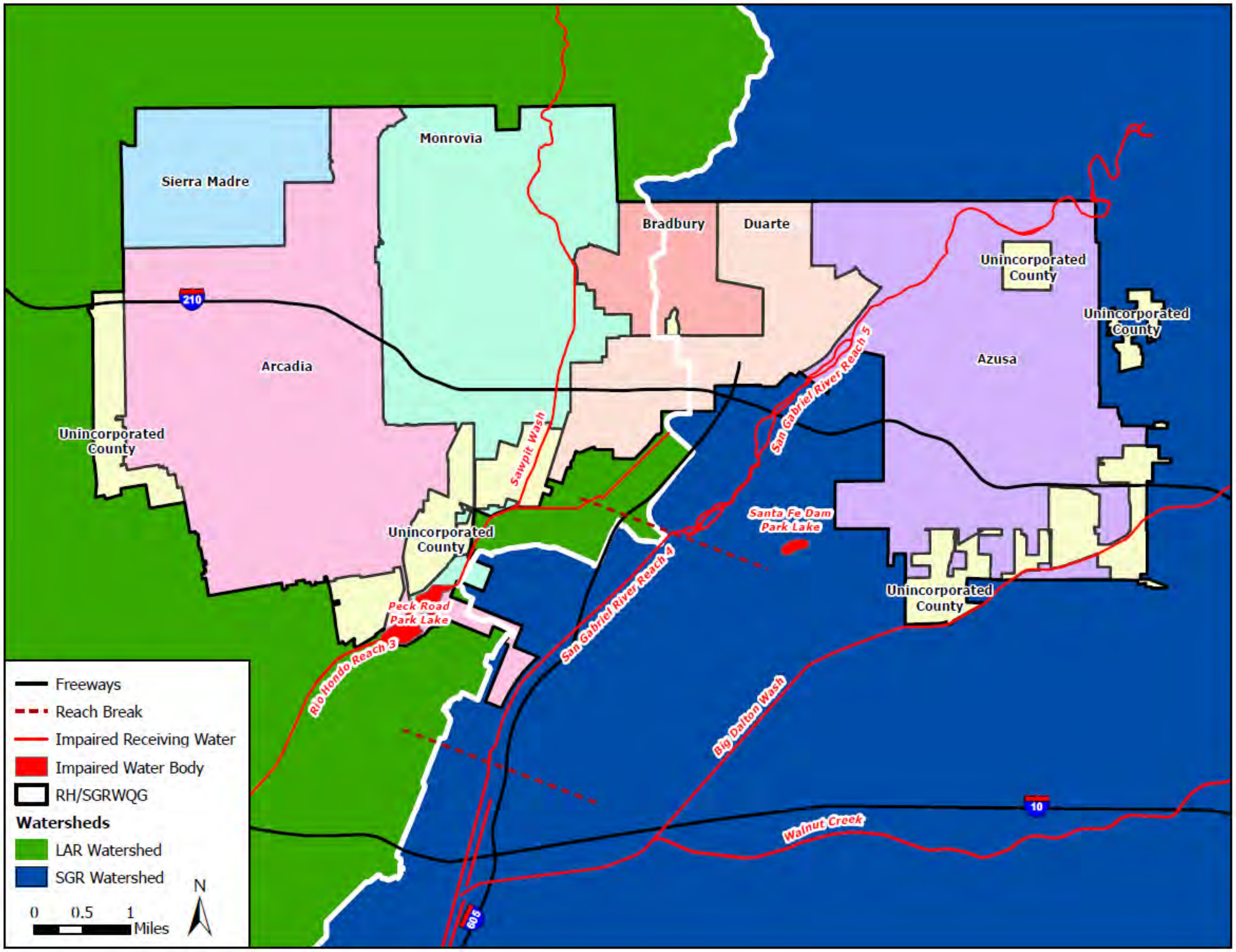


Figure 1-8 RH/SGRWQG Nearby Impaired Water Bodies (Azusa shown for watershed context – no longer a member of the WQG)

Table 1-5 demonstrates which RH/SGRWQG members are affected by each of the TMDLs per Attachment K, Tables K-5, K-6, K-9, and K-10, of the MS4 Permit and applicable TMDL staff reports for TMDLs approved after the MS4 Permit was adopted.

Table 1-5 RH/SGRWQG TMDLs and Applicability

RH/SGRWQG Member	LAR Watershed Trash TMDL	LAR Nitrogen Compounds and Related Effects TMDL	LAR and Tributaries Metals TMDL	LAR Watershed Bacteria TMDL	Los Angeles Area Lakes TMDLs for Peck Road Park Lake	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxics TMDL[1]	SGR and Impaired Tributaries Metals and Selenium TMDL	TMDL for Indicator Bacteria in the SGR, Estuary, and Tributaries
Arcadia	X	X	X	X	X		X	X
Bradbury	X	X	X	X	X		X	X
Duarte	X	X	X	X	X		X	X
Monrovia	X	X	X	X	X		X	X
Sierra Madre	X	X	X	X	X			
County of Los Angeles	X	X	X	X	X	X	X	X
LACFCD		X	X	X	X	X	X	X

[1] The Cities of Arcadia , Bradbury, Duarte, Monrovia, and Sierra Madre have a TMDL obligation to monitor at the mouth of the LAR and SGR Estuaries for the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxics TMDL.

Regional Board adopted TMDLs include implementation plans providing interim and final compliance dates. **Table 1-6** lists the interim and final compliance dates relevant to the RH/SGRWQG. There are two compliance paths for the LAR dry-weather bacteria TMDL, based on whether or not each jurisdiction, or the group, develops and implements a LRS. The LRS must quantitatively demonstrate that outfall specific actions are sufficient to result in attainment of the final WQOs. Additionally, there are required dry-weather "snapshot" monitoring events where, for each event, every flowing outfall is sampled for bacterial indicators. Six snapshot monitoring events are required prior to LRS implementation and three after to assess effectiveness. Completing the LRS process provides regulatory relief by providing seven additional years before final effluent limitations become effective. The LRS due date and corresponding interim and final compliance milestones for the dry-weather bacteria TMDL for the LAR side of the RH/SGRWQG are included in **Table 1-6**. The RH/SGRWQG plans to develop an ACS/LRS for the LAR Watershed, which is subject to the LAR Bacteria TMDL, as further discussed in the beginning of this subsection.

The Regional Board approved an implementation plan for the SGR Metals TMDL on March 4, 2014. For Peck Road Park Lake there is no established implementation plan; therefore, the milestones and ultimate compliance dates for Peck Road Park Lake have been established through the EWMP process. The compliance dates and milestones for the TMDLs applicable to the RH/SGRWQG are listed in **Table 1-6**, including those for Peck Road Park Lake. **Table 1-7** identifies the WQBELs and WLAs for discharges to Peck Road Park Lake.

Table 1-6 Schedule of TMDL Compliance Milestones Applicable to the RH/SGRWQG

TMDL	Water Bodies	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Milestones (Bolded **numbers** indicate milestone deadlines within the current MS4 Permit term)[1]													
					2012	2013	2014	2015	2016	2018	2020	2023	2024	2026	2028	2030	2036	2037
LAR Nitrogen[2]	All	Ammonia, Nitrate, Nitrite, Nitrate+Nitrite	Meet WQBELs	All	**Pre 2012**													
					Final													
LAR Trash	All	Trash	% Reduction	All	**9/30**	**9/30**	**9/30**	**9/30**	**9/30**									
					70%	**80%**	**90%**	**96.7%**	**100%**									
LAR Metals	All	Copper, Lead, Zinc, Cadmium	% of MS4 area Meets WQBELs	Wet	**1/11**								1/11		1/11			
					25%								50%		100%			
SGR Metals	All	Copper, Lead, Zinc	% of MS4 area Meets WQBELs[3]	Wet						**3/31**	9/30	9/30		9/30				
										10%	35%	65%		100%				
LAR Bacteria	All	*E. Coli*	Meet WQBELs	Dry w/o LRS								9/23						
												Final						
				Dry w/ LRS					**3/23**			9/23				3/23		
									LRS Due[4]			Interim				Final		
				Wet														3/23
																		Final
SGR Bacteria[5]	All	*E. Coli*	Meet WQBELs	Dry										12/1				
														Final				
				Wet													12/1	
																	Final	
LA Area Lakes	Peck Road Park Lake	Total-P, Total-N, Trash Water and Sediment: PCBs, Chlordane, DDT, Dieldrin	Meet WLAs	All	USEPA TMDLs, which do not contain interim milestones or implementation schedule. The MS4 Permit (Part VI.E.3.c, page 145) allows MS4 Permittees to propose a schedule as part of this EWMP. See **Section 2.5** for established schedule.													

[1] The MS4 Permit term is assumed to be five years from the MS4 Permit effective date or December 27, 2017.
[2] See Section "Key Findings Related to the Los Angeles River Nitrogen TMDL" in **Attachment D** for a summary of existing water quality.
[3] Alternatively may be demonstrated as percent of required reduction.
[4] LRS requires coordinated effort by all MS4 Permittees within a segment or tributary. An LRS must quantitatively demonstrate that the actions for specific outfalls are sufficient to result in attainment of the *final* WLAs. Requires six snapshot sampling events prior to LRS and three post-LRS snapshot sampling events. The RH/SGRWQG is investigating an ACS/LRS, as discussed above.
[5] Anticipated schedule assumes TMDL will become effective December 1, 2016. The schedule will be revised through the Adaptive Management Process depending on the effective date.

1

Table 1-7 Applicability of WQBELs and WLAs for Peck Road Park Lake

Constituent	Water Column	Suspended Sediment	Fish Tissue
Total Nitrogen	W		
Total Phosphorus	W		
Trash	W		
Total PCB	W	W	Alt
Total Chlordane	W	W	Alt
Dieldrin	W	W	Alt
Total DDT*	W	W	Alt

W = WLA established by TMDL.
Alt = Alternate compliance options if fish tissue targets are met.
*Total DDT measured in suspended sediment, 4-4' DDT measured in water column.

1.4 EWMP Development Process

According to Part VI.C.1.f.v of the MS4 Permit, each EWMP must provide appropriate opportunity for meaningful stakeholder input, including, but not limited to, a permit-wide WMP Technical Advisory Committee (TAC) that will advise and participate in the development of the EWMP from month six through the date of approval. The MS4 Permit requires that the TAC include at least one Permittee representative from each WMA for which an EWMP is being developed and one public representative from a non-governmental organization with public membership, and staff from the Regional Board and USEPA Region IX. The RH/SGRWQG has been part of the TAC and provided input on the various topics discussed. Additionally, the RH/SGRWQG is working with local and regional stakeholders to receive input on the EWMP process.

The RH/SGRWQG members have held bi-monthly meetings since the project's initiation and continued to do so throughout the EWMP development process. Two workshops were held to bring together interested parties to provide input and insight into the approach and findings of this EWMP. These workshops solicited input and ideas from stakeholders, specifically in regards to potential multi-benefit regional projects.

The RH/SGRWQG conducted its first stakeholder outreach meeting on May 5, 2014, in collaboration with the Upper San Gabriel River Group. Thirty-nine (39) participants attended the outreach event, including non-governmental organizations, an assembly member representative, Regional Board staff, and other interested stakeholders. The second stakeholder outreach meeting was held on March 9, 2015, also in collaboration with the Upper San Gabriel River Group. This meeting was held at the Los Angeles County Arboretum and ninety-five (95) participants attended the meeting. Similar to the first outreach event, attendants included non-governmental organizations, an assembly member representative, Regional Board staff, news reporters, and other interested stakeholders. This outreach event focused on the potential regional projects being selected for inclusion in the EWMP and allowed stakeholders to provide feedback.

1.5 EWMP Overview

The EWMP details the water quality priorities within the RH/SGRWQG and identifies the existing control measures in place to address those priorities. Additional control measures are proposed over the implementation timeframe so that WQOs can be achieved by the milestones specified in the MS4 Permit or established as part of this EWMP. An RAA has been conducted for the areas that are not tributary to regional EWMP projects to demonstrate compliance at each of the applicable milestone dates. Additionally, the control measure implementation schedule and cost have been developed. The EWMP includes the following sections:

- **Section 2 – Water Quality Priorities**
  Receiving water bodies are identified and characterized based on limited available water quality data. Water Body-Pollutant Classifications are developed so that categories can be assigned to each water body-pollutant combination and they can be prioritized. The water quality priorities are the primary "driver" of the EWMP.

- **Section 3 – Watershed Control Measures**
  This section outlines the existing control measures implemented by the RH/SGRWQG. Potential control measures are also identified. Existing structural Best Management Practices (BMPs) are identified and planning documents were reviewed to identify potential regional projects. In addition, the methodology for identifying and selecting additional regional and distributed BMPs is included. The current MCMs are also described. The proposed watershed control measures, both structural and non-structural, are identified and will be implemented to address the water quality priorities.

- **Section 4 – Reasonable Assurance Analysis**
  The details regarding the RAA modeling are presented in this section, including the modeling software and the dry- and wet-weather modeling approaches. The model calibration and validation are presented. The baseline simulation and the estimated load reductions based on the 90^{th} percentile load analysis are discussed and the limiting priority pollutant is established. The pollutant load reductions based on control measure implementation are also identified to demonstrate compliance at each of the applicable milestone dates.

- **Section 5 – Control Measure Implementation Schedule**
  This section identifies the schedule for implementation of the selected watershed control measures. The implementation schedule is such that the interim and final WQOs will be satisfied by the applicable milestone dates.

- **Section 6 – Control Measure Implementation Cost**
  The control measure implementation cost for the proposed control measures is presented in this section. The capital costs and operation and maintenance costs are discussed. The annual cost for the group is identified over the implementation timeframe. Additionally, the funding strategies proposed are identified.

- **Section 7 – Adaptive Management Process**
  The EWMP is part of an adaptive management process laid out in the MS4 Permit. This section discusses future iterations as part of this process.

1.6 2012 MS4 Permit Process and EWMP Implementation

Following Regional Board adoption of the 2012 MS4 Permit as Order R4-2012-0175 on November 8, 2012, thirty-seven cities and three non-governmental organizations filed petitions for review with the State Water Resources Control Board (SWRCB), which were acknowledged in a January 30, 2013 letter, and deemed complete on July 8, 2013. Five of the filing Cities also simultaneously filed Request for Stays, which were denied on June 14, 2013. On April 1, 2014, the SWRCB adopted an Own Motion Review and thirty-five of the petitioners agreed to have their petitions for review placed in abeyance. The SWRCB adopted the new Order on June 12, 2015, and the Regional Board posted revisions to the MS4 Permit shortly thereafter. The following reservation is included as a contingency in the EWMP, while the review processes proceed.

> *The Cities of Duarte and Huntington Park filed a Petition for Writ of Mandate and Complaint on July 2, 2015, in the Los Angeles Superior Court, in that case entitled The Cities of Duarte and Huntington Park v. State Water Resources Control Board, et al., Los Angeles Superior Court Case No. BS156303 (hereafter, the "Duarte Case"), challenging, among other things, the propriety of the various Permit terms and the subsequently issued State Board Order, Order No. WQ-2015-0075 (issued on June 16, 2015 -hereafter, "State Board Order"). The Duarte Case challenges, among other issues, those Permit terms and State Board Order requirements designed to require that the Permittees strictly comply with numeric effluent limits, either directly by meeting all such numeric limitations, including both interim and final numeric limits, or indirectly through the implementation of "Watershed Management Programs" ("WMPs") or "Enhanced Watershed Management Programs" ("EWMPs") that are to be designed to meet all such numeric effluent limitations.*

> *On July 24, 2015, the City of Gardena also filed a Petition for Writ of Mandate and Complaint in Los Angeles Superior Court entitled City of Gardena v. Regional Water Quality Control Board, et al., Los Angeles Superior Court Case No. BS156342 (hereafter the "Gardena Case") asserting similar claims to those raised in the Duarte Case, among others.*

> *In spite of the pending Duarte and Gardena Cases, the Cities under this EWMP are acting in good faith and moving forward to attempt to comply with all of the applicable terms of the Permit, and look forward to working with the Regional Board to assess and implement the strategies and requirements necessary for compliance. Nevertheless, the Cities believe that many of the terms of the 2012 Permit are invalid, including the terms involving compliance with numeric limits. The Cities hereby expressly reserve and are not waiving, with this submission or otherwise, any of their rights to challenge the need for any EWMP or CIMP, or any other part or portion of the Permit or the State Board Order. In addition, the Cities are not waiving, and hereby expressly reserve, any and all rights they have or may have to seek to recover the costs from the State to develop and implement any EWMP, or CIMP, on the grounds that such requirements are unfunded State mandates, and if funds are not provided by the State, to reimburse the Cities for such programs, to assert that all such requirements are invalid.*

2. Water Quality Priorities

The identification of water quality priorities is an important first step in the EWMP process. Water quality priorities provide the basis for implementation and monitoring activities within the EWMP, CIMP, and the selection and scheduling of BMPs during the RAA. Part VI.C.5.a of the MS4 Permit outlines the pertinent elements of the prioritization process as follows:

1. Water quality characterization based on available monitoring data, TMDLs, 303(d) lists, stormwater annual reports, etc.
2. Water body-pollutant classification to identify water body-pollutant combinations (WBPCs) that fall into three MS4 Permit defined categories.
3. Source assessment for the WBPCs in the three categories.
4. Prioritization of the WBPCs.

Based on available information and data analysis, WBPCs are classified into one of the three MS4 Permit categories: Category 1 if WBPCs are subject to established TMDLs; Category 2 if they are on the 303(d) list, or have sufficient measured exceedances of objectives to be listed; and Category 3 if observed exceedances are too infrequent to be listed. The categories are further described in **Table 2-1**. To support development of the EWMP scheduling, subcategories were developed for each of the WBPCs in Category 1, 2, and 3, and are discussed in **Section 2.2**.

Table 2-1 Water Body-Pollutant Combination Categories

Category	Priority	Water Body-Pollutant Combinations (WBPCs)
1	Highest Priority	WBPCs for which TMDL WQBELs and/or RWLs are established in Part VI.E and Attachments O and P of the MS4 Permit.
2	High Priority	WBPCs for which data indicate water quality impairment in the receiving water according to the State's Listing Policy, regardless of whether the pollutant is currently on the 303(d) list and for which the MS4 discharges may be causing or contributing.
3	Medium Priority	WBPCs for which there are insufficient data to indicate impairment in the receiving water according to the State's Listing Policy, but which exceed applicable RWLs contained in the MS4 Permit and for which MS4 discharges may be causing or contributing to the exceedance.

The following sections describe the characterization and prioritization of those WBPCs found to be issues in the RH/SGRWQG area.

2.1 Water Quality Characterization

Per Part VI.C.5.a.i of the MS4 Permit, each EWMP shall include an evaluation of existing water quality conditions, including characterization of stormwater and non-stormwater discharges from the MS4 and receiving water quality, to support identification and prioritization/sequencing of management actions. This section provides a summary of the information considered and analyses conducted to support the classification of WBPCs into the three priority categories. The characterization process consisted of the following steps, which are discussed in the following sections:

1. Identifying the water bodies within the EWMP area.
2. Compiling WBPCs with applicable TMDLs listed in the MS4 Permit.
3. Compiling 303(d) listings from the 2010 303(d) list, the most recent approved list.

4. Gathering additional relevant data and information (e.g., water quality data).
5. Conducting data analysis to evaluate attainment of WQOs (relevant to TMDL requirements, 303(d) impairment listings, and existing water quality data).

Data was obtained from sources including: established TMDLs, 303(d) listings, WQBELs, RWLs, Surface Water Ambient Monitoring Program (SWAMP), and annual reports. The RH/SGRWQG gathered and used the following information to assess water quality and identify water quality priorities:

- Findings from Illicit Connections and Illicit Discharge (IC/ID) Elimination Programs;
- Findings from the Industrial/Commercial Facilities Programs;
- Findings from the Development Construction Programs;
- Findings from the Public Agency Activities Programs;
- TMDL source investigations;
- Findings from monitoring programs, such as TMDL compliance monitoring and receiving water monitoring; and
- Any other pertinent data, information, or studies related to constituent sources and conditions that contribute to the highest water quality priorities.

Monitoring data for sites within the LAR and SGR Watersheds was obtained from the following sources:

- Los Angeles County Department of Public Works (LACDPW) provided long-term monitoring data from the SGR Mass Emission Station (S14) and the tributary monitoring performed on the Rio Hondo (TS06);
- The Council for Watershed Health provided monitoring data from their monitoring activities throughout the watershed;
- The California Environmental Data Exchange Network (CEDEN); and
- Los Angeles County Sanitation Districts (LACSD) provided long-term receiving water monitoring data.

Locations of sites with available water quality data are shown on **Figure 2-1**. Data received from the Council for Watershed Health and CEDEN largely consisted of short term monitoring activities and many sites from these programs were only used for a single sampling event or had a limited number of constituents tested at the sites. All data were screened to identify potential WQO exceedances.

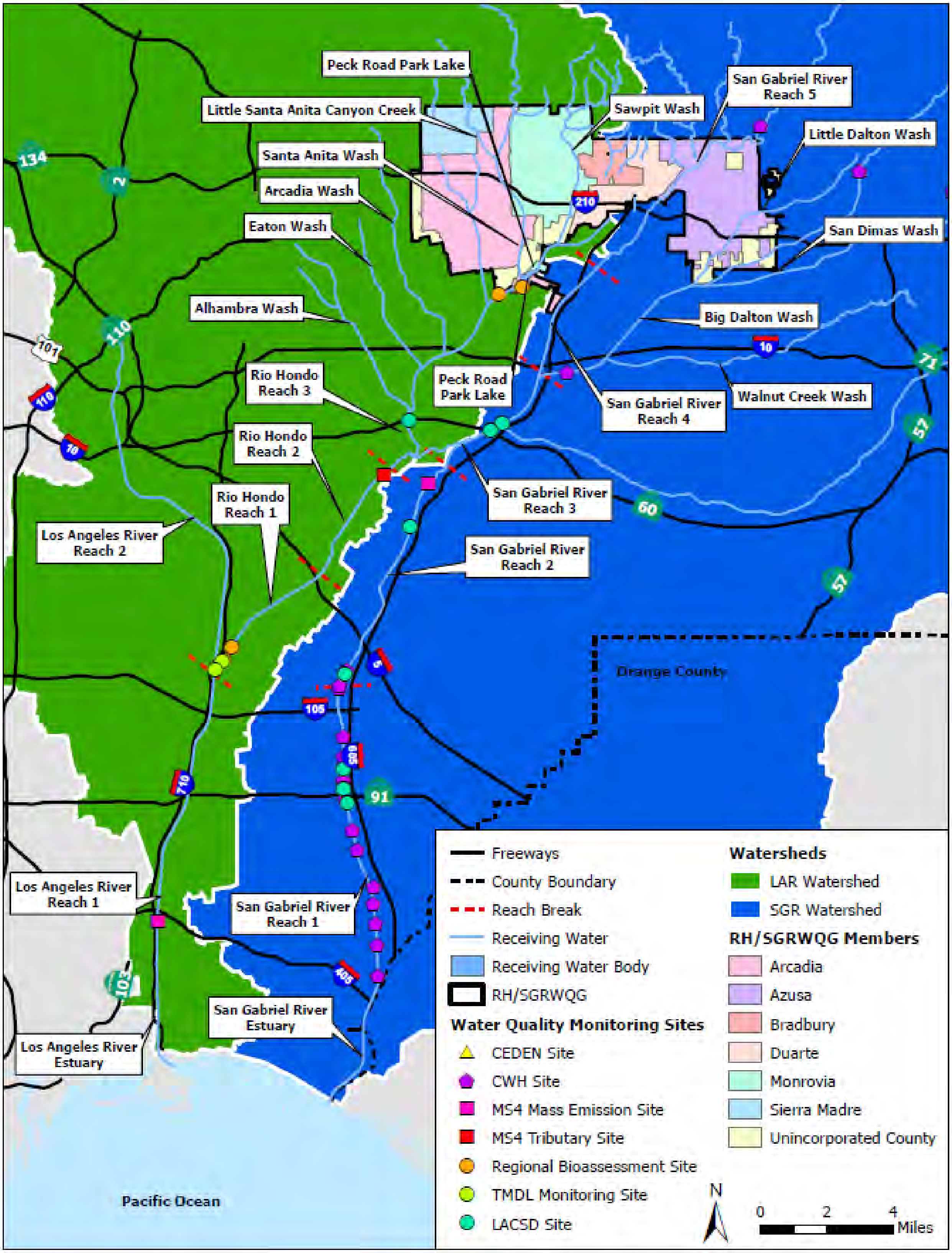


Figure 2-1 RH/SGRWQG Water Bodies, Regional Board Reaches, and Site Locations with Available Water Quality Data (Azusa shown for watershed context – no longer member of the WQG)

2.1.1 Characterization of Receiving Water Quality

Per Part VI.C.4.a.i of the MS4 Permit, each EWMP must include an evaluation of existing water quality conditions, including a characterization of receiving water quality. **Attachment D** includes additional details on the data analysis and results.

Data were compiled to identify constituents exceeding applicable WQOs. Applicable WQOs were compiled from the California Toxics Rule (CTR), the Basin Plan, and relevant TMDLs. Applicable WQOs were selected based on the beneficial uses identified in **Table 1-3** and identified in **Attachment D**. These WQOs were used to assess exceedance frequency and determine the WBPC categorization.

Reported monitoring data was analyzed to determine constituents exceeding WQOs. The data was screened to ensure each record contained at a minimum the following information: water body identification, an identifiable site location (i.e., GPS coordinates), date of sampling, name of constituent, minimum detection level, reporting level, the result (or in cases where the level was below detection level for the analysis, a flag indicating not detected), units of measurement, sample matrix, sample collection, and an indication of dissolved or total where appropriate. **Table 2-2** quantifies the amount of water quality monitoring data that was obtained and used for water quality prioritization. The data summary is provided for all available data collected within the past 10 years, and for recent data collected within the past 5 years. Water quality data collected through the CIMP will be used to update **Table 2-2** and re-characterize applicable water bodies as part of the adaptive management process, especially Little Santa Anita Canyon Creek, Santa Anita Wash, Monrovia Canyon Wash, Sawpit Wash, and Little Dalton Wash, where water quality data does not currently exist.

Table 2-2 Summary of Available Data

Water Body	All Data (2002-2012)			Previous 5 Years (2007-2012)		
	Total Analyses	Number Detected[1]	Number of Constituents[2]	Total Analyses	Number Detected[1]	Number of Constituents[2]
Rio Hondo Reach 3	12,985	5,796	311	3,658	1,690	218
SGR Reach 5	146	146	53	37	37	37
Big Dalton Wash	20	18	18	0	0	0
San Dimas Wash	17	15	17	0	0	0
Peck Road Park Lake[3]	28	28	17	0	0	0
Totals:	**13,196**	**6,003**	**---**	**3,695**	**1,727**	**---**

[1] Number of analyses where the constituent was present in the sample above the minimum detection level.
[2] Number of distinct constituents. Total copper and dissolved copper are counted as distinct constituents.
[3] Including tributaries to the named water body.

Impaired water bodies and constituents identified in the initial screening were individually evaluated based on the frequency, timing, and magnitude of exceedances within the data based on the category. Constituents subject to a TMDL underwent data review to determine the status of compliance. Constituents on the 303(d) list for a watershed were reviewed to identify the basis for the listing and the current status of exceedances. Constituents potentially exceeding receiving water limits but not already accounted for in a TMDL or the 303(d) list were analyzed based on applicable WQOs.

Based on the data review, constituents that had no observed exceedances in the past five years or would not meet the 303(d) listing criteria for impairment could potentially be delisted. The exceedance frequency over the past five years for the identified constituents is presented in **Table 2-3**. The water quality data are compared to the WQBELs where available or the WQOs to calculate the percent exceeding the limitations. For each WBPC, the number of exceedances and total number of samples analyzed are presented.

Attachment D includes a summary of the key findings from the receiving water data analysis. The key findings highlight outcomes of the data analysis that affected the constituents addressed by the EWMP and the way the constituent is addressed.

Table 2-3 Exceedances Based on Water Quality Data Analysis

Constituent	Data Range	Number of Exceedances/Number of Samples			
		Rio Hondo Reach 3	SGR Reach 5	San Dimas Wash	Big Dalton Wash
Aluminum	All	0/32	---	---	0/1
	5-yrs	---	---	---	---
Ammonia	All	1/187	0/2	0/1	0/1
	5-yrs	0/13	---	---	---
2,3,7,8-TCDD	All	0/6	---	---	---
	5-yrs	0/6	---	---	---
Benzo(a)Pyrene	All	1/54	---	---	---
	5-yrs	1/11	---	---	---
Benzo(b)Fluoranthene	All	2/30	---	---	---
	5-yrs	1/11	---	---	---
Benzo(k)Fluoranthene	All	3/54	---	---	---
	5-yrs	2/11	---	---	---
Bis(2-Ethylhexyl) Phthalate	All	5/11	---	---	---
	5-yrs	---	---	---	---
Chloride	All	3/123	0/1	0/1	0/2
	5-yrs	1/58	0/1	---	
Chrysene	All	1/54	---	---	---
	5-yrs	1/11	---	---	---
Diazinon	All	6/72	---	---	---
	5-yrs	2/19	---	---	---
Dibenzo(a,h)Anthracene	All	3/54	---	---	---
	5-yrs	2/11	---	---	---
Copper	All	11/117	1/4	---	---
	5-yrs	3/52	0/1	---	---
Total Dissolved Solids	All	0/117	0/3	---	---
	5-yrs	0/52	0/1	---	---
Dissolved Oxygen	All	82/220	---	0/1	0/1
	5-yrs	23/59	---	---	---
pH	All	47/222	0/3	0/1	0/1
	5-yrs	5/52	---	---	---
E. coli	All	43/59	---	---	---
	5-yrs	36/52	---	---	---
Fecal Coliform	All	158/220	---	---	---
	5-yrs	35/52	---	---	---

Table 2-3 Exceedances Based on Water Quality Data Analysis

Constituent	Data Range	Number of Exceedances/Number of Samples			
		Rio Hondo Reach 3	SGR Reach 5	San Dimas Wash	Big Dalton Wash
Total Coliform	All	220/220	---	---	---
	5-yrs	52/52	---	---	---
Indeno(1,2,3-cd)Pyrene	All	3/47	---	---	---
	5-yrs	3/9	---	---	---
Mercury	All	2/74	---	---	---
	5-yrs	1/43	---	---	---
N-Nitrosodimethylamine	All	4/51	---	---	---
	5-yrs	0/9	---	---	---
Lead	All	4/117	0/3	---	---
	5-yrs	0/52	0/1	---	---
Nitrate	All	0/192	0/5	0/1	---
	5-yrs	0/24	0/1	---	---
Nitrite	All	0/192	0/1	0/1	---
	5-yrs	0/24	---	---	---
Total Nitrogen	All	1/246	---	---	---
	5-yrs	0/90	---	---	---
Selenium	All	---	0/2	---	---
	5-yrs	---	---	---	---
Cyanide	All	6/92	---	---	---
	5-yrs	0/27	---	---	---
Zinc	All	1/117	0/3	---	---
	5-yrs	0/52	---	---	---

2.1.2 Characterization of Discharge Quality

Per Part VI.C.5.a.i of the MS4 Permit, each EWMP must include a characterization of stormwater and non-stormwater discharges from the MS4. Data is very limited for MS4 discharges within the RH/SGRWQG area. Regional studies, monitoring data, and/or land use data will be further evaluated in the future to characterize discharge quality. In addition, data will become available through CIMP implementation, which will be utilized through the adaptive management process.

2.2 Water Body-Pollutant Classification

Based on available information and data analysis, WBPCs were classified in one of the three MS4 Permit categories described in **Table 2-1**. To reflect the sub-categorization outlined in the Regional Board's RAA Guidelines, subcategories are defined to facilitate scheduling decision support for watershed actions determined as part of the RAA and EWMP process. The subcategories are defined in **Table 2-4** and the categorization is summarized in **Table 2-5**.

Table 2-4 Water Body-Pollutant Combination Subcategory Definitions

Category	Water Body-Pollutant Combinations (WBPCs)	Description
1	**Category 1A:** WBPCs with past due or current MS4 Permit term TMDL deadlines.	WBPCs with TMDLs with past due or current MS4 Permit term interim and/or final limits. These pollutants are the highest priority for the current MS4 Permit term.
	Category 1B: WBPCs with TMDL deadlines beyond the MS4 Permit term.	The MS4 Permit does not require the prioritization of TMDL interim and/or final deadlines outside of the MS4 Permit term or USEPA TMDLs, which do not have implementation schedules. To ensure EWMPs consider long term planning requirements and utilize the available compliance mechanisms these WBPCs should be considered during BMP planning and scheduling, and during CIMP development.
	Category 1C: WBPCs addressed in USEPA TMDL without a Regional Board Adopted Implementation Plan.	
2	**Category 2A:** 303(d) listed WBPCs or WBPCs that meet 303(d) listing requirements.	WBPCs with confirmed impairment or exceedances of RWLs. WBPCs in a similar class[1] as those with TMDLs are identified. WBPCs currently on the 303(d) list are differentiated from those that are not to support utilization of EWMP compliance mechanisms.
	Category 2B: 303(d) listed WBPCs or WBPCs that meet 303(d) listing requirements that are not a "pollutant"[2] (i.e., toxicity).	WBPCs where specific actions may not be identifiable because the cause of the impairment or exceedances is not resolved. Either routine monitoring or special studies identified in the CIMP should support identification of a "pollutant" linked to the impairment and re-prioritization in the future.
3	**Category 3A:** All other WBPCs with exceedances identified through CIMP implementation.	Pollutants that are in a similar class[1] as those with TMDLs are identified.
	Category 3B: All other WBPCs that are not a "pollutant"[2] (i.e., toxicity).	WBPCs where specific actions may not be identifiable because the cause of the impairment or exceedances is not resolved. Either routine monitoring or special studies identified in the CIMP should support identification of a "pollutant" linked to the impairment and re-prioritization in the future.
	Category 3C: WBPCs identified by the RH/SGRWQG members.	The RH/SGRWQG members may identify other WBPCs for consideration in EWMP planning.

[1] Pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the EWMP for the TMDL. (MS4 Permit Part VI.C.2.a.i).

[2] While pollutants may be contributing to the impairment, it currently is not possible to identify the *specific* pollutant/stressor.

Table 2-5 Summary of RH/SGRWQG WBPC Categories

Class[1]	Constituents	Rio Hondo Reach 3	Monrovia Wash	Sawpit Wash	SGR Reach 5	San Dimas Wash	Big Dalton Wash	Peck Road Park Lake
Category 1A: WBPCs with past due or current term TMDL deadlines.								
Nutrients[2]	Ammonia	F	F	F				
	Nitrate	F	F	F				
	Nitrite	F	F	F				
	Nitrate + Nitrite	F	F	F				
Metals[2]	Copper (Wet)	I	I	I				
	Lead (Wet)	I	I	I	I[3]	I[3]	I[3]	
	Zinc (Wet)	I	I	I				
	Cadmium (Wet)	I	I	I				
Trash[2]	Trash	I/F	I/F	I/F				
Category 1B: WBPCs with TMDL deadlines beyond the current MS4 Permit term.								
Metals[2]	Copper (Wet)	F	F	F				
	Lead (Wet)	F	F	F	F[3]	F[3]	F[3]	
	Zinc (Wet)	F	F	F				
	Cadmium (Wet)	F	F	F				
Bacteria[2]	Fecal Coliform	I/F	I/F[4]	I/F[4]				I/F[4]
	E. coli	I/F	I/F[4]	I/F[4]	I/F	I/F	I/F	I/F[4]
Category 1C: WBPCs addressed in USEPA TMDL without an Implementation Plan.[5]								
Nutrients	Total Nitrogen							X
	Total Phosphorus							X
Legacy	PCB (Sediment)							X
	PCB (Water)							X
	Chlordane (Sediment)							X
	Chlordane (Water)							X
	Dieldrin (Sediment)							X
	Dieldrin (Water)							X
	DDT (Sediment)							X

Table 2-5 Summary of RH/SGRWQG WBPC Categories

Class[1]	Constituents	Rio Hondo Reach 3	Monrovia Wash	Sawpit Wash	SGR Reach 5	San Dimas Wash	Big Dalton Wash	Peck Road Park Lake
	DDT (Water)							X
Trash	Trash							X
Category 2B: 303(d) listed WBPCs.								
Metals	Lead (Dry)		303(d)[6]					
Other	Bis(2-ethylhexyl) phthalate			303(d)				
Category 3: WBPCs without a TMDL or 303(d) listing.[7,8]								

[1] Pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the EWMP for the TMDL (MS4 Permit, Part VI.C.2.a.i).
[2] MS4 discharges from Sawpit Wash, Santa Anita Wash, and direct MS4 discharges to Peck Road Park Lake are subject to the LAR Metals TMDL and the LAR Bacteria TMDL.
[3] Grouped wet-weather WLA, expressed as total recoverable metals discharged to all upstream reaches and tributaries of the SGR Reach 2.
[4] These water bodies are hydrologically disconnected from the Rio Hondo and thus the LAR during dry-weather and during some wet-weather events.
[5] USEPA Los Angeles Area Lakes TMDL states that lead is currently meeting numeric targets for water and sediment during wet- and dry-weather; therefore no WLA has been assigned and it has not been identified as a WBPC.
[6] Monrovia Wash is 303(d) listed for lead; however, the LAR Metals TMDL only assigns a dry-weather load allocation for non-point sources and therefore no WLA is assigned for MS4 sources.
[7] Monitoring of Monitoring and Reporting Plan Table E-2 constituents in the first year at Long Term Assessment sites will identify the Category 3 WBPCs.
[8] Pollutants noted with exceedances in **Table 2-3** that are not associated with an existing TMDL or 303(d) listing have not been identified as Category 3 pollutants because the data analyzed is from areas downstream of the RH/SGRWQG (downstream monitoring sites shown in **Figure 2-1**). Once CIMP data has been collected for the group area, Category 3 pollutants will be identified as WBPCs through the Adaptive Management Process, as appropriate. Based on the first CIMP wet-weather monitoring event, exceedances were not detected for potential Category 3 WBPCs.

Notes:

Unless explicitly stated as sediment, constituents are associated with the water column.
I/F = Denotes where the MS4 Permit or newly approved TMDL includes interim (I) and/or final (F) effluent and/or RWLs.
X = Identification of a WBPC, but no corresponding MS4 Permit implementation.
303(d) = WBPC on the 2010 303(d) list where the listing was confirmed during data analysis.

2.3 Source Assessment

After the WBPCs were categorized, the next step in the prioritization process was to conduct a source assessment. The MS4 Permit requires that a source assessment be conducted to identify potential sources within the RH/SGRWQG area for the WBPCs in Categories 1 through 3, utilizing existing information. The source assessment, contained herein, draws on readily available information to characterize potential sources of pollutants and assesses whether MS4 discharges are likely to be significant sources of these constituents. Pollutant sources may come from point or non-point sources, described below. Utilizing existing information, the constituents in **Table 2-5** were evaluated to determine if MS4 discharges could be a potential source. Many constituents are typically associated with MS4 discharges and additional investigations are not required. However, for some constituents, MS4 discharges are either not known as significant sources of the constituent or other potential sources are more likely.

2.3.1 Potential Point Sources

Point sources are defined as discrete sources or conveyances that may carry pollutants to surface waters. Point sources are also a primary way pollutants are introduced into the environment. In California, point source discharges are regulated under Federal CWA NPDES Permits and California's Porter-Cologne Water Quality Control Act WDRs. The NPDES Permits in the RH/SGRWQG area include an MS4 Permit, California Department of Transportation (Caltrans) MS4 Permit, Construction General Permit (CGP), Industrial General Permit (IGP), major and minor NPDES Permits, and other general NPDES Permits. Combined NPDES/WDR Permits are issued by the Regional Board for discharges to surface waters. The NPDES Permit types that fall within the Los Angeles Regional Board jurisdiction for the LAR and SGR Watersheds are presented in **Table 2-6**.

The significance of these permitted discharges with respect to their potential contributions of pollutants to the watershed is a function of flow volumes and associated water quality discharge characteristics. The contribution of discharges from dry- or wet-weather runoff also varies. For example, Caltrans, Construction and Industrial General stormwater Permittee discharges can deliver contaminated storm runoff directly into the watershed rivers and tributaries, as well as through the MS4. However, during dry-weather, their pollutant contribution potential is generally low. A broad assessment of the relative potential for pollutant contribution and runoff condition (wet- or dry-weather) of the discharges typically associated with each of the permit types is also presented in **Table 2-6**.

Table 2-6 NPDES Permits for Watersheds within the RH/SGRWQG

Type of NPDES Permit	LAR Watershed Number of Permits[1]	SGR Watershed Number of Permits[2]	Potential for Pollutant Contribution
Publicly Owned Treatment Works	6	5	High (dry-weather)
Municipal Stormwater	3	2	High (wet/dry-weather)
Caltrans Stormwater	-	1	High (wet/dry-weather)
Industrial Stormwater	1,307	526	High (wet-weather)
Construction Stormwater	204	203	High (wet-weather)
Other Major Industrial NPDES Discharges	3	2	High (wet-weather)
Minor NPDES Discharges	15	6	Medium (wet/dry-weather)
General NPDES Permits:			
Construction and Project Dewatering	35	16	Medium (wet-weather)

Table 2-6 NPDES Permits for Watersheds within the RH/SGRWQG			
Type of NPDES Permit	**LAR Watershed Number of Permits[1]**	**SGR Watershed Number of Permits[2]**	**Potential for Pollutant Contribution**
Petroleum Fuel Cleanup Sites	7	5	Medium (dry-weather)
Volatile Organic Compound (VOC) Cleanup Sites	6	4	Medium (dry-weather)
Hydrostatic Test Water	8	4	Low (wet/dry-weather)
Non-Process Wastewater	9	3	Medium (dry-weather)
Potable Water	25	81	Low (wet/dry-weather)

[1] (USEPA, 2005)
[2] (RWQCB, 2015)

2.3.2 Potential Non-Point Sources

Nearly all discharges to the Los Angeles and San Gabriel Rivers, and their tributaries, are regulated as point sources and are predominantly comprised of discharges from water reclamation plants and storm drains. Pollutants from non-point sources are conveyed to surface waters in a diffused manner (i.e., not directly from point source conveyances). However, when contaminants from such non-point sources reach the MS4, they become regulated through the MS4 Permit.

Non-point sources in the RH/SGRWQG area include:

- Atmospheric deposition
- Natural background loading (i.e., metals)
- Onsite Wastewater Treatment Systems (OWTS, a.k.a. septic systems)
- Runoff from the National and State forests in the headwaters of many tributaries
- Sources that occur within the channels of the LAR, SGR, and tributaries ("in-channel sources") such as:
    - Groundwater discharges
    - Transient population
    - Pet waste
    - Sanitary sewer leaks/spills
    - Illicit/illegal discharges
    - Wildlife and birds
    - Suspension and/or re-growth of sediment-associated pollutants

2.3.3 Specific Constituents

The source assessment for RH/SGRWQG Category 1 through 3 WBPCs was conducted to identify whether MS4 discharges are likely to be causing or contributing to impairments or exceedances. The assessment criteria was evaluated based on the following facts or findings:

- Findings from RH/SGRWQG Illicit Connections and Illicit Discharge Elimination Programs;
- Findings from RH/SGRWQG Industrial/Commercial Facilities Programs;
- Findings from RH/SGRWQG Development Construction Programs;
- Findings from RH/SGRWQG Public Agency Activities Programs;
- TMDL source investigations;
- Watershed model results;

- Findings from RH/SGRWQG monitoring programs, including but not limited to TMDL compliance monitoring and receiving water monitoring; and
- Other pertinent data, information, or studies related to pollutant sources and conditions that contribute to the highest water quality priorities.

During the EWMP development, the RH/SGRWQG compiled summary data from the Illicit Discharge Elimination Program, Industrial/Commercial Facilities Program, Development and Construction Program, and Public Agencies Activities Program to identify whether pollutant sources or trends were apparent. While minimal data is available for these programs in the Individual Annual Reports from each City in response to the 2001 MS4 Permit, the data does not present conclusions or identify sources. For example, the number of illicit connections/discharges eliminated is identified, but the source was unknown.

During the last six years of the 2001 MS4 Permit implementation, inspections were not required as part of the Industrial/Commercial Facilities Program, so the available data was limited, dated, and rudimentary in content. The primary emphasis of the Industrial/Commercial Facilities Program is to inspect whether the industrial/commercial facilities are implementing good housekeeping practices and protective measures. The inspection reports emphasize on the correction of these measures rather than the actual pollutants or monitoring results. Future inspection initiated under 2012 MS4 Permit, Part VI.D.6, will produce more focused and specific source assessment information.

As noted in **Section 2.1**, monitoring data specific to this EWMP area are sparse and through the data analysis it is currently unknown if MS4 discharges from the EWMP area are contributing to water quality issues observed downstream. Monitoring data from non-MS4 Permittees in the RH/SGRWQG were also reviewed; however, not all Industrial General Permittees submitted data to the Storm Water Multiple Application and Report Tracking System (SMARTS) website. Initially, this data was briefly reviewed and appeared to have little diagnostic value in predicting pollutant sources or loads. Following receipt of the Regional Board EWMP comment letter, the analysis was repeated and again the data was found to be of limited value in guiding current pollutant source assessments. In the majority of cases, the monitoring data appeared variable and inconsistent, reported with mistaken concentration units, and the analytical parameters tracked were unrelated to likely facility pollutants or observed watershed impairments.

As apparent from the following subsections, TMDL pollutant source assessments and models reviewed during preparation of the EWMP were inconclusive and overly broad upon which to take actionable source determinations or source control efforts. This follows past Regional Board studies, and the majority of environmental data, which suggest that a few sources are responsible for a significant share of environmental problems. At this time, models are not specific enough to accommodate a few specific sources, let alone the impact of a major source such as copper in brake pads. Current models are inadequate for distinguishing copper loads from a residential area adjacent to a freeway with those from a rural area. Such sources will likely be identified through implementation of the CIMP and the Adaptive Management Process.

2.3.3.1 Nitrogen Compounds, pH, and Phosphorous

The LAR Nitrogen Compounds and Related Effects TMDL asserted that:

> *The principal source of nitrogen compounds to the Los Angeles River is discharges from the Donald C. Tillman WRP, the Los Angeles-Glendale WRP, and the Burbank WRP. During dry-weather period, the major POTWs contribute 84.1 percent of the total dry-weather nitrogen load. Urban runoff, stormwater, and groundwater discharge may also contribute nitrate loads. Further evaluation of these sources is set forth in the Implementation Plan.*

2.3.3.2 Trash

The Trash TMDL for the LAR Watershed asserted the following in the source analysis section of the technical TMDL:

> *The major source of trash in the river results from litter, which is intentionally or accidentally discarded in watershed drainage areas. Transport mechanisms include the following:*
>
> 1. *Storm drains: trash is deposited throughout the watershed and is carried to the various reaches of the river and its tributaries during and after significant rainstorms through storm drains.*
> 2. *Wind action: trash can also blow into the waterways directly.*
> 3. *Direct disposal: direct dumping also occurs.*
>
> *Extensive research has not been done on trash generation or the precise relationship between rainfall and its deposition in waterways. However, it has been found that the amount of gross pollutants entering the stormwater system is rainfall dependent but does not necessarily depend on the source (Walker and Wong, December 1999). The amount of trash which enters the stormwater system depends on the energy available to re-mobilize and transport deposited gross pollutants on street surfaces rather than on the amount of available gross pollutants deposited on street surfaces. The exception to this finding of course would be in the event that there is zero gross pollutants deposited on the street surfaces or other drainages tributary to the storm drain.*
>
> *Where gross pollutants exist, a clear relationship between the gross pollutant load in the stormwater system and the magnitude of the storm event has been established. The limiting mechanism affecting the transport of gross pollutants, in the majority of cases, appears to be remobilization and transport processes (i.e., stormwater rates and velocities).*
>
> *Several studies conclude that urban runoff is the dominant source of trash. The large amount of trash conveyed by urban stormwater to the Los Angeles River is evidenced by the amount of trash that accumulates at the base of storm drains. The amount and type of trash that is washed into the storm drain system appears to be a function of the surrounding land use.*

While this assessment may have been correct several years ago, the RH/SGRWQG Permittees within the LAR Watershed have installed full capture certified devices where ever possible within the jurisdictions. Most of the cities are 90 percent or more compliant with the trash TMDL and are investigating opportunities to complete this implementation effort.

2.3.3.3 Metals

LAR Watershed

The LAR Metals TMDL Coordinated Monitoring Program (CMP) Plan stated the following regarding sources of metals to MS4 discharges:

> *There are significant differences in the sources of metals loadings during dry-weather and wet-weather. During dry-weather, most of the metals loadings are in the dissolved form. The three major publicly owned treatment works (POTWs) that discharge to the river (Tillman WRP, LA-Glendale WRP, and Burbank WRP) constitute the majority of the flow and metals loadings during dry-weather. The storm drains also contribute a large percentage of the loadings during dry-weather because although their flows are typically low, concentrations of metals in urban runoff may be quite high. The remaining portion of the dry-weather flow and metals loadings*

represents a combination of tributary flows, groundwater discharge, and flows from other permitted NPDES discharges within the watershed.

During wet-weather, most of the metals loadings are in the particulate form and are associated with wet-weather stormwater flow. On an annual basis, stormwater contributes about 40 percent of the cadmium loading, 80 percent of the copper loading, 95 percent of the lead loading and 90 percent of the zinc loading. This stormwater flow is permitted through two MS4 permits, a separate Caltrans MS4 permit, a general construction stormwater permit and a general industrial stormwater permit.

Non-point sources of metals may include tributaries that drain the open space areas of the watershed. Direct atmospheric deposition of metals on the river is also a small source. Indirect atmospheric deposition on the land surface that is washed off during storms is a larger source, which is accounted for in the estimates of stormwater loadings.

As summarized in the LAR Metals TMDL CMP Annual Reports, dry-weather monitoring data from stations downstream of the RH/SGRWQG were rarely in exceedance for metals. The exceedances associated with the Rio Hondo monitoring station were generally associated with very low flows and the observation of very high hardness. Either of these observations alone might suggest the MS4 Permit identified concentrations are not relevant to impairments or daily loads. The RH/SGRWQG will continue to monitor for dry-weather metal concentrations, as proposed in the Approved CIMP, and implement the watershed control measures identified in **Section 3.4** to further identify and control the sources of metals in runoff and RH/SGRWQG receiving waters.

SGR Watershed

The SGR and Impaired Tributaries Metals and Selenium TMDL stated the following regarding the sources of metals:

Sources of metals in stormwater include automobile brake pads, vehicle wear, building materials, pesticides, erosion of paint and deposition of air emissions from fuel combustion and industrial facilities.

A Southern California stormwater study conducted between 2001-2005 found that industrial land use sites contributed substantially higher fluxes and event mean concentrations (EMCs) of copper and zinc relative to other land use site categories (e.g., residential, commercial, etc.) (Tiefenthaler et al., 2007, pp. 13-29.). In contrast, the highest fluxes for lead were associated with agriculture, high density residential, and recreational land use sites, while the highest EMCs for lead related to high density residential and industrial land use sites. Industrial sites typically have >70% impervious cover as well as on-site sources of metals which may explain the higher loadings of copper and zinc from industrial land use sites observed in the study. In addition, industrial land use sites were found to contribute substantially higher fluxes of Total Suspended Solids (TSS) relative to other land uses (along with agriculture land use sites). In the Los Cerritos Channel Freshwater Watershed and San Gabriel River Watershed, industrial land use only constitutes 8% and 4% of total land use, respectively.

The contribution of automobile brake pads to copper levels in Los Cerritos Channel and the San Gabriel River could be significant. Deposited onto roads by vehicles, copper from brake pad use is transported by stormwater into water bodies. The Brake Pad Partnership, a multi-stakeholder effort to understand the environmental impacts that may arise from brake pad wear debris from passenger vehicles, conducted a watershed modeling study of copper from brake pads affecting water quality in South San Francisco Bay, as an example area. The study determined that copper from brake pads accounts for up to half of the anthropogenic copper *discharged from highly urbanized areas to the San Francisco Bay (Brake Pad Partnership Update, 2007). It is likely that brake pads are a major contributor to copper in stormwater runoff from urbanized areas.*

While this may be true for the potential pollutant sources of lead to the MS4 within the SGR Watershed portion of the RH/SGRWQG area, further source assessment of the MS4 discharge will be conducted to determine the primary source within the RH/SGRWQG MS4s.

2.3.3.4 Bacteria

LAR Watershed

The LAR Watershed Bacteria TMDL made the following assertions regarding the identification of indicator bacteria sources to the LAR:

Dry-weather urban runoff and stormwater conveyed by storm drains are the primary sources of elevated bacterial indicator densities to the Los Angeles River Watershed during dry- and wet-weather. The linkage between the numeric targets and the allocations is supported by the following scientific findings:

1. *In Southern California, in dry-weather, local sources of bacteria principally drive exceedances (LARWQCB, 2002b; 2003b; 2004a).*
2. *Tiefenthaler et al. found that in natural streams bacteria levels were generally higher during lower flow condition (Tiefenthaler et al., 2008).*
3. *Ackerman et al. found that storm drains contribute roughly 13 percent of the flow in the Los Angeles River in dry-weather, while Water Reclamation Plants (WRPs) account for roughly 72 percent of the flow in the river during dry-weather. With this flow, storm drains were contributing almost 90 percent of the E. coli loading (Ackerman et al., 2003). E. coli concentrations were found to be as much as four orders of magnitude higher from storm drains than from the WRP discharges.*
4. *In the BSI study, the CREST team found that approximately 85 percent of the storm drain samples collected exceeded the E. coli objective. In the reaches investigated, E. coli loading from storm drains and tributaries greatly exceeded the allowable instream loading. The study also found that some of the loading in Reach 2 could not be attributed to the measured storm drain inputs.*
5. *In Southern California, in wet-weather, upstream or watershed sources principally cause the bacteria exceedances (LARWQCB, 2002b; 2003c; 2004a).*
6. *During wet-weather, WRP discharges may account for as little as 1 percent of the total flow in the river (CREST, 2009a).*
7. *Based on three experiments conducted by Noble et al. (1999) to mimic natural conditions in or near Santa Monica Bay (SMB), two in marine water and one in fresh water, bacteria degradation was shown to range from hours to days (Noble et al., 1999). Based on the results of the marine water experiments, the model assumes a first-order decay rate for bacteria of 0.8 d-1 (or 0.45 per day). Degradation rates were shown to be as high as 1.0 d-1 (Noble et al., 1999). These studies show that bacterial degradation and dilution during transport through the watershed do not significantly affect bacterial indicator densities in receiving waters.*

Based on these findings, further source assessment of the MS4 discharges will need to be conducted to determine the primary source of bacteria within the RH/SGRWQG MS4s.

SGR Watershed

The SGR, Estuary and Tributaries Indicator Bacteria TMDL made the following assertions regarding the identification of indicator bacteria sources to the SGR:

> *There are many sources of indicator bacteria to the MS4s. Discharges from MS4s are the primary source of bacteria to SGR in both dry- and wet-weather (Ackerman et. al., 2005 and Grifith et al., 2014.)*
>
> *Based on available data surface runoff (stormwater and non-stormwater discharges) from urbanized areas conveyed via the MS4 is a significant source of bacteria to the SGR and its tributaries. Mass emissions data collected under the Los Angeles County MS4 Permit show elevated levels of bacteria in the river. SCCWRP's data from storm drains and channels draining urban areas also show elevated levels of bacteria, indicating that urban areas are the primary source of bacteria to SGR and its tributaries. Data from throughout the Los Angeles Region further demonstrate that bacteria concentrations are significantly greater in developed areas.*
>
> *The monitoring data show that bacteria loadings from WRPs are significantly less than stormwater loadings. Based on mass emission station data, watershed-wide monitoring data, and SCCWRP's studies, the Los Angeles Water Board staff concludes that stormwater and non-stormwater runoff from urban areas served by the storm drain system (MS4s) is a significant source of bacteria. Storm drain system discharges may have elevated levels of bacteria indicators due to sanitary sewer leaks and spills, illicit connections of sanitary sewer lines to the storm drain system, runoff from homeless encampments, pet waste, and illegal discharges from recreational vehicle holding tanks, among others. Other point sources were analyzed and found to be less significant or there were not enough data to quantify their contribution. Existing point source discharges that have permits containing effluent limits for bacteria will continue to have effluent limits for bacteria. Existing point source discharges that do not have effluent limits for bacteria in their permits are not assigned WLAs. Any future point source discharges must be evaluated to determine whether reasonable potential exists for the discharge to be a source of bacteria that could cause or contribute to an exceedance of the applicable water quality standards. If reasonable potential analysis (RPA) during permitting process does not indicate reasonable potential then effluent limits do not need to be included in the permit. All non-point sources are assigned LAs.*

Similar to the LAR Watershed portion of the RH/SGRWQG area, further source assessment of the MS4 discharge will need to be conducted to determine the primary source of bacteria within the RH/SGRWQG area.

2.3.3.5 Legacy Pollutants – Nutrients, PCB, Chlordane, Dieldrin, and DDT

The Los Angeles Area Lakes TMDLs for Peck Road Park Lake states the following regarding the sources of nutrients for Peck Road Park Lake TMDL impairments:

> *Peck Road Park Lake has been sampled several times over the past two decades. Slight exceedances of the pH target have been observed in the lake and may be due to natural conditions. DO levels in the epilimnion are typically greater than 7 mg/L and impairment due to low DO is not evident in either the historic or recent sampling events (DO levels do approach zero in the deeper waters but no exceedances have been observed relative to the target depths). Readings collected in December 2008 were collected with an uncalibrated meter. Chlorophyll a concentrations are relatively low and no measurements greater than 19 μg/L (historic data) have been reported. The maximum chlorophyll a concentration measured recently is 13.4 μg/L and*

the average concentration is 6.2 µg/L. It does not appear, based on these data, that excessive nutrient loading is causing an impairment. It is unlikely that the source of the odor reported at Peck Road Park Lake is due to elevated nutrient and algal biomass levels. They are likely associated with the trash impairment.

Based on historic and recent monitoring data, Peck Road Park Lake is not impaired by low DO or excessive nutrient loading. Though odor has been noted as a problem at the lake, it is likely not due to eutrophication as no algal blooms have been observed in the lake and chlorophyll a concentrations are relatively low. To protect Peck Road Park Lake from degradation, nutrient loading should remain at or below existing levels as an antidegradation measure to ensure future loading does not increase the chlorophyll a concentration.

Much of the Peck Road Park Lake watershed remains in forested and other undisturbed land uses. As development occurs in this watershed, BMPs will be required such that loading rates are consistent with the allocations established by these TMDLs. Therefore, no load allocation has been set aside for future growth. It is unlikely that any dischargers of significant nutrient loading will be permitted in the watershed. If any sources currently assigned load allocations are later determined to be point sources requiring NPDES permits, those load allocations are to be treated as wasteload allocations for purposes of determining appropriate water quality-based effluent limitations pursuant to 40 CFR 122.44(d)(1).

The TMDL states the sources of PCB for Peck Road Park Lake TMDL impairments are as follows:

PCBs in Peck Road Park Lake are primarily due to historical loading and storage within the lake sediments, with some ongoing contribution by watershed wet-weather loads. Dry-weather loading is assumed to be negligible because hydrophobic contaminants primarily move with particulate matter that is mobilized by higher flows. Stormwater loads from the watershed were estimated based on simulated sediment load and observed PCB concentrations on sediment near inflows to the lake.

Watershed loads of PCBs may arise from spills from industrial and commercial uses, improper disposal, and atmospheric deposition. Industrial and commercial spills will tend to be associated with specific land areas, such as older industrial districts, junk yards, and transformer substations. Improper disposal could have occurred at various locations (indeed, waste PCB oils were sometimes used for dust control on dirt roads in the 1950s). Atmospheric deposition occurs across the entire watershed.

There is no definitive information on specific sources of elevated PCB load within the watershed at this time. Therefore, an average concentration of sediment is applied to all contributing areas. The average concentration of PCBs on incoming sediment was estimated to be 15.38 µg/kg dry weight and the estimated annual sediment load to Peck Road Park Lake is 990.3 tons/yr, including sediment delivered through the water diversion (see Appendix D, Wet Weather Loading). The resulting estimated wet-weather load of PCBs is approximately 13.8 g/yr.

Lake sediments are often the predominant source of PCBs in biota. The bottom sediment serves as a sink for organochlorine compounds that can be recycled through the aquatic life cycle. PCBs are strongly sorbed to sediments and have long half-lives in sediment and water. Incoming loads of PCBs will mainly be adsorbed to particulates from stormwater runoff (eroded sediments from legacy contamination sites or from atmospheric deposition).

The existing sediment PCB concentrations in Peck Road Park Lake are lower than the consensus-based TEC target, and existing fish tissue concentrations are higher than the fish tissue target. Therefore, a sediment target to achieve FCGs is calculated based on biota-sediment *bioaccumulation (a BSAF approach), using the ratio of the FCG to existing fish tissue concentrations of 3.6/34.4 = 0.105. This ratio is applied to the observed in-lake sediment concentration of 12.28 µg/kg dry weight to obtain the site-specific sediment target concentration to achieve fish tissue goals of 1.29 µg/kg dry weight. The fish tissue-based target concentrations were calculated using only recent data (collected in the past 10 years) because the loads and exposure concentrations of PCBs are likely to have declined steadily since the cessation of production and use of the chemical.*

The BSAF-derived sediment target is less than the consensus-based sediment quality guideline TEC of 59.8 µg/kg dry weight. (The consensus-based sediment quality guideline is for the protection of benthic organisms, and explicitly does not address bioaccumulation and human-health risks from the consumption of contaminated fish.) The lower value of the consensus-based TEC target or the BSAF-derived target is selected as the final sediment target. In addition, the CTR criterion for human health (0.17 ng/L) is the selected numeric target for the water column and protects both aquatic life and human health.

The toxicant loading model can be used to estimate the loading rate that would be required to yield the existing sediment concentration under steady-state conditions. This yields an estimate that a load of 1,005 g/yr would be required to maintain observed sediment concentrations under steady-state conditions. The estimated current watershed loading rate is 13.8 g/yr, or 1.4 percent of this amount. Therefore, impairment due to elevated fish tissue concentrations of PCBs in Peck Road Park Lake is primarily due to the storage of historic loads of PCBs in the lake sediment.

The sources of Chlordane for Peck Road Park Lake TMDL impairments are as follows:

Chlordane in Peck Road Park Lake is primarily due to historical loading and storing within the lake sediments, with some ongoing contribution by watershed wet-weather loads. Dry-weather loading is assumed to be negligible because hydrophobic contaminants primarily move with particulate matter that is mobilized by higher flows. Stormwater loads from the watershed were estimated based on simulated sediment load and observed chlordane concentrations on sediment near inflows to the lake. Watershed loads of chlordane may arise from past pesticide applications, improper disposal, and atmospheric deposition. Pesticide applications were most likely associated with agricultural, commercial, and residential areas. Improper disposal could have occurred at various locations, while atmospheric deposition occurs across the entire watershed.

There is no definitive information on specific sources within the watershed at this time. Therefore, an average concentration of sediment is applied to all contributing areas. The average concentration of chlordane on incoming sediment was estimated to be 3.15 µg/kg dry weight, and the annual sediment load to Peck Road Park Lake is 990.3 tons/yr, including sediment delivered through the water. The resulting estimated wet-weather load of chlordane is approximately 2.83 g/yr.

Lake sediments are often the predominant source of total chlordane in biota. The bottom sediment serves as a sink for organochlorine compounds that can be recycled through the aquatic life cycle. Chlordanes are strongly sorbed to sediments and have long half-lives in sediment and water. Incoming loads of total chlordane will mainly be adsorbed to particulates from stormwater runoff (eroded sediments from legacy contamination sites or from atmospheric deposition).

The existing sediment chlordane concentrations in Peck Road Park Lake are lower than the consensus-based TEC target, and existing fish tissue concentrations are higher than the fish *tissue target. Therefore, a sediment target to achieve FCGs is calculated based on biota-sediment bioaccumulation (a BSAF approach), using the ratio of the FCG to existing fish tissue concentrations of 5.6/13.44 = 0.417. This ratio is applied to the observed sediment concentration of 4.14 µg/kg dry weight to obtain the site-specific sediment target concentration to achieve fish tissue goals of 1.73 µg/kg dry weight. The fish tissue-based target concentrations were calculated using only recent data (collected in the past 10 years) because the loads and exposure concentrations of chlordane are likely to have declined steadily since the cessation of production and use of the chemical.*

The BSAF-derived sediment target is less than the consensus-based TEC of 3.24 µg/kg dry weight. (The consensus-based sediment quality guideline is for the protection of benthic organisms, and explicitly does not address bioaccumulation and human-health risks from the consumption of contaminated fish.) The lower value of the consensus-based TEC target or the BSAF-derived target is selected as the final sediment target. In addition, the CTR criterion for human health (0.59 ng/L) is the selected numeric target for the water column and protects both aquatic life and human health.

The toxicant loading model can be used to estimate the loading rate required to yield the existing sediment concentration under steady-state conditions. This yields an estimate that a load of 696 g/yr would be required to maintain observed sediment concentrations under steady state conditions. The estimated watershed loading rate is 2.83 g/yr, or 0.4 percent of this amount. Therefore, impairment due to elevated fish tissue concentrations of chlordane in Peck Road Park Lake is primarily due to the storage of historic loads of chlordane in the lake sediment.

The TMDL states the sources of DDT for Peck Road Park Lake TMDL impairments are as follows:

Total DDTs present in Peck Road Park Lake are primarily due to historical loading and storage within the lake sediments, with some ongoing contribution by watershed wet-weather loads. Dry-weather loading is assumed to be negligible because hydrophobic contaminants primarily move with particulate matter that is mobilized by higher flows. Stormwater loads from the watershed were estimated based on simulated sediment load and observed DDT concentrations on sediment data near inflows to the lake. Watershed loads of DDT may arise from past pesticide applications, improper disposal, and atmospheric deposition. Pesticide applications were most likely associated with agricultural, commercial, and residential areas. Improper disposal could have occurred at various locations, while atmospheric deposition occurs across the entire watershed.

There is no definitive information on specific sources of elevated DDT load within the watershed at this time. Therefore, an average concentration on sediment is applied to all contributing areas. The average concentration of total DDTs on incoming sediment was estimated to be 5.57 µg/kg dry weight, and the annual sediment load to Peck Road Park Lake is 990.3 tons/yr, including sediment delivered through the water diversion. The resulting estimated wet-weather load of total DDTs is approximately 5.0 g/yr.

Lake sediments are often the predominant source of DDT in biota. The bottom sediment serves as a sink for organochlorine compounds that can be recycled through the aquatic life cycle. DDT is strongly sorbed to sediment and has a long half-life in sediment and water. Incoming loads of DDT will mainly be adsorbed to particulates from stormwater runoff (eroded sediments from legacy contamination sites or from atmospheric deposition).

A sediment target to achieve FCGs is calculated based on biota-sediment bioaccumulation (a BSAF approach), using the ratio of the FCG to existing fish tissue concentrations of 21/15.5 = 1.355. This ratio is applied to the estimated lake sediment concentration of 5.09 µg/kg dry *weight to obtain the site-specific sediment target concentration to maintain fish tissue goals of 6.90 µg/kg dry weight. The BSAF-derived sediment target is greater than the estimated existing sediment concentration because the average recent fish tissue concentration does not exceed the fish tissue based target concentration.*

The fish tissue-based target concentrations were calculated using only recent data (collected in the past 10 years) because the loads and exposure concentrations of total DDT are likely to have declined steadily since the cessation of production and use of the chemical.

The BSAF-derived sediment target is greater than the consensus-based TEC for total DDTs of 5.28 µg/kg dry weight. The consensus-based TEC of 5.28 µg/kg dry weight is therefore the most restrictive target and is used as the target in this TMDL. Selection of the consensus-based TEC target protects the benthic biota and ensures continued attainment of the fish tissue based target concentration. The estimated existing concentration in lake of 5.09 µg/kg is less than the TEC, which would imply that no reduction from existing in-lake sediment concentrations may be needed. However, the estimated influent concentration is greater than the TEC.

The toxicant loading model can be used to estimate the loading rate that would be required to yield the existing sediment concentration under steady-state conditions. This yields an estimate that a load of 84 g/yr would be required to maintain observed sediment concentrations under steady-state conditions. The estimated current watershed loading rate is 5 g/yr, or 6 percent of this amount. Thus, concentrations of total DDTs in fish tissue in Peck Road Park Lake appear to be primarily due to the storage of historic loads of DDT in the lake sediment.

The TMDL states the sources of Dieldrin for Peck Road Park Lake TMDL impairments are as follows:

Dieldrin in Peck Road Park Lake is primarily due to historical loading and storage within the lake sediments, with some ongoing contribution by watershed wet-weather loads. Dry-weather loading is assumed to be negligible because hydrophobic contaminants primarily move with particulate matter that is mobilized by higher flows. Stormwater loads from the watershed could not be directly estimated because all sediment and water samples were below detection limits. Watershed loads of dieldrin may arise from past pesticide applications, improper disposal, and atmospheric deposition. Pesticide applications were most likely associated with agricultural, commercial, and residential areas. Improper disposal could have occurred at various locations.

There is no definitive information on specific sources within the watershed at this time. Therefore, an average concentration of sediment is applied to all contributing areas.

An upper-bound analysis for dieldrin is performed using the simulated sediment load and detection limit to determine the maximum potential loading rate of dieldrin from the watershed. The dieldrin sediment concentration is assigned as the upper bound estimate of concentration on influent sediment (0.91 µg/kg dry weight, calculated with non-detects set equal to the individual sample detection limits). The annual sediment load to Peck Road Park Lake, including sediment delivered through the water diversion is 990.3 tons/yr. The resulting estimated upper bound on wet-weather load of dieldrin from the watershed is 0.82 g/yr or less.

Lake sediments are often the predominant source of dieldrin in biota. The bottom sediment serves as a sink for organochlorine compounds that can be recycled through the aquatic life cycle. Dieldrin is strongly sorbed to sediments and has a long half-life in sediment and water. Incoming loads of dieldrin will mainly be adsorbed to particulates from stormwater runoff (eroded sediments from legacy contamination sites or from atmospheric deposition).

The estimated existing sediment dieldrin concentrations in Peck Road Park Lake are lower than the consensus-based TEC target, and existing fish tissue concentrations are higher than the fish tissue target. Therefore, a sediment target based on biota-sediment bioaccumulation (a BSAF approach) is calculated using ratio of the FCG to existing fish tissue concentrations in largemouth bass of 0.46/1.06 = 0.434. Sediment concentrations of dieldrin in Peck Road Park Lake are reported as below detection limits ranging from 0.7 to 1.44 µg/kg dry weight. However, dieldrin is highly bioaccumulative, and low sediment concentrations can lead to unacceptable fish tissue concentrations. Using an estimated concentration of 0.98 µg/kg dry weight based on the average of the sample detection limits, the resulting target concentration would be 0.43 µg/kg dry weight to obtain FCGs. Calculation with a literature-based BSAF suggests that even lower concentrations might be needed. However, the literature based BSAF is highly uncertain and may not be directly applicable to conditions in Peck Road Park Lake. Therefore, the target based on the detection limits is used, with acknowledgment that the estimate may need to be refined if additional data are collected at lower detection limits.

2.3.3.6 Source Assessment Summary

Nutrients, metals, indicator bacteria, and trash are commonly measured in MS4 discharges. While there are no specific measurements for outfalls in the RH/SGRWQG area, it is reasonable to assume the MS4 may contain these constituents. Additionally, where historic contamination exists, legacy pollutants such as PCBs and chlorinated pesticides may be found in MS4 discharges. These classes of compounds represent the Category 1 pollutants, where TMDLs have identified the MS4 as potential sources.

Two constituents identified in the receiving water assessment, cyanide and bis(2-ethylhexyl) phthalate have been associated with potential laboratory Quality Assurance/Quality Control (QA/QC) issues, as it is a known laboratory contaminant. While clear evidence of laboratory contamination is not available, the fact that no exceedances have been observed in the last 5 years suggests that MS4 discharges are unlikely to be a significant source of bis(2-ethylhexyl) phthalate. As a result, bis(2-ethylhexyl) phthalate is not considered to be a water quality priority based on the initial source assessment.

The LACSD and other laboratories have identified concerns with the preservation of cyanide samples for analysis. Analysis of different preservation and analytical methods for cyanide has indicated that artificial increases in cyanide concentrations can be introduced through the preservation and analytical process for cyanide (Stanley, 2012). As a result, LACSD has modified their sampling collection and cyanide analysis procedures to reduce the potential for artificially increasing cyanide concentrations. A review of the cyanide data used in the analysis determined that all samples with exceedances were from the MS4 mass emission station using sample processing methods that could potentially exacerbate cyanide concentrations. As a result, it is possible that some or all of the cyanide exceedances result from the analytical process. However, cyanide is also released from some industrial and commercial activities that could be present in the watershed.

Diazinon was used as an insecticide for agriculture and also as an all-purpose indoor and outdoor commercial pest control product. The majority land use designation within the RH/SGRWQG is residential. In addition, agricultural land use designation within the RH/SGRWQG is located within the City of Bradbury. With these two land use designations, MS4 discharges cannot be excluded as a potential source of diazinon. With the ban on diazinon for commercial use, diazinon receiving water concentrations and exceedances may decrease through the years. Further investigation pertaining to the source of exceedances is necessary to assess if discharges from MS4s are a potential source in the future.

Based on the source assessment and pollutant linkages to the MS4, the water quality priorities were generated and summarized in **Table 2-7**. The table also indicates the potential linkage to the MS4, defined as follows:

- **High** – where TMDLs exist (Category 1 pollutants) that have identified WLAs for the MS4;
- **Medium** – not a clear determination of positive or negative attribution to the MS4; and
- **Low** – where it is likely a source other than the MS4 that contributes to the water quality exceedances.

The EWMP identifies control measures to address the water quality priorities, except for those pollutants where the source is attributed to a non-MS4 source, such as water reclamation plants.

Table 2-7 Water Quality Priorities for the RH/SGRWQG

Category	Class	Pollutant	Water Body	MS4 Linkage
Category 1	Bacteria	Fecal Coliform and *E. Coli*	Rio Hondo Reach 3, Monrovia Wash, Sawpit Wash, and Peck Road Park Lake	High
		E.Coli	SGR Reach 3, San Dimas Wash, and Big Dalton Wash	High
	Legacy	PCBs, Chlordane, Dieldrin, DDT	Peck Road Park Lake	High
	Metals	Cadmium, Copper, Zinc	Rio Hondo Reach 3, Monrovia Wash, and Sawpit Wash	High
		Lead	Rio Hondo Reach 3, Monrovia Wash, Sawpit Wash, SGR Reach 5, San Dimas Wash, and Big Dalton Wash	High
	Nutrients	Ammonia, Nitrate, Nitrite, Nitrate + Nitrite	Rio Hondo Reach 3, Monrovia Wash, and Sawpit Wash	Low
		Total Nitrogen, Total Phosphorus	Peck Road Park Lake	Low
	Trash	Trash	Rio Hondo Reach 3, Monrovia Wash, Sawpit Wash, and Peck Road Park Lake	High
Category 2	Metals	Lead	Monrovia Wash	High
	Other	Bis(2-ethylhexyl) phthalate	Sawpit Wash	Low

2.4 Prioritization

The MS4 Permit outlines a prioritization process that defines how pollutants in the various categories will be considered in scheduling as part of the EWMP. Based on compliance pathways outlined in the MS4 Permit, the scheduling factors considered include the following:

- TMDLs with past due interim and/or final limits and those with interim and/or final limits within the MS4 Permit term (schedule according to TMDL schedule)
- TMDLs with interim and/or final limits outside the MS4 Permit term (schedule according to TMDL schedule)
- Other receiving water exceedances
    - Pollutants in the same class as those addressed in a TMDL (evaluate ability to consider on same timeframe as TMDL)
    - Pollutants on the 303(d) list or in the same class as those on the 303(d) listings (develop schedule to address as soon as possible with milestones)
    - Pollutants with exceedances that are not in the same class as 303(d) listing (conduct monitoring under CIMP to confirm exceedances and if confirmed develop schedule with milestones)
    - Pollutants without exceedances in last 5 years (not prioritized for BMPs, but included in monitoring)

Evaluating whether or not a pollutant is in the same class as either a TMDL or a 303(d) listed pollutant is a critical decision for prioritization and scheduling. The MS4 Permit definition of class is as follows:

> "Pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the EWMP for the TMDL."

As part of EWMP development and the RAA, prioritizing and sequencing of BMPs considered the aforementioned factors.

2.5 Milestone Schedule for Non-TMDL Pollutants

For WBPCs not addressed through a Regional Board adopted compliance schedule, development of interim milestones and final compliance dates must conform to one of the three MS4 Permit defined schemes (MS4 Permit Parts VI.C.2.i-iii):

1. Pollutants that are in the same class as those addressed in a TMDL for the watershed and for which the water body is identified as impaired on the 303(d) list as of December 28, 2012;
2. Pollutants that are not in the same class as those addressed in a TMDL for the watershed, but for which the water body is identified as impaired on the 303(d) list as of December 28, 2012; or
3. Pollutants for which there are exceedances of RWLs, but for which the water body is not identified as impaired on the 303(d) list as of December 28, 2012.

Pollutants having similar fate and transport mechanisms (e.g., particle associated), making them amenable to treatment using the same control measures, can be referred to as a "BMP class." Alternatively pollutants may be addressed following an existing TMDL timeline, referred to as a "scheduling class." The remaining WBPCs were segregated into these classes as shown in **Table 2-8**. The interim and final compliance schedules identified in **Table 1-6** in **Section 1.3.2** for the Category 1 WBPCs are the backbone upon which numeric milestones and schedule dates for other water quality priorities are proposed.

Table 2-8 Initial Classification for USEPA TMDLs, 303(d) Listings, and Other Exceedances of RWLs

Pollutants	Water Body	Sub-category	BMP Class	RB TMDL in RH/SGRWQG with Same BMP Class?	Scheduling Class	RB TMDL in RH/SGRWQG with Same Scheduling Class?	Initial Classification
Total Nitrogen	Peck Road Park Lake	1C	Nutrients	Yes	Machado Lake Nutrients	Yes	USEPA TMDL
Total Phosphorus	Peck Road Park Lake	1C	Nutrients	Yes	Machado Lake Nutrients	Yes	USEPA TMDL
Trash	Peck Road Park Lake	1C	Trash	Yes	LAR Trash TMDL	Yes	USEPA TMDL
PCBs	Peck Road Park Lake	1C	Sediment	Yes	Machado Lake Toxics[1]	Yes	USEPA TMDL
Chlordane	Peck Road Park Lake	1C	Sediment	Yes	Machado Lake Toxics[1]	Yes	USEPA TMDL
Dieldrin	Peck Road Park Lake	1C	Sediment	Yes	Machado Lake Toxics[1]	Yes	USEPA TMDL
DDT	Peck Road Park Lake	1C	Sediment	Yes	Machado Lake Toxics[1]	Yes	USEPA TMDL
Bis (2-ethylhexyl) phthalate	Sawpit Wash	2C	Sediment	Yes	Machado Lake Toxics[1]	Yes	303(d) listed and same class as pollutants addressed in a TMDL in the watershed

[1] Machado Lake Pesticides and PCBs (Toxics) TMDL

1

2.5.1 Constituent Relationships

Subcategory 1C WBPCs include those identified in the Peck Road Park Lake TMDLs issued by USEPA. As stated in the technical TMDL, recent monitoring data suggest that nutrient loads and related WQOs are being met, but need to be monitored into the future. Although the nutrient WQOs were being met at the time the TMDL was being developed, a timeline consistent with the Machado Lake Nutrients TMDL is most appropriate so that necessary measures are implemented in the event an exceedance was to occur. The Machado Lake TMDLs will serve as the basis for determining the schedule/timeline for the Peck Road Park Lake TMDLs, as both Machado Lake and Peck Road Park Lake are lakes developed in the early 1970s in urban areas with comparable environments, impairments, and sources (as identified in the TMDLs). As was the case with Machado Lake, the schedule/timeline presented in this EWMP is for MS4 discharges into the lake and do not address polluted bed sediments. Once the MS4 discharges have been addressed, the bed sediment will be assessed and addressed as needed. The trash component of this TMDL is being addressed as a requirement of the Los Angeles River Trash TMDL and the schedule for that TMDL also addresses the Los Angeles Area Lakes TMDLs.

Based on pollutant fate and transport characteristics, Peck Road Park Lake legacy pollutant WBPCs milestone schedules/timelines are most appropriately based upon those identified in the Machado Lake TMDLs. At both locations, the pollutants include organochlorine pesticides and PCBs (or Aroclors) which are no longer in commercial use and typically bind to sediment particles which settle out in non-flowing receiving waters. Their environmental fate is typically through natural attenuation or bioremediation, although sediment removal and disposal may be necessary to more rapidly achieve water and sediment quality objectives.

Subcategory 2C WBPCs include State 2010 Integrated Report, or CWA 303(d) list, identified impairments for bis(2-ethylhexyl) phthalate in Sawpit Wash. Phthalates are common plastizers and laboratory contaminants. Although it is unlikely to still be present, the most appropriate scheduling corollary would be with the Machado Lake Toxics TMDL as the fate and transport of this compound is typical of many organic compounds which tend to bind to particulates and be degraded through natural attenuation. Utilizing the Machado Lake Toxics TMDL timeline will also be consistent with the Peck Road Park Lake timelines discussed above, which is beneficial as Sawpit Wash is tributary to Peck Road Park Lake.

If WBPCs are not assigned to existing TMDL schedules, then the RH/SGRWQG would be required to develop a detailed time schedule, of specific actions to undertake, that will achieve compliance with the numeric WLAs. For such pollutants, the time schedule requested must be as short as possible, taking into account the time since establishment of the TMDL, technological, operational, and economic factors that affect the design, development, and implementation of the control measures that are necessary to comply with the WLAs. If the requested time schedule exceeds one year, the proposed schedule shall include interim requirements and numeric milestones and the date(s) for their achievement. In assessing appropriate schedules for WBPCs, similar, adopted, Regional Board TMDL implementation schedules will be used to the extent possible based on the rationale that they would meet the requirements in as short a time as is possible and considering other factors identified in the MS4 Permit.

2.5.2 Milestones and Schedules

The preferred approach for developing USEPA TMDL, 303(d) listed, or RWL exceedance WBPCs milestone and compliance schedules is to determine whether the pollutants are in the same class as those already being addressed in a Regional Board developed TMDL applicable to the RH/SGRWQG and, if so, align the proposed WBPC milestone and compliance schedule with that developed for the Regional Board TMDL. As previously discussed and summarized in **Table 2-8**, these WBPCs all align with developed Regional Board TMDLs.

2.5.2.1 USEPA Peck Road Park Lake TMDLs

The majority of WBPCs, which may be suitable for milestone identification based on Regional Board TMDL schedules, are associated with the USEPA Peck Road Park Lake TMDLs (2012b); approved by USEPA Region IX on March 26, 2012. Although each USEPA TMDL identified constituent must be evaluated individually, their similarity in fate, transport, source control, and BMP implementation mechanisms, as compared to existing TMDLs, substantiates the assertion that their scheduling should track that of similar TMDLs already being implemented in the region.

Peck Road Park Lake Nutrient TMDL

The nutrient portion of the Peck Road Park Lake TMDLs can be difficult to intuitively translate for EWMP planning purposes, in that its objectives are to control summer in-lake eutrophication, primarily by controlling storm and seasonal diversion flows containing nitrogen and phosphorous. In Section 4.10.1 of the USEPA Los Angeles Area Lakes TMDL, the USEPA asserts that "*The nutrient-response analysis for Peck Road Park Lake indicates that existing levels of nitrogen and phosphorus loading are resulting in attainment of the summer average chlorophyll a target concentration of 20 µg/L and are not significantly impacting dissolved oxygen levels in the waterbody. As an anti-degradation measure, nitrogen and phosphorus TMDLs are allocated based on existing loading."* While this assertion advocates for overlooking the need to develop a TMDL implementation milestone schedule, variance in flow volumes, especially flows diverted to San Gabriel River, significantly drive the annual pollutant load estimates. The TMDL notes that, as an annual average, over 41 percent of the nitrogen load is attributed to the SGR flows from above urban Reach 4, diverted by LACDPW for water conservation and recharge purposes; however, in many years the actual diversion volume is negligible, while infrequently those flows overwhelmingly predominate. While the TMDL rationally anticipates potential diversion volume aberrations by allowing for three year averaging, it is unclear how comingled spring diversion flows, along with those from non-MS4 NPDES discharges, would be cost-effectively segregated and accounted for during these conditions, nor how they would be integrated to potentially result in unanticipated summer impairments. Therefore this EWMP proposes that the Peck Road Park Lake nutrient TMDL milestone schedule follow the timeline of the Machado Lake Nutrients TMDL, which assumes final compliance 9.5 years after the effective date of the TMDL. Based on this timeline, the final compliance date for nutrients would be January 1, 2026. Ultimately, the RH/SGRWQG concurs with the clarity of the USEPA, that this TMDL is aimed at demonstrating compliance with MS4 Permit anti-degradation requirements. The proposed compliance schedule is summarized in **Table 2-8**.

Peck Road Park Lake PCBs, DDT, Chlordane, and Dieldrin TMDLs

PCBs and organochloride pesticides like DDT, chlordane, and dieldrin bind to suspended sediments and organic particulates, which are then mobilized and transported by storm flows, before settling in quiescent receiving water bodies. As with the other legacy pollutants, commercial sources have been eliminated and controls are mostly targeted at the elimination of sediment sources, runoff reduction, and sediment settling or soil filtration associated with runoff infiltration. Their environmental fate (elimination) is mostly through natural attenuation and augmented biodegradation, although sediment dredging and disposal is a potential engineered alternative. The Peck Road Park Lake PCBs, DDT, Chlordane, and Dieldrin TMDLs established WLAs for inflowing water and suspended sediment based on the CTR water column target. The TMDL determined MS4 discharge baseline load, or sediment-bound concentration, for each of the TMDLs is identified in **Table 2-9** along with the suspended sediment WLA and percent reduction in load or concentration. This EWMP includes an implementation schedule determined by the RH/SGRWQG for control measures to achieve proposed interim numeric milestones and dates, as well as final compliance date(s) that meet the identified sediment borne WQOs. As identified in **Table 2-8**, the Peck Road Park Lake PCBs, DDT, Chlordane, and Dieldrin TMDLs are in the sediment pollutant class for the purpose of scheduling watershed controls.

Table 2-9 Target Load Reductions for Peck Road Park Lake TMDLs

Peck Road Park Lake TMDL	Baseline Load (μg/kg dry weight)	Suspended Sediment WLA (μg/kg dry weight)	Percent Reduction
PCBs	15.38	1.29	91.6
DDT	5.57	5.28	5.2
Chlordane	3.15	1.73	45.1
Dieldrin	0.91	0.43	53.0

Although the LAR Bacteria TMDL contains a potentially suitable alternative schedule, the most appropriate backbone upon which to build the Peck Road Park Lake PCBs, DDT, Chlordane, and Dieldrin TMDLs schedule is the Machado Lake Pesticides and PCBs (Toxics) TMDL, since it includes PCBs, DDT, and other organochlorine pesticides having similar fate, transport, and BMP class characteristics. The Machado Lake Pesticides and PCBs (Toxics) TMDL identifies a timeline of 7.5 years from the effective date of the TMDL. Using this timeline, the final compliance date is January 1, 2024. However, this proposed date may be modified through the adaptive management process as the effectiveness of proposed control measures to control sediment and associated pollutants are assessed.

Peck Road Park Lake Trash TMDL

The RH/SGRWQG members subject to the Peck Road Park Lake Trash TMDL are concurrently implementing control measures to address the Los Angeles River Trash TMDL and by necessity will follow that TMDL implementation schedule and the interim numeric milestones and final compliance dates identified in **Table 1-6** in **Section 1.3.2**.

2.5.2.2 303(d) Listed WBPCs

The MS4 Permit requires that 303(d) listed WBPCs, in the same class as those addressed by a watershed TMDL, be assigned interim milestone and final compliance schedules corresponding to those for that TMDL. Like many organics, bis(2-ethylhexyl) phthalate binds to suspended sediments and organic particulates, which are then mobilized and transported by storm flows, before settling in quiescent receiving water bodies. Controls are mostly targeted at the elimination of plastic debris, sediment sources, runoff reduction, and sediment settling, or soil filtration, associated with runoff infiltration. Their environmental fate (elimination) is mostly through natural attenuation and augmented biodegradation. For Sawpit Wash and bis(2-ethylhexyl) phthalate the most similar pollutant class characteristics are sediments as found in the Machado Lake Toxics TMDL. The Machado Lake Toxics TMDL has a final compliance date of January 1, 2024, therefore the final compliance date for bis(2-ethylhexyl) phthalate will be the same. However, this proposed date may be modified through the adaptive management process as the effectiveness of proposed control measures to control sediment and associated pollutants are assessed.

2.5.3 Interim Milestones and Compliance Schedule

Interim and final compliance dates in the Machado Lake Nutrients and Machado Lake Pesticides and PCBs (Toxics) TMDLs are the foundation for selecting interim and final milestone dates for WBPCs that do not have a Regional Board approved TMDL. The dates proposed are subject to the procurement of grants or other financial support commensurate with the existing and future fiduciary responsibilities of the RH/SGRWQG members. The dates may be further adjusted based on evolving information developed through the iterative adaptive management process identified in the MS4 Permit or similar Parts within future Permits, LAR Metals TMDL, Water Effect Ratio (WER) Site-Specific Objectives (SSO) BPA approved by the Regional Board in February 2015, the proposed Zinc WER SSO, and new monitoring and impairment data.

Table 2-10 presents the compliance schedule for WBPCs not included in a Regional Board approved TMDL, including USEPA TMDLs and 303(d) listings. **Table 2-11**, **Table 2-12** and **Table 2-13** present the numeric milestones which must be achieved by the dates presented in **Table 2-10**. Note that the compliance WLAs are presented per jurisdiction in the tables, to match the presentation in the MS4 Permit. However, compliance will be established across jurisdictions to the extent covered by monitoring site catchment areas. The schedule identified in this EWMP is subject to change based on changing data, information, legislation, law, and fiscal priorities through the adaptive management process. Any schedule modifications will be consistent with TMDL related compliance schedules and submitted to the Regional Board for review and approval based on the requirements of the MS4 Permit.

Table 2-10 Schedule of WBPCs without a Regional Board Approved TMDL

TMDL	Water Bodies	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Milestones (Bolded **numbers** indicate milestone deadlines within the current Permit term)[1]						
					2016	2017	2018	2020	2022	2024	2026
LA Area Lakes	Peck Road Park Lake	Total-P, Total-N	Meet WLAs	All							1/1
											Final
LA Area Lakes	Peck Road Park Lake	Water and Sediment: PCBs, DDT, Chlordane, Dieldrin	Meet WLAs	All						1/1	
										Final	
LA Area Lakes	Peck Road Park Lake	Trash	Meet WLAs	All	**9/30**						
					100%						
N/A	Sawpit Wash	Bis(2-ethylhexyl) phthalate	Meet RWL	All							3/23
											Final

[1] The current Permit term is assumed to end on December 27, 2017.

Table 2-11 Peck Road Park Lake Nutrients TMDL Milestones

Subwatershed	Milestone Date	Milestone Type	RH/SGRWQG Member	Total Nitrogen (lb/yr)[1]	Total Phosphorus (lb/yr)[1]
All Weather					
Eastern	January 1, 2026	Final WLA	Arcadia	2,320	383
			Bradbury	3,223	497
			Duarte	9,616	1,540
			County of Los Angeles	5,532	924
			Monrovia	38,736	6,243
Near Lake	January 1, 2026	Final WLA	Arcadia	1,115	158
			County of Los Angeles	773	129
			Monrovia	415	60.4
Western	January 1, 2026	Final WLA	Arcadia	16,334	2,840
			County of Los Angeles	2,818	467
			Monrovia	2,678	425
			Sierra Madre	4,254	695

[1] Each WLA must be met at the point of discharge. A three year average will be used to evaluate compliance. However, if applicable water quality criteria for ammonia, dissolved oxygen and pH, and the chlorophyll a target are met in the lake, then the total nitrogen and phosphorus allocations are considered attained.

Note: WLAs are contingent of MS4 Permit Part VI.E.3.

Table 2-12 Peck Road Park Lake PCBs, Chlordane, DDT, and Dieldrin TMDLs Milestones

Subwatershed	Milestone Date	Milestone Type	RH/SGRWQG Member	Suspended Sediment Milestone	Water Column Milestone
PCBs – All Weather					
Eastern	January 1, 2024	Final WLA	Arcadia	1.29 µg/kg dry weight	0.17 ng/L
			Bradbury		
			Duarte		
			County of Los Angeles		
			Monrovia		
Near Lake	January 1, 2024	Final WLA	Arcadia		
			County of Los Angeles		
			Monrovia		
Western	January 1, 2024	Final WLA	Arcadia		
			County of Los Angeles		
			Monrovia		
			Sierra Madre		
Chlordane – All Weather					
Eastern	January 1, 2024	Final WLA	Arcadia	1.73 µg/kg dry weight	0.59 ng/L
			Bradbury		
			Duarte		
			County of Los Angeles		
			Monrovia		
Near Lake	January 1, 2024	Final WLA	Arcadia		
			County of Los Angeles		
			Monrovia		
Western	January 1, 2024	Final WLA	Arcadia		
			County of Los Angeles		
			Monrovia		
			Sierra Madre		

Note: WLAs are contingent of MS4 Permit Part VI.E.3.

Table 2-12 Peck Road Park Lake PCBs, Chlordane, DDT, and Dieldrin TMDLs Milestones

Subwatershed	Milestone Date	Milestone Type	RH/SGRWQG Member	Suspended Sediment Milestone	Water Column Milestone
DDT – All Weather					
Eastern	January 1, 2024	Final WLA	Arcadia	5.28 µg/kg dry weight	0.59 ng/L
			Bradbury		
			Duarte		
			County of Los Angeles		
			Monrovia		
Near Lake	January 1, 2024	Final WLA	Arcadia		
			County of Los Angeles		
			Monrovia		
Western	January 1, 2024	Final WLA	Arcadia		
			County of Los Angeles		
			Monrovia		
			Sierra Madre		
Dieldrin – All Weather					
Eastern	January 1, 2024	Final WLA	Arcadia	0.43 µg/kg dry weight	0.14 ng/L
			Bradbury		
			Duarte		
			County of Los Angeles		
			Monrovia		
Near Lake	January 1, 2024	Final WLA	Arcadia		
			County of Los Angeles		
			Monrovia		
Western	January 1, 2024	Final WLA	Arcadia		
			County of Los Angeles		
			Monrovia		
			Sierra Madre		

Note: WLAs are contingent of MS4 Permit Part VI.E.3.

1

Table 2-13 Milestones for WBPCs without Regional Board Approved TMDL

Water Body	Milestone Date	Milestone Type	Milestone
Bis(2-ethylhexyl) phthalate – All Weather			
Sawpit Wash	January 1, 2024	Final RWL	1.8 µg/L

3. Watershed Control Measures

The EWMP provides the opportunity for Permittees to customize their stormwater programs to address water quality priorities through the implementation of stormwater BMPs, referred to in the MS4 Permit as watershed control measures. The overarching goal of BMPs in the EWMP is to reduce the impact of stormwater and non-stormwater on receiving water quality and address the water quality priorities. As part of the EWMP development process, various BMP types were evaluated and selected. This section describes the different types of BMPs that were considered for inclusion in the EWMP, with an emphasis on regional BMPs, which were critical to the EWMP development process. Additionally, this section discusses the evaluation process and watershed control measures selected for future consideration.

The three main categories of BMPs include structural, both regional or distributed, and institutional as defined below. The term "regional BMP" is different than "regional EWMP project" in that regional BMP projects are not necessarily able to capture the 85th percentile, 24-hour storm event.

Regional BMPs: Constructed structural practices intended to treat runoff from a contributing area of multiple parcels (normally on the order of 10s or 100s of acres or larger) (**Figure 3-1**)

Distributed BMPs: Constructed structural practices intended to treat runoff relatively close to the source and typically implemented at a single- or few-parcel level (normally less than one acre) (**Figure 3-2**)

Institutional BMPs: Policies, actions and activities intended to prevent pollutants from entering stormwater runoff thus eliminating the source of the pollutants. These BMPs are not constructed.

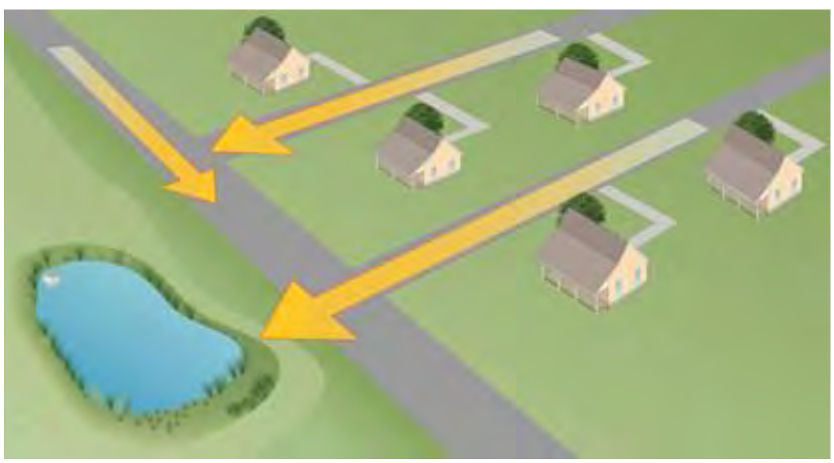


Figure 3-1 Conceptual Schematic of Regional BMP Implementation Approach

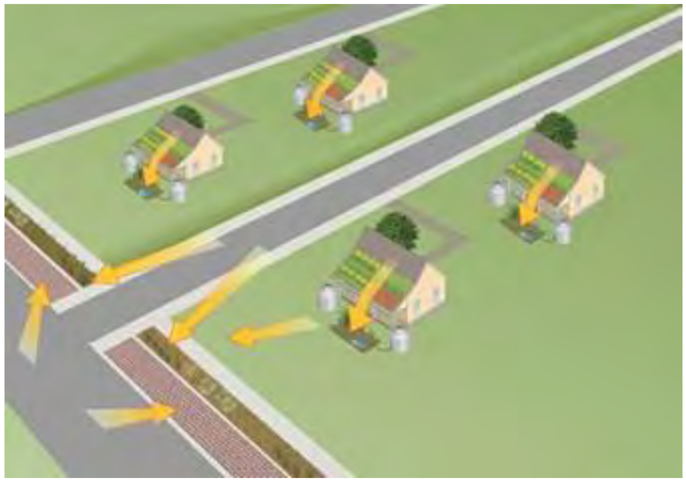


Figure 3-2 Conceptual Schematic of Distributed BMP Implementation Approach

This section summarizes existing and potential control measures by identifying existing BMPs and MCMs utilized by the RH/SGRWQG and evaluating performance data of the structural (regional and distributed) BMPs, and institutional (non-structural) control measures being implemented. Potential opportunities for customization of MCMs are identified and the information to support the modifications is also discussed. This section also summarizes the control measures that are proposed as part of this EWMP, which are included in the RAA discussed in **Section 4**.

To comply with the MS4 Permit requirements, an evaluation was performed that considers opportunities within the participating Permittees jurisdictions to utilize multi-benefit regional projects that, when feasible, detain all non-stormwater discharge and the flows produced by the 85th percentile, 24-hour storm event. A review of all relevant TMDL implementation plans and watershed management plans was performed to identify previously identified regional projects within the RH/SGRWQG EWMP area. An approach was developed and used to determine other potential regional project sites. The process was used to assess and select regional project sites for future consideration.

3.1 Non-Structural BMPs

Non-structural BMPs are non-constructed control measures that limit the amount of stormwater runoff or pollutants that are transported within the MS4 area. These control measures are also referred to as institutional BMPs. Most institutional BMPs are implemented to meet MCM requirements in the MS4 Permit.

MS4 Permit Part VI.C.5.b.iv.(1) directs that the MCMs identified in Parts VI.D.4 to VI.D.10 be incorporated as part of the EWMP. Permittees can evaluate the MCMs, identify potential modifications that will address water quality priorities, and provide justification for modification and/or elimination of any MCM that is determined to not be applicable, with the exception of MCMs in the Planning and Land Development Program which may not be eliminated. Customization may include replacement of an MCM for a more effective measure, reduced implementation of an MCM, augmented implementation of the MCM, focusing the MCM on the water quality priority, or elimination of an MCM. The MS4 Permit categorizes institutional BMPs and MCMs into the six program categories listed below. The programs that are applicable to the LACFCD are identified with an asterisk (*).

1. Development Construction Program
2. Industrial/Commercial Facilities Program
3. IC/ID Detection and Elimination Program*
4. Public Agency Activities Program*

5. Planning and Land Development Program
6. Public Information and Participation Program (PIPP)*

MCMs are considered a subset of institutional BMPs, which are non-constructed control measures that prevent the release of flow/pollutants or transport of pollutants within the MS4 area. Institutional BMPs include:

- Irrigation control
- Brake pad replacement
- Replacement of lead in wheel weights
- Street sweeping
- Catch basin cleaning
- Downspout disconnect program

3.1.1 Summary of Existing MCMs/Institutional BMPs

The following MCMs/institutional BMPs are already being implemented by the RH/SGRWQG members:

- Concrete Curing
- Compost Bin Sales and Workshops
- Dog Parks
- Dewatering Operations
- Dust Control
- Erosion Control
- Enhanced Street Sweeping
- Hardscape Design
- Hazardous Waste Management
- Landscape Design
- Liquid Waste Management
- Material Delivery and Storage
- Material Use
- Mulch Give Away
- Paving and Grinding Operations
- Potable Water/Irrigation
- Preserved Existing Vegetation
- Sanitary/Septic Waste Management
- Scheduling
- Solid Waste Management
- Spill Prevention and Control
- Stockpile Management
- Street Sweeping and Vacuuming
- Vehicle and Equipment Fueling
- Vehicle and Equipment Maintenance
- Waste Oil Recycling Center
- Water Conservation Practices
- Water Trucks
- Wind Erosion Control

Attachment P identifies the MCMs/institutional BMPs required by the MS4 Permit and summarizes the existing and planned implementation by RH/SGRWQG members. The new MCMs/institutional BMPs that were not required as part of the 2001 MS4 Permit, but are required as part of the current (2012) MS4 Permit, do not need to be implemented until this EWMP has been approved based on Part VI.D.a.b.ii of the MS4 Permit.

3.1.2 Modifying MCMs/Institutional BMPs

Part VI.C.5.b.iv.(1) of the MS4 Permit directs Permittees to assess MCMs to identify opportunities for focusing resources on the water quality priorities identified in **Section 2**. Each Permittee is encouraged to implement the requirements in Parts VI.D.4 through VI.D.10, or may implement customized actions within each category of control measures as set forth in this EWMP, once approved. Permittees can evaluate the MCMs, identify potential modifications that will address water quality priorities, and provide justification for modification or elimination of any MCM that is determined to be ineffective (with the exception of the Planning and Land Development Program, which may not be eliminated or modified). MCM customization may include replacement, reduced implementation, augmented implementation, focused implementation or elimination.

An approach was developed for evaluating MCMs and/or institutional BMPs for customization to better address the water quality priorities. The steps associated with this process are as follows:

Step 1. Summarize the Current MCM Implementation

The current MCM implementation as reported in the 2010-2011 and 2011-2012 LAC Unified Stormwater Annual Reports is summarized in **Attachment O**.

Step 2. Compare Current MCM Implementation to MS4 Permit

The 2001 MS4 Permit MCM requirements are compared to the requirements specified in the 2012 MS4 Permit in **Attachment P**. This comparison, along with the identification of existing MCM elements being implemented, allow for a general assessment of potential gaps in the current programs. In general, the 2001 MS4 Permit and 2012 MS4 Permit requirements are worded differently and contain different specific requirements that cannot easily be compared. Each of the RH/SGRWQG members implements different programs that comply with the same requirements. As part of this approach, each agency performed more specific assessments to determine if they would benefit from MCM customizations.

As shown in **Attachment P**, gaps between the current program implementation under the 2001 MS4 Permit and the 2012 MS4 Permit MCM requirements are primarily in the Planning and Land Development Program, Construction Program, and Public Agency Activities. For instance:

- *Planning and Land Development Program:* Extensive new requirements for LID and hydromodification control.
- *Construction Program:* New requirements for erosion and sediment control procedures, especially for sites less than 1 acre, and for Erosion and Sediment Control Plans (ESCPs).
- *Public Agency Activities:* MCMs for inventory of Permittee-owned facilities, determine retrofit opportunities, assessment of flood management projects, assessment of flood control facilities, demonstration of Integrated Pest Management (IPM), among others.

For the PIPP, Industrial/Commercial Program, and IC/ID Elimination Program, the 2012 MS4 Permit contains some modifications to existing MCMs and additional detail as compared to the 2001 MS4 Permit. One significant change is the elimination of the Principal Permittee which previously implemented the PIPP on behalf of all Permittees. Now each Permittee is individually responsible for the implementation of the PIPP. For these programs, no other significant new program elements are required as in the MCMs listed above. The MCM requirements and existing implementation served as the basis for further evaluation of MCMs.

Step 3. Develop a List of MCMs that are Candidates for Customization

The first step was to develop a list of the MCMs that may be evaluated for customization. There are two parallel approaches for developing the list:

- Identify MCMs that do not address or only partially address the water quality priorities; or
- Identify MCMs that the stormwater program staff would like to eliminate or customize based on implementation experience.

Each of the MCM programs that may be customized through the EWMP were evaluated to determine if the MCM addresses the water quality priorities identified in **Section 2**. In addition, the potential effectiveness of the MCM program regarding the water quality priorities was determined based on program goals, implementation, and experience. The evaluation also took into account the RH/SGRWQG preferences.

Step 4. Evaluate Existing Information and Data to Develop Justifications for MCM Customization

Based on the list of MCMs that were candidates for modification identified in Step 3, potential general approaches or opportunities for MCM customization were identified. Based on the general approaches or opportunities, the RH/SGRWQG members evaluated the customized MCMs to determine if potential modifications were warranted. **Table 3-1** summarizes the potential modifications identified through this approach. The table also includes non-structural control measures in addition to the MS4 Permit defined MCMs. This table only presents potential enhancements and the proposed non-structural control measures are discussed in **Section 3.4**.

Table 3-1 Summary of Potential Non-Structural BMP Enhancements

Potential Modification or Enhancement	Justification
PIPP	
Develop a Grassroots Committee.	Community leaders may have stronger community connections, thus a better platform to provide educational and outreach materials.
Additional school outreach programs.	Sending home in school packets educational materials to help educate the students and individuals in the household.
Industrial/Commercial Facilities Program	
Evaluate operations of industrial facilities inspected to verify whether their operations are subject to IGP.	Identifying activities at industrial/commercial facilities where the Standard Industrial Classification (SIC) code does not require coverage under IGP will require facilities to get coverage and comply with requirements in the IGP.
Development Construction Program	
Recommend monitoring and sampling as part of the Erosion and Sediment Control Plan requirements.	Requiring developer to conduct self-inspections and monitoring will most likely result in more thorough BMP implementation by developers and contractors.
Inspect construction sites where Erosion and Sediment Control Plans have been approved.	
Public Agency Activities Program	
More frequent street sweeping, especially in areas that lack full capture certified trash control devices.	Implementing a more vigorous street sweeping schedule will allow debris to be captured before it can be transported downstream.
Utilize regenerative air vacuum equipment for street cleaning in land use areas that generate high metals loads.	Vacuum street cleaners are more effective at removing metals compared to sweepers.
Set maximum street sweeper speeds to optimize effectiveness in removing trash, debris, and sediments.	Traveling at speeds recommended by street sweeping manufacturers will improve the sweeping effectiveness at removing pollutants.
Sweeping center median gutters, and "pork chop" islands at street intersections.	Sweeping areas that are not normally swept may capture additional pollutants.
Revise curb miles cleaned as an indicator to volume of trash collected.	Volume of trash collected provides a better indication of the program effectiveness.

Table 3-1 Summary of Potential Non-Structural BMP Enhancements

Potential Modification or Enhancement	Justification
Enhanced maintenance of catch basins, especially those with connector pipe screens.	Enhanced maintenance will prevent sediments and debris from accumulating and traveling downstream.
IC/ID Program	
Municipal Codes that include enforcement action such as the issuance of Notice of Violations (NOVs) for illicit connections.	Utilizing violations will give the RH/SGRWQG a greater presence and the threat of a penalty may have a greater influence over developers and others.
Municipal Codes that require follow up inspections within ten days for illicit connections.	Implementing a time schedule for follow up inspections will ensure that the cleanup is completed in a timely manner.
Abatement and cleanup required within one day of discovery.	Current procedures allow for up to 72 hours, therefore a quicker response will positively correlate to a lower load contribution.
Other Institutional BMPs	
Enhanced Irrigation Control	
Promote replacement of grass with xeriscape vegetation.	Installing artificial turf and/or drought tolerant plants, or installing weather based irrigation controllers, will conserve water and reduce runoff associated with irrigation which is often the source of dry-weather flows, which are often the most concentrated with pollutants.
Promote replacement of grass with drought tolerant native plant species.	
Outreach that focuses on the installation of weather based irrigation controllers.	
Perform landscape irrigation audits.	Actions that require residents to become aware of their water usage as well as limiting it may reduce the amount of irrigation occurring, thus reducing runoff due to excess irrigation.
Implement water budgets.	
Inform residents on other types of BMPs or irrigation equipment that may be utilized.	
Downspout Disconnection Program	
Implement a downspout disconnect program.	Implementing a downspout disconnect program will promote water conservation and reuse, by capturing stormwater runoff for irrigation use, thus reducing the volume of water reaching the storm drain system.

3.1.3 Approaches to Additional Non-Stormwater Discharge Control Measures

Non-stormwater discharge is often the most polluted, as it is highly concentrated from an activity that generally consists of washing down something or over irrigating. In an attempt to capture what is referred to as the "first flush," water quality requirements often include the mitigation of the 85th percentile, 24-hour storm event or the 0.75-inch storm event, such as regional EWMP projects and SUSMP/LID projects. MCMs and other institutional BMPs are in place in an attempt to reduce non-stormwater discharges as well. Control measures are proposed to address large storm volumes generated within the RH/SGRWQG and it is safe to assume that the proposed control measures will also address non-stormwater discharges within those drainage areas. An analysis was performed to quantify the anticipated load reduction through the implementation of wet-weather controls, which is summarized in **Section 4.2**. Non-stormwater discharges throughout the RH/SGRWQG that are not addressed with wet-weather controls will be addressed through the CIMP non-stormwater discharge source assessment.

3.2 Structural BMPs

As part of the EWMP development process, BMPs that are considered sufficient in addressing water quality priorities and achieving compliance with MS4 Permit WQOs are identified. Structural BMPs vary in function and type, with each BMP providing unique design characteristics and benefits from implementation. The overarching goal of BMP implementation as part of the EWMP process is to reduce the impact of stormwater and non-stormwater flows on receiving water quality. This subsection focuses on the structural BMPs assessed and selected for future consideration to address the water quality priorities and demonstrate compliance through the RAA.

3.2.1 Categories of Structural BMPs

Regional and distributed BMPs are separated into subcategories as shown in **Table 3-2**. These categories are used to compile and describe information on existing, planned, potential, and proposed BMPs. The nomenclature was important for engaging stakeholders as the EWMP was developed.

Table 3-2 Summary of Structural BMP Categories and Major Functions

Category	Subcategory	Example BMP Types
Regional[1]	Infiltration	Surface infiltration basin, subsurface infiltration gallery
	Detention	Surface detention basin, subsurface detention gallery
	Constructed Wetland	Constructed wetland, flow-through/linear wetland
	Treatment Facility	Facilities designed to treat runoff from and return it to the receiving water
	Low Flow Diversion	Facilities designed to divert dry-weather flows to the sanitary sewer, or in some cases, to spreading grounds
Distributed	Site-Scale Detention	Dry detention basin, wet detention pond, detention chambers, etc.
	Green Infrastructure	**Bioretention** and **biofiltration** (vegetated practices with a soil filter media, and the latter with an underdrain)
		Permeable pavement
		Green streets (often an aggregate of bioretention/biofiltration and/or permeable pavement)
		Infiltration BMPs (non-vegetated infiltration trenches, dry wells, rock wells, etc.)
		Bioswales (vegetative filter strips or vegetated swales)
		Rainfall harvest (green roofs, cisterns, rain barrels)
	Flow-Through Treatment BMP	Media/cartridge filters, high-flow biotreatment filters, etc.
	Source Control Treatment BMPs	Catch basin inserts, screens, hydrodynamic separators, trash enclosures, etc.

[1] The term "Regional BMP" does not necessarily indicate the project can capture the 85^{th} percentile storm, as used in the MS4 Permit. The term "Regional EWMP Projects" indicates those regional BMPs that are able (or expected to be able) to capture the 85^{th} percentile storm.

The BMP performance functions that drive BMP performance are presented in each BMP Fact Sheet in **Attachment E**. The three major BMP functions for structural BMPs are infiltration, water quality treatment, and storage, as follows:

1

Infiltration: Runoff is directed to percolate into the underlying soils. Volume reduction and groundwater recharge occur in infiltration practices.

Figure 3-3 Conceptual Diagram Illustrating Infiltration

Storage: Runoff is captured, stored (detained), and slowly released into downstream waters. Storage can reduce the peak flow rate from a site but does not directly reduce runoff volume.

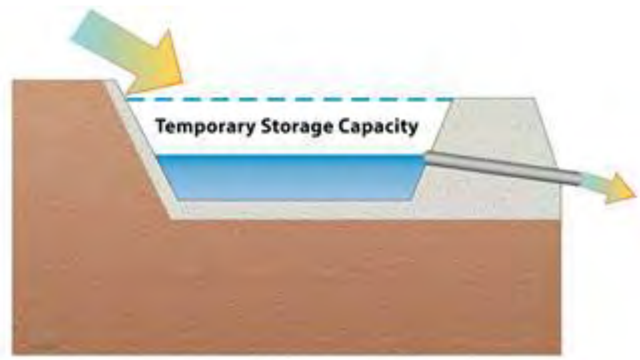


Figure 3-4 Conceptual Diagram Illustrating Storage

Water Quality (WQ) Treatment: Pollutants are removed through various unit processes, including filtration, settling, sedimentation, sorption, straining, and biological or chemical transformations.

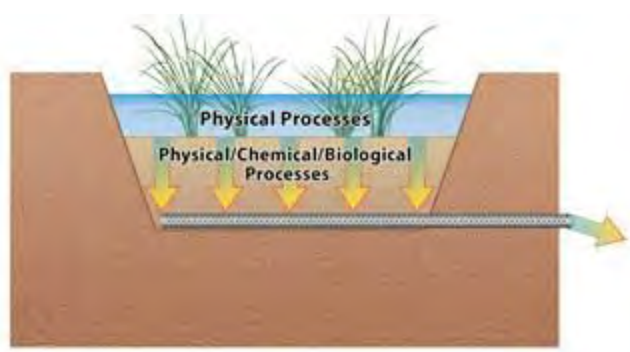


Figure 3-5 Conceptual Diagram Illustrating Water Quality Treatment

2

The preceding BMP functions were incorporated into relative performance gauges (**Figure 3-6**) to graphically represent the functions achieved by each BMP subcategory. Relative performance gauges are used in the BMP Fact Sheets, which are found in **Attachment E**. The circles represent the relative magnitude and range of each performance function for the particular BMP, in order to allow for comparison among different BMP types.

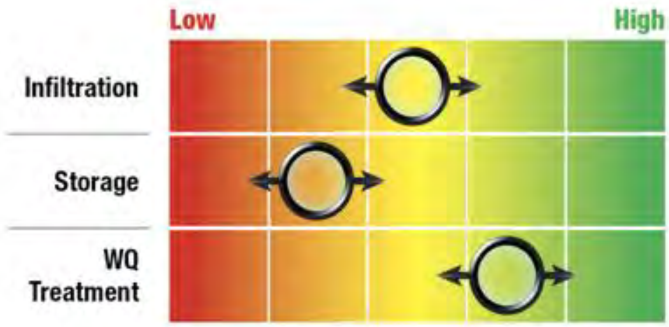


Figure 3-6 Example Relative Performance Gauge for Structural BMPs

Regional BMPs are constructed structural practices intended to treat runoff from a contributing area of multiple parcels (normally on the order of 10s or 100s of acres or larger). Regional practices include infiltration facilities that promote groundwater recharge and detention facilities that encourage settling. Infiltration and detention regional BMPs can be either constructed as open-surface basins or subsurface galleries. Regional practices also include constructed wetlands, which use engineered wetland environments to encourage pollutant removal, treatment facilities, which use conventional wastewater treatment processes to target pollutants of concern (POC), or low flow diversions, which divert flows to the sanitary sewer. Regional BMP Fact Sheets are found in **Attachment E**, and include the following BMPs:

- Infiltration facilities
- Detention facilities
- Constructed wetlands
- Treatment facilities

Distributed BMPs are constructed structural practices intended to treat runoff relatively close to the source and typically implemented at a single- or few-parcel level (normally less than one acre). As described in the BMP Fact Sheets, found in **Attachment E**, distributed BMPs include the following subcategories:

- Site-scale detention facilities
- Green infrastructure
- Flow-through treatment BMPs
- Source control structural BMPs

A major subcategory of distributed BMPs is green infrastructure. The MS4 Permit specifies that EWMPs should "incorporate effective technologies, approaches and practices, including green infrastructure." The primary goal of distributed green infrastructure BMPs is to intercept and treat runoff near its source using resilient natural systems. As opposed to traditional gray infrastructure, green infrastructure relies on contact between runoff, soils, and vegetation to accomplish volume and pollutant reduction. Green infrastructure has been shown to cost-effectively reduce the impacts of wet-weather flows while also reducing BMP maintenance requirements (Kloss et al. 2006). In addition, green infrastructure can provide multiple benefits to the surrounding community, including increased property values, increased enjoyment of surroundings and sense of well-being, increased safety, and reduced crime rate (Ward et al. 2008; Shultz and Schmitz 2008; Wolf 2008; Northeastern Illinois Planning Commission 2004; Hastie 2003; Kuo 2003; Kuo et al. 2001a; Kuo et al. 2001b; Wolf 1998).

Structural BMPs incorporated into the green infrastructure subcategory include the following, as described in the BMP Fact Sheets:

- Bioretention and biofiltration
- Permeable pavement
- Green streets
- Bioswales
- Infiltration BMPs
- Rainfall harvest (green roofs, cisterns, and rain barrels)

3.2.2 Summary of Existing Structural BMPs

The following sources were used to compile information on existing control measures, including MCMs and BMP programs already in effect for each of the participating RH/SGRWQG members:

- Standard Urban Stormwater Mitigation Plan (SUSMP) plan check records
- 2011-2012 Unified Annual Stormwater Report
- Integrated Regional Watershed Management Plan (IRWMP) documents
- Amigos de los Rios website
- RH/SGRWQG NOI for development of an EWMP

Three existing regional BMP projects were identified within the RH/SGRWQG EWMP area and are discussed below. Existing projects include projects that were constructed prior to 2012, as the water quality measured in 2012 serves as the baseline water quality which controls implementation efforts. The three projects are illustrated in **Figure 3-7** and a detailed summary is included in **Attachment F**. A total of 74 existing distributed BMP projects were identified and are summarized in **Table 3-3** and illustrated in **Figure 3-8**. A detailed list of distributed BMPs is provided in **Attachment G**. In addition, the 2011-2012 Unified Annual Stormwater Report was reviewed and a summary of the reported BMPs, categorized based on the categorization described in **Table 3-2**, is in **Attachment H**. The summary was created based on the following assumption: the number of existing BMPs is the number of BMPs reported as maintained in 2011-2012.

Table 3-3 Summary of Existing Distributed BMPs

Jurisdiction	Number of Existing Distributed BMPs Reported by Jurisdiction									
		Green Infrastructure								
	Site-Scale Detention	Bioretention/ Biofiltration	Permeable Pavement	Green Street	Bioswale	Infiltration BMPs	Rainfall Harvest	Flow-Through Treatment BMP	Source Control Structural BMP	Unknown
LA County	--	4	--	--	--	--	6	--	6	3
Arcadia	--	--	--	--	--	--	2	--	1	1
Bradbury	--	--	--	--	--	--	--	--	--	--
Duarte	--	--	--	--	--	--	1	--	2	1
Monrovia	--	--	--	--	--	8	--	--	2	10
Sierra Madre	--	--	--	--	--	--	--	--	--	--
Total:	**0**	**4**	**0**	**0**	**0**	**8**	**9**	**0**	**11[1]**	**15[1]**

Sources: City of Arcadia Plan Check Approvals, City of Monrovia SUSMP Records, Los Angeles County LID Developments GIS data, IRWMP, and RH/SGRWQG NOI

[1] Total does not match total illustrated in **Figure 3-8** because geographical information is not available.

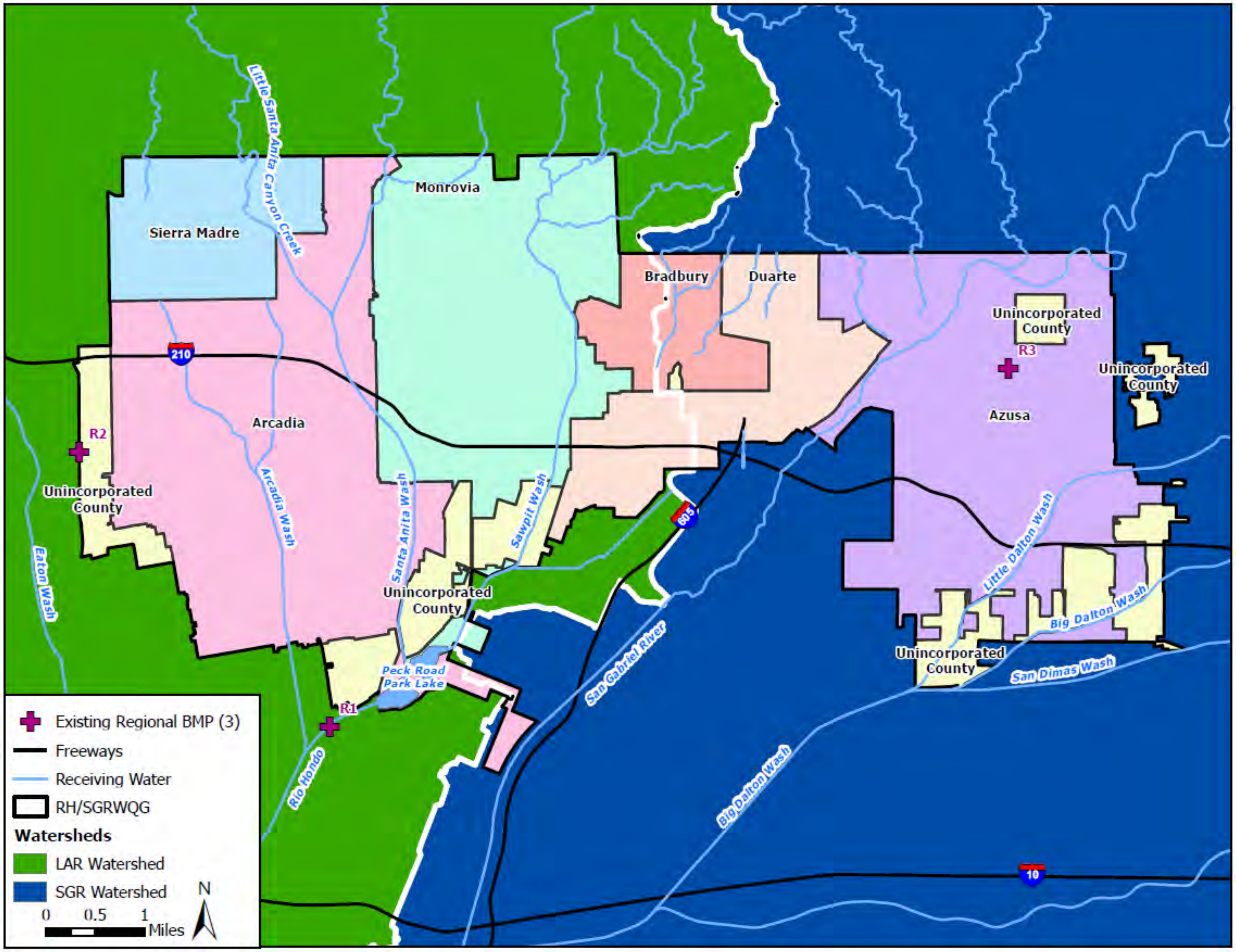


Figure 3-7 Existing Regional BMPs (Azusa shown for watershed context – no longer a member of the WQG)
Notes: BMPs with no spatial data are not shown. Numbering corresponds with project ID numbers listed in **Attachment F**.

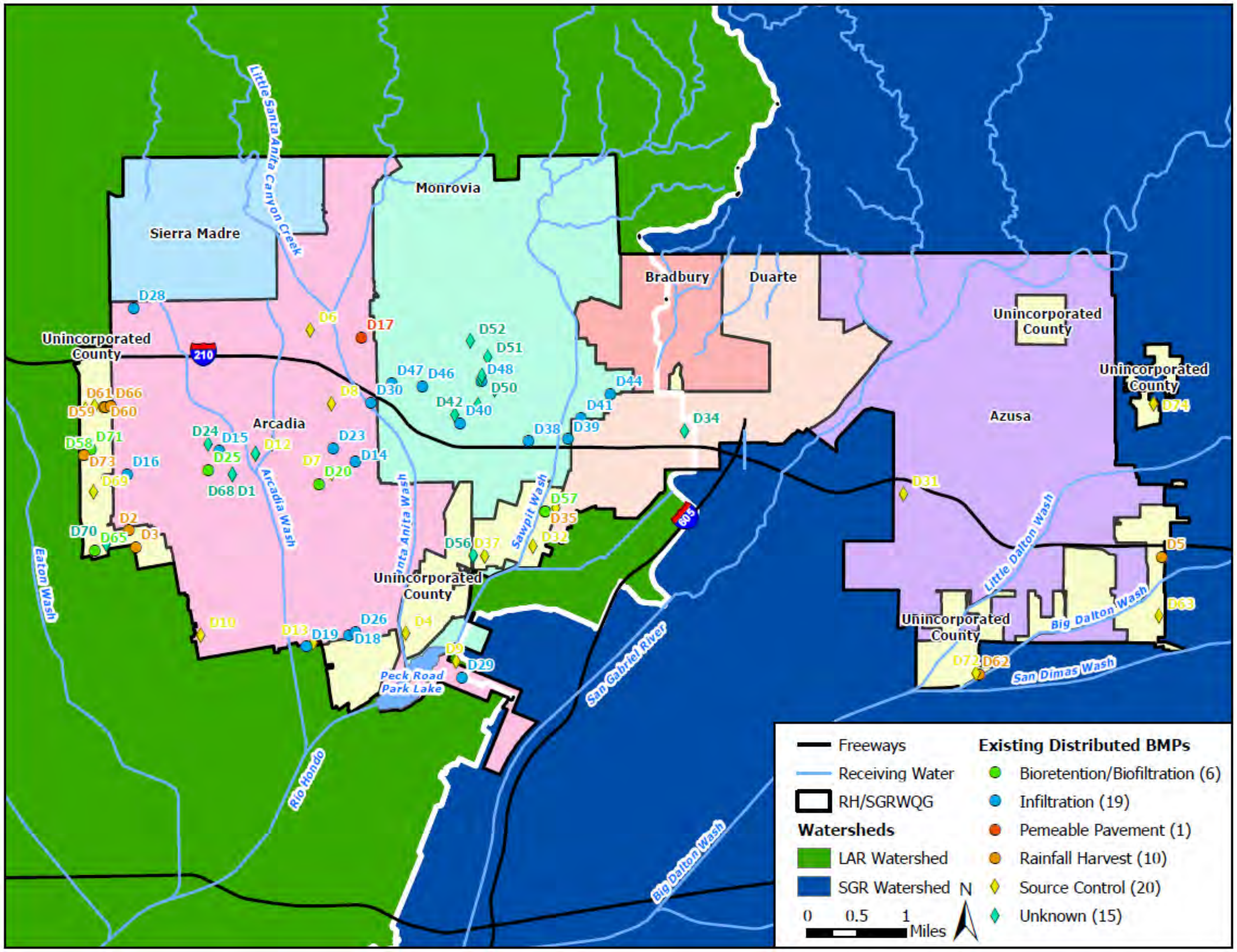


Figure 3-8 Existing Distributed BMPs (Azusa shown for watershed context – no longer a member of the WQG)
Notes: BMPs with no spatial data are not shown. Numbering corresponds with project ID numbers listed in **Attachment G**.

BMPs, including regional BMP projects, implemented prior to the baseline pollutant loads being used for the RAA calibration are considered part of the baseline, while those that were implemented after the baseline pollutant loads were established can be modeled in the RAA to demonstrate a load reduction. Three regional projects have been implemented by the RH/SGRWQG. The projects must be evaluated to determine if they meet EWMP criteria prior to determining if credit can be taken for water quality improvement. Part VI.C.1.g of the MS4 Permit states that wherever feasible, EWMP groups, such as the RH/SGRWQG, should identify and implement regional multi-benefit projects that retain (i) all non-stormwater runoff and (ii) all stormwater runoff from the 85th percentile, 24-hour storm event for the drainage area tributary to the project. The Rio Hondo Trail Enhancements Project, Rosemead Boulevard Improvement Project, and San Gabriel Forest Gateway Interpretive Center Project were constructed following the pollutant load baseline determination. These projects were evaluated to determine if credit towards load reduction from baseline conditions could be used to demonstrate compliance. These projects were identified in planning documents as described in **Section 3.2.3** and were identified as already being constructed or in the construction phase. Each of the projects provides water quality benefits, but not enough information was available to quantify those benefits such that credit could be taken towards demonstrating compliance in the RAA.

Rio Hondo Trail Enhancements

According to the Amigos de los Rios website, the Rio Hondo Trail Enhancement project was completed in 2013. The project included the greening and installation of new gates and signage along 2.1 miles of trail located on the east bank of the Rio Hondo, from Lower Azusa Road to Peck Water Conservation Park. The project incorporated the use of native plants and shrubs, permeable paving, and bioswales. These distributed BMPs enhance runoff water quality in the project area vicinity, but the overall water quality benefits of the project could not be assessed with the limited information available.

Rosemead Boulevard Improvement Project

The Rosemead Boulevard Improvement Project was proposed in late 2007 and completed in February 2012, prior to the issuance of the 2012 MS4 Permit. The project represents the first LAC road to incorporate water quality enhancements. The project incorporated 2.5 miles of roadway improvements along Rosemead Boulevard between Foothill Boulevard and the Temple City boundary. Improvements included, but were not limited to, median landscaping, decorative street lights, tree planting, utility undergrounding, and bioswales. The project installed 1,712 feet of bioswales, contributing to the capture and retention of runoff generated within the project's drainage area (Green Street, 2013).

San Gabriel Forest Gateway Interpretive Center

In 2008, the Forest Gateway Interpretive Center was constructed in coordination with Amigos de los Rios. The San Gabriel Canyon Forest Gateway is a 2.5-acre pocket park and interpretive center in Azusa that provides a unique interface between urban and Angeles National Forest environments marking the entrance to the National Forest. The project is part of Amigos de los Rios efforts to support the Emerald Necklace of East LAC and to make a greener Los Angeles. The project incorporated various bioswales and utilized native plants and trees. Bioswales remove sediment-associated pollutants by settling and straining and improve water quality. The project received funding from Proposition A.

3.2.3 Planned Structural BMPs

Part VI.C.1.g of the MS4 Permit states that wherever feasible, EWMP groups, such as the RH/SGRWQG, should identify and implement regional multi-benefit projects that retain (i) all non-stormwater runoff and (ii) all stormwater runoff from the 85th percentile, 24-hour storm event for the drainage area tributary to the project. In drainage areas within the EWMP area where retention of the 85th percentile, 24-hour storm event is not feasible, the EWMP must include an RAA to demonstrate that applicable WQBELs and RWLs will be achieved through the implementation of other watershed control measures including regional projects, enhanced MCMs, and distributed BMPs. Previously identified regional projects were identified and evaluated to determine if they would or could meet the above criteria. Documents were also reviewed to identify planned distributed BMPs.

The following documents and websites were reviewed to find previously identified structural BMP projects that address water quality:

- 2006 San Gabriel River Corridor Master Plan
- 2010 Multi-Pollutant TMDL Implementation Plan for the Unincorporated County Area of the Los Angeles River Watershed
- Amigos de los Rios website
- OPTI, part of the Greater Los Angeles County (GLAC) IRWMP online project database
- Los Angeles County Clean Water, Clean Beaches online project database
- Council for Watershed Health website
- Other local news articles

These reference documents include broad concepts, outlining the steps necessary to improve water quality. Recommendations include various BMP types for a range of different conditions; however, some documents do not provide specific BMP details to determine if they would meet EWMP project criteria as presented. Other references identify specific projects and locations, however insufficient detail is provided to evaluate if the project will retain all non-stormwater runoff and stormwater runoff from the 85th percentile, 24-hour storm event. Potential regional BMP projects introduced in the above references are in varying stages of planning, design, construction, or in some instances have already been constructed as identified in **Section 3.2.2**. In addition, valuable information was obtained from OPTI and the Los Angeles Clean Water, Clean Beaches online project databases.

The Implementation Plans relevant to the RH/SGRWQG TMDLs were reviewed in an effort to identify planned projects The planned regional projects identified were evaluated to determine if they satisfy regional EWMP project criteria. If implemented, the drainage areas tributary to projects that satisfy the regional EWMP project criteria will be in compliance with WQOs and those that do not will be modeled in the RAA to incorporate load reductions. Identified projects are listed in **Attachment I** and illustrated in **Figure 3-9**. The list of planned regional projects includes projects that are located downstream of the RH/SGRWQG EWMP area and adjacent to the Rio Hondo or SGR, as the group may be able to benefit from these projects.

Projects identified in **Attachment I** were evaluated to determine if they satisfied the regional EWMP project criteria specified in Part VI.C.1.g of the MS4 Permit or if they provide substantial water quality benefits. Each of the projects has the potential to be designed in a manner which incorporates water quality benefits. However, there is not enough information available to determine if these projects will satisfy EWMP criteria as presented. While regional projects are still in the planning phase, it is possible to modify concepts and designs to incorporate water quality and multi-use benefits to meet the EWMP criteria. If the RH/SGRWQG decides to pursue these projects in the future, the concepts will be further investigated to determine if they satisfy EWMP criteria. If they do not, a feasibility study will be performed to determine how they could be modified. The following four projects exhibited the greatest potential of the planned regional BMP projects to possibly satisfy the regional EWMP project criteria:

- Buena Vista Wetlands
- Hugo Reid Park Infiltration Basin Project
- Monrovia Station Square Project
- Whittier Narrows Park Project

The Buena Vista Wetlands and Hugo Reid Park Infiltration Basin project sites were evaluated as part of the regional project screening further detailed in **Section 3.2.4**. Monrovia Station Square was recently improved and includes distributed water quality improvements (see discussion below); therefore, it was not evaluated as a regional EWMP project. The Whittier Narrow Park Project would benefit the RH/SGRWQG; however, the site is located outside the Group's jurisdiction. This site was not further evaluated for regional EWMP project implementation as part of the RH/SGRWQG EWMP.

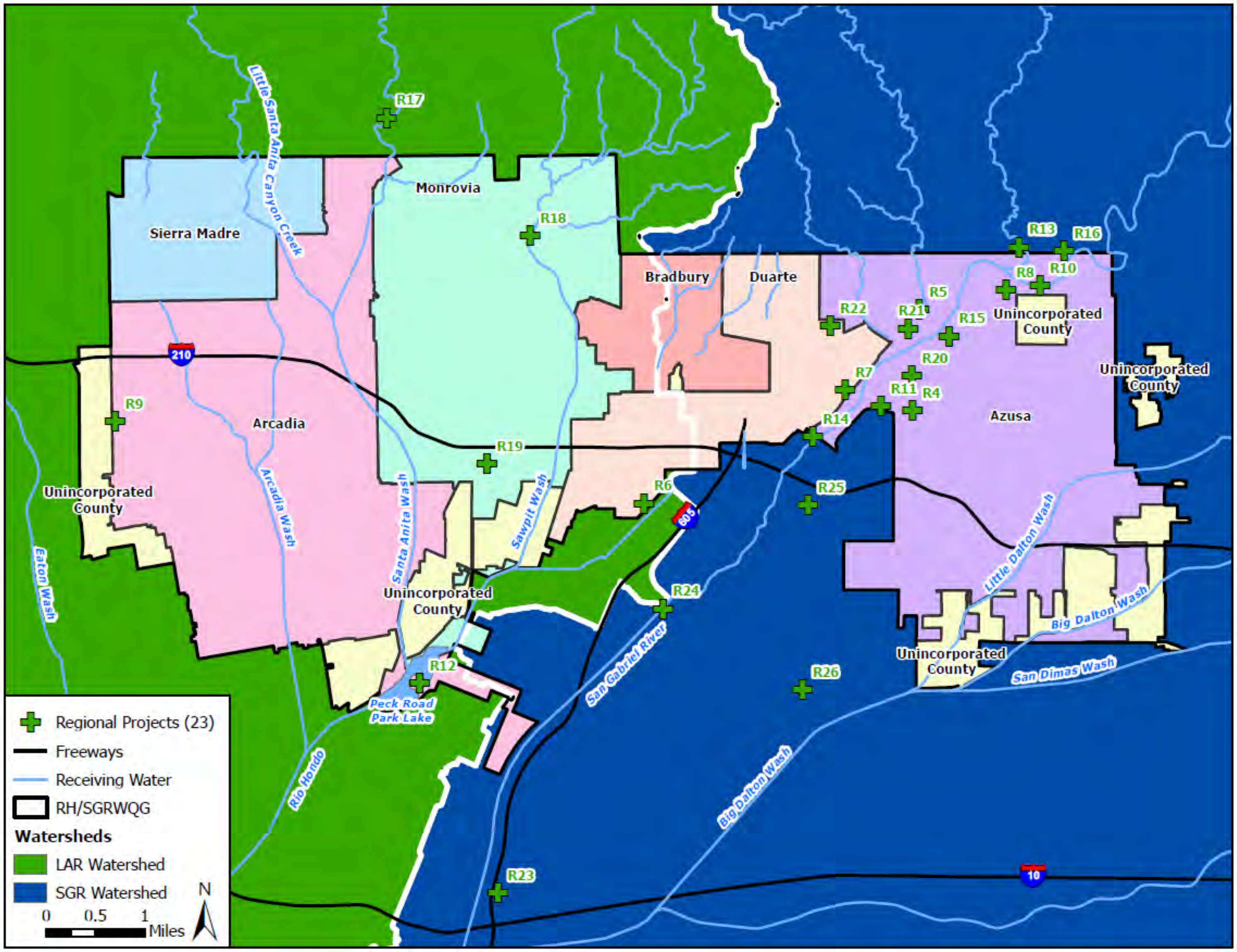


Figure 3-9 Regional BMPs Identified in Planning Documents (Azusa shown for context – no longer a member of WQG)
Notes: BMPs with no spatial data are not shown. Numbering corresponds with project ID numbers listed in **Attachment I**.

A total of four planned distributed BMP projects were identified and include:

- Monrovia Station Square/Transit Village Multi-Benefit Park and Greenway Project (City of Monrovia)
- Santa Anita Park and Shopping Mall Parking Lot BMP (City of Arcadia)

Additionally, the Cities of Arcadia, Bradbury, Duarte, and Monrovia plan to implement full capture trash source control structural BMPs in all areas tributary to the Rio Hondo to comply with the Los Angeles River Trash TMDL.

The planned distributed BMPs are illustrated in **Figure 3-10** and listed in **Attachment J**. In addition to the identified planned distributed BMP projects, the SUSMP requires post-construction structural or treatment control BMPs for new development and redevelopment. In addition, the Planning and Land Development Program in Part VI.D.7 of the MS4 Permit requires implementation of LID and Hydromodification Control BMPs, such as green streets, which are designed to minimize the percentage of impervious surfaces through infiltration, evapotranspiration (ET), and rainfall harvest and use. As development and redevelopment occur, additional structural BMPs will be constructed in accordance with the SUSMP and Planning and Land Development Program to treat or retain the runoff from public and private parcels.

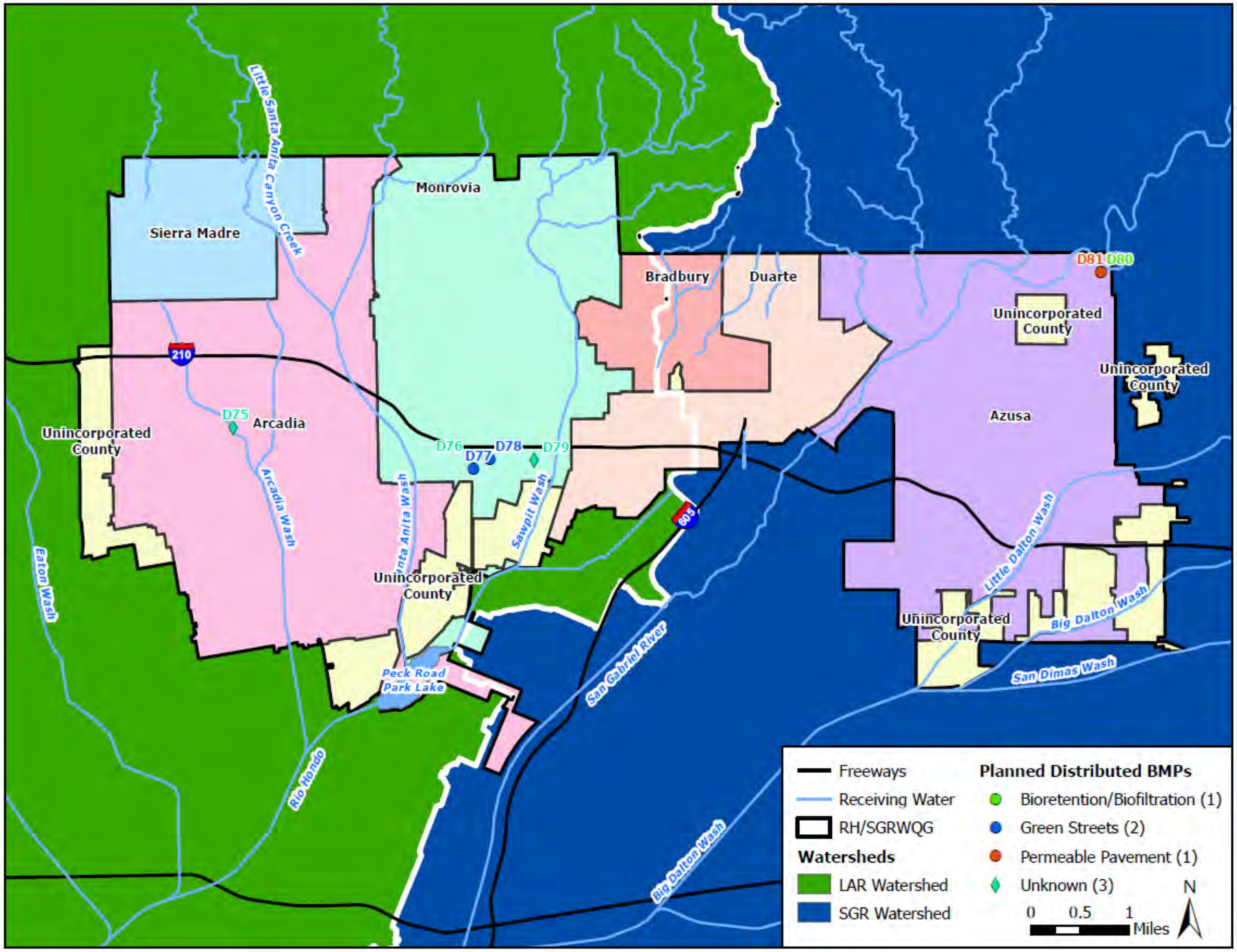


Figure 3-10 Planned Distributed BMPs (Azusa shown for watershed context – no longer a member of the WQG)

Notes: BMPs with no spatial data are not shown. Numbering corresponds with project ID numbers listed in **Attachment J**.

3.2.4 Identifying and Selecting Multi-Benefit Regional Projects

This section presents the approach and process used to identify and select regional projects, including, but not limited to regional EWMP projects. The approach was utilized to identify and screen preferred regional stormwater enhancement projects and support the evaluation of projects that will meet the objectives of the MS4 Permit. The process includes:

1. Compilation and evaluation of regional BMPs from existing planning documents;
2. Identification of additional regional BMPs/project sites;
3. Evaluation of all regional BMPs/project sites; and
4. Recommended projects for implementation.

This approach includes a Geographic Information System (GIS)-based assessment of publicly and privately-owned properties containing sufficient open space (e.g., large parking lots) and other conditions suitable to support a regional stormwater enhancement project. A ranking system was developed and used to screen each potential project sites using the same criteria. Both regional BMP and regional EWMP projects were identified using this process. Regional EWMP projects are able to retain all non-stormwater runoff and stormwater runoff generated by the 85th percentile, 24-hour storm event, whereas regional BMP projects are those stormwater enhancement projects that do not meet the EWMP criteria, but still provide regional water quality benefits. Regional BMP projects are constructed structural BMPs intended to collect and treat runoff from a contributing drainage area composed of multiple parcels, normally on the order of 10s or 100s of acres.

Potential project locations initially included open spaces, whether they are within parks, schools, large parking lots, or golf courses. These sites were identified using available aerial imagery and by utilizing available land use data, which includes these land use classifications. A GIS-based approach allowed the use of both aerial imagery and available map datasets. Once open areas were identified, the potential project sites were further refined and considered input from the group and interested stakeholders.

A GIS model was used to manage spatial data needed for the identification and screening of potential regional projects within the RH/SGRWQG area. Compiled data was used to support the prioritization of potential projects based on location specific criteria supporting the need and project implementation feasibility. The GIS analysis evaluated data critical in identifying high priority catchments, corresponding to those used for the RAA, for regional BMP installation within a watershed, such as land use, pollution generation, hydrology, topography, parcel ownership, existing storm drain flow direction, and infrastructure integration opportunities. The following subsection provides additional details on how this methodology was utilized to identify and rank potential project sites.

3.2.4.1 Potential Regional Project Sites

A list of potential regional BMP project locations within the RH/SGRWQG area was developed utilizing the approach described above. Using GIS land use layers and aerial imagery, several potential project sites were identified. The project sites were identified based on open space and their proximity to receiving water/MS4 infrastructure. Other criteria were evaluated during this phase, and the potential project sites identified represent the long list of potential locations that were narrowed down by using the ranking system described in the following section. The areas identified as potential project sites for regional BMPs within the RH/SGRWQG area are illustrated in **Figure 3-11**.

Based on a preliminary visual screening, the considered site size, proximity to a stormwater conveyance system, and location within the watershed, a list of projects to be further evaluated was determined. The list also includes project sites that were identified by members of the group and interested stakeholders. The 41 sites that were analyzed in greater detail are illustrated in **Figure 3-12** and listed in **Table 3-4**.

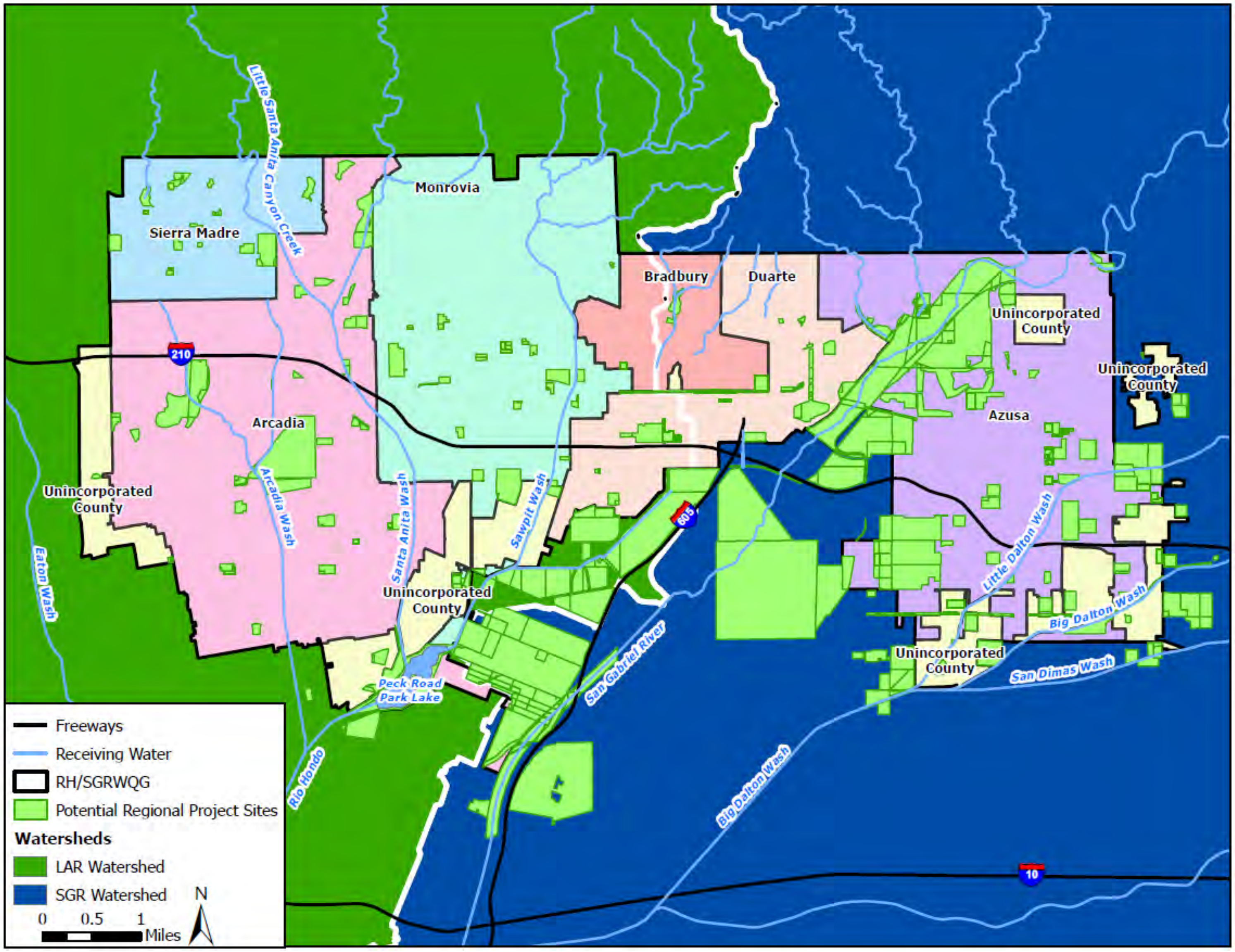


Figure 3-11 Potential Regional Project Sites within the RH/SGRWQG Area (Azusa shown for watershed context – no longer a member of the WQG)

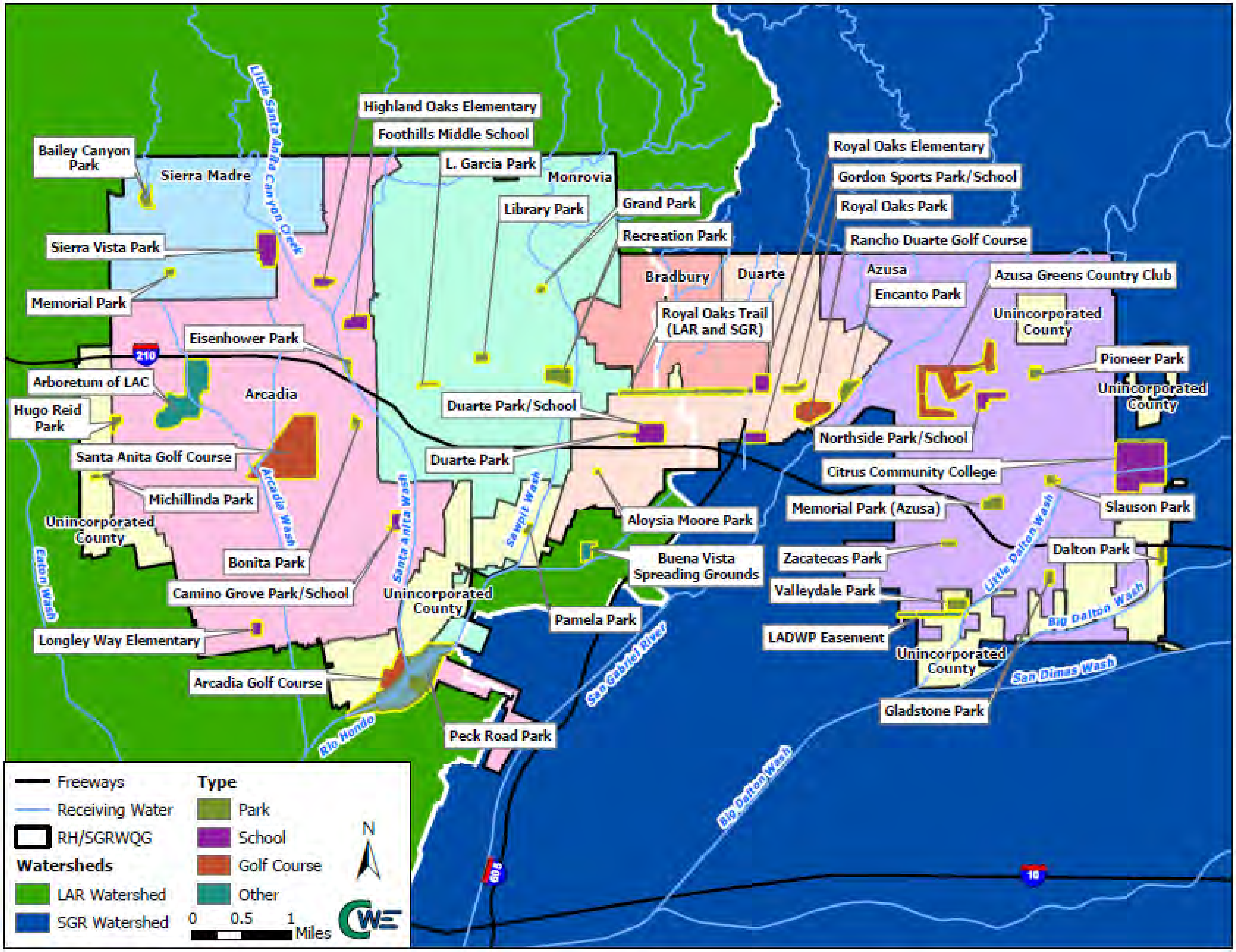


Figure 3-12 Potential Regional Project Sites Analyzed within the RH/SGRWQG Area **(Azusa shown for watershed context – no longer a member of the WQG)**

Table 3-4 Potential Regional Project Sites

Parks	
Aloysia Moore Park	Memorial Park (Sierra Madre)
Bailey Canyon Park	Michillinda Park
Bonita Park	Northside Park
Dalton Park	Pamela Park
Duarte Park	Peck Road Park
Eisenhower Park	Pioneer Park
Encanto Park	Recreation Park
Gladstone Park	Royal Oaks Park
Grand Park	Sierra Vista Park
Hugo Reid Park[1]	Slauson Park
L. Garcia Park	Valleydale Park
Library Park	Zacatecas Park
Memorial Park (Azusa)	
Golf Courses	
Arcadia Golf Course*	Rancho Duarte Golf Course
Azusa Green Country Club	Santa Anita Golf Course*
Educational Facilities	
Camino Grove Park/School	Gordon Sports Park/School
Citrus Community College	Highland Oaks Elementary
Duarte Park/School	Longley Way Elementary
Foothills Middle School	Royal Oaks Elementary
Other Open Spaces	
Arboretum of LAC*	Los Angeles Department of Water and Power (LADWP) Easement
Buena Vista Spreading Grounds[1]	Royal Oaks Trail

* More than one alternative for site was evaluated
[1] Previously planned projects as described in **Section 3.2.3** (from existing implementation plans)

3.2.4.2 Project Screening

A system scaled from one to ten is utilized for scoring each of the ranking criteria with the best sites having the highest scores. Additionally, a weight coefficient is assigned to each criterion to make some criteria more influential in the overall ranking process. The definition of the ranking criteria used, scoring system developed, available information used for project evaluation, and the weight coefficient of each of the criteria is discussed in this section so it is clear how the results of the Regional BMP Projects Worksheet (included in **Attachment K**) were derived. The ranking criteria used to evaluate and screen projects are listed below.

- General Criteria
  - Proximity to receiving water/MS4 infrastructure
  - Ownership
  - Size of catchment area
  - Size of opportunity site
  - Jurisdictions
  - Catchment area land use and likely pollutants
  - Multi-use opportunities and connectivity

  - Funding opportunities
  - Local knowledge
- Underlying Soil Conditions Criteria
  - Seasonal high groundwater table depth
  - Proximity to groundwater production wells
  - Pollutants in soil or groundwater
  - Geotechnical hazards
  - Soil type

Table 3-5 summarizes the scoring system and weight of each of the criteria. Additional details are provided below.

Table 3-5 Ranking Criteria, Weight, and Scoring System Summary

Ranking Criteria	Weight	Scoring System (10 being best)									
		1	2	3	4	5	6	7	8	9	10
General Criteria											
Proximity to receiving water/MS4 infrastructure	**1**			> 1000 ft Surface		500-1000 ft		100-500 ft			< 100 ft
Ownership[1]	**3**	Private									Public
Size of catchment area	**1**	Currently not used									
Size of opportunity site	**3**	> 100%	80-100%		50-80%		30-50%		10-30%	5-10%	0-5%
Jurisdictions	**1**				1			2			3+
Catchment area land use and likely pollutants	**2**		< 20%			20-50%			50-80%		> 80%
Multi-use opportunities	**1**	Currently not used									
Funding opportunities	**1**					Potential funds			Potential partners/ funding		Already looking into it
Local knowledge	**2**	Varies based on local knowledge									
Underlying Soil Conditions Criteria											
Seasonal high groundwater table depth	**1**					> 30 ft					< 30 ft
Proximity to groundwater production wells	**1**					< 200 ft					> 200 ft
Pollutants in soil or groundwater	**1**	Superfund site[2]				2+ GT[3] sites			1 GT[3] site		0 GT[3] sites
Geotechnical hazards	**1**		Liq[4] and fault hazards			Liq[4] or fault hazards					No hazards
Soil type	**1**		> 0.9		0.8-0.9		0.6-0.8		0.4-0.6		< 0.4

[1] Schools scored zero (0)
[2] Superfund sites automatically eliminated
[3] Geotracker
[4] Liquefaction

Proximity to Receiving Water/MS4 Infrastructure

Definition

The "Proximity to Receiving Water/MS4 Infrastructure" criterion is beneficial to determining which regional projects are near a stormwater conveyance system so that runoff can be easily diverted and captured for infiltration. Potential project sites near a receiving water and/or MS4 infrastructure are more likely to be feasible to implement and less costly to divert runoff. In addition to proximity, it is preferred that the potential regional project sites are downstream of the conveyance system so that gravity systems can be used to capture and divert runoff.

Scoring System

The potential project sites located in close proximity to MS4 infrastructure received higher scores, as shown in **Figure 3-13**, because diversion is likely to be less costly due to lower pipe quantities and trenching lengths. The cost is also likely to be less due to shallower systems which require less excavation. Sites that are located upstream of MS4 infrastructure were classified as surface flow and received lower scores as these scenarios are often associated with higher construction costs and may cause more disruption around the project site which is seen as an inconvenience to the public.

1	2	3	4	5	6	7	8	9	10
		>1000 ft Surface		500 – 1000 ft		100 -500 ft			<100 ft

Figure 3-13 Scoring System for Proximity to Receiving Water/MS4 Infrastructure

Weight Coefficient

A weight coefficient of one was given to this criterion.

Available Information

ArcGIS was used to determine the proximity to receiving water/MS4 infrastructure for each of the potential project sites. Data layers available online for LAC, along with other data provided by the group, were used to determine the location of existing infrastructure. Measurements were taken from the side of the potential project parcel closest to the adjacent conveyance system.

Ownership

Definition

The "Ownership" ranking criterion is noteworthy because potential project sites located on private property would be extremely expensive to implement; therefore, utilizing publically owned land represents a more feasible option.

Scoring System

The potential project sites located on publically owned parcels are given high scores and privately owned parcels are given low scores, as shown in **Figure 3-14**. Potential project sites located within schools are given a zero because extensive coordination would be involved and the Division of the State Architect (DSA) does not typically approve long-term infiltration projects on school properties.

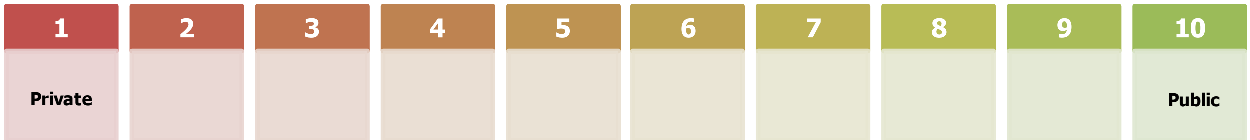


Figure 3-14 Scoring System for Ownership

Weight Coefficient

A weight coefficient of three was given to this criterion to emphasize the benefits and cost savings associated with implementing projects on public property. Additionally, the weight coefficient helps lower the score of the projects associated with schools to emphasize the difficulty working with DSA, especially on infiltration projects.

Available Information

Assessor parcel maps available on the LAC, Office of the Assessor website were used to verify the ownership of the potential project parcels. During preliminary screening, ownership was assumed based on land use types (i.e., parks are generally publically owned, etc.); therefore, most of this information was known through the initial GIS screening. In the RH/SGRWQG area, it is common to find schools with adjacent parks and playgrounds. In these cases the parks are used by the school and therefore would require similar requirements and approval from the DSA.

Size of Catchment Area

Definition

The "Size of Catchment Area" ranking criterion was originally intended to measure and score the size of the catchment area tributary to the potential project. Other ranking criteria already take into account the size of the catchment, for example, the "Jurisdictions," "Size of Opportunity Site," and "Catchment Area Land Use and Likely Pollutants" criterion. These criteria take into account the size of the catchment relative to other criterion. This category is currently not being used to evaluate potential projects based on the narrative provided below in regards to the scoring system.

Scoring System

The scoring system for this criterion is not clear, in that a larger catchment area is not necessarily better than a smaller more manageable one. If a large catchment area is treated it is beneficial to the RH/SGRWQG because a large area would be considered in compliance with the MS4 Permit, but if the entire 85th percentile, 24-hour storm event is not treated then the area cannot be considered in compliance without additional control measures modeled through the RAA process. Other criteria, as specified above, have taken into account the size of the catchment and are able to provide more valuable information than the size alone. Potential project sites with a majority of their catchment area outside of a RH/SGRWQG jurisdiction were automatically taken off of the list for consideration.

Weight Coefficient

A weight coefficient was not provided for this criterion, as it was not used to assess potential project sites.

Available Information

The catchment area for each of the potential projects was delineated using GIS, with the Watershed Management Modeling System (WMMS) subwatershed data as a base. If the project site was situated in a downstream portion of a subwatershed, the subwatershed was cut based on available topography data and storm drain conveyance system routing. In some cases potential projects were located downstream of WMMS subwatershed(s); therefore, the whole subwatershed or multiple subwatersheds would be classified as tributary to the project site. Most projects have more than one option in terms of where flows can be diverted from, thus changing the catchment area delineation. The values determined are based on the diversion scenario that seemed most feasible based on engineering judgment and experience. The subcatchments were delineated for all potential projects and used to score other ranking criteria, as it was determined that a larger catchment size does not necessarily correlate with a more feasible project site. In some cases, a site was assessed based on two different subwatershed delineations.

Size of Opportunity Site

Definition

The "Size of Opportunity Site" was used to identify how much of a parcel would be required to mitigate flows from the 85th percentile, 24-hour storm event based on preliminary calculations assuming the BMP provides ten feet of storage depth. This criterion helps assess the feasibility of implementation because constructing BMPs with storage depths larger than ten feet can be costly and using the entire footprint of a parcel is not feasible due to existing surface and subsurface infrastructure such as buildings and subterranean parking lots that take up portions of the parcel area.

Scoring System

Potential project sites that require less area compared to the total area available (i.e., parcel area) receive higher scores and represent more feasible options, as demonstrated in **Figure 3-15**. Based on standard practice, it is feasible to implement water quality enhancement projects on approximately five percent of a parcel.

1	2	3	4	5	6	7	8	9	10
>100 %	80-100 %		50-80 %		30-50 %		10-30 %	5-10 %	0-5 %

Figure 3-15 Scoring System for Size of Opportunity Site

Weight Coefficient

A weight coefficient of three was given to this criterion because a project site that requires a twenty foot storage depth over the entire parcel is not desirable, or likely to be feasible, and should not be ranked high through this process.

Available Information

Using the rational method and procedures identified in the LAC Hydrology Manual (LACDPW, 2006) the flows generated by the 85th percentile, 24-hour storm event were approximated. The catchment delineations previously described and GIS data was used to identify the dominant soil types, land use, and rainfall depths within the catchment area. The land use composition within the drainage area provides information regarding the percent of impervious area tributary to the potential project site. Most projects have more than one option in terms of where flows can be diverted from, thus changing the catchment area delineation. The values determined are based on the diversion scenario that seemed most feasible based on engineering judgment and experience. GIS parcel data was used to identify the area of the potential project parcels, which was compared to the required BMP footprint assuming the BMP provides a storage depth of ten feet.

Jurisdictions

Definition

The "Jurisdictions" ranking criterion was used to identify how many of the group member's jurisdictions would benefit from project implementation; therefore, what jurisdictions are included within the drainage area tributary to the project site.

Scoring System

Potential project sites that accept flows from more jurisdictions are given higher scores, as shown in **Figure 3-16**, because these projects encourage collaboration, shared cost, better connectivity, and shared benefit.

1	2	3	4	5	6	7	8	9	10
			One			Two			≥ Three

Figure 3-16 Scoring System for Jurisdictions

Weight Coefficient

A weight coefficient of one was given to this criterion because a potential project site should not be ruled out if it only treats what is produced in that jurisdiction.

Available Information

Using the catchment delineation described previously, GIS was used to identify how many jurisdictions were included in the area tributary to the potential project site. Most projects have more than one option in terms of where flows can be diverted from, thus changing the catchment area delineation. The values determined are based on the diversion scenario that seemed most feasible based on engineering judgment and experience.

Catchment Area Land Use and Likely Pollutants

Definition

The "Catchment Area Land Use and Likely Pollutants" criterion was used to identify the land use categories tributary to the potential project site. This criterion is significant because it is beneficial to implement regional projects that will address the water quality priorities in the watershed. Based on the MS4 Permit, the area tributary to a regional EWMP project is considered in compliance with all water quality standards. By addressing the water quality priorities, not only will the area be in compliance, but it will also contribute to downstream receiving water compliance through load reductions.

Scoring System

The scoring system for this criterion is more complex than the others because the water quality priorities are different for the LAR and SGR Watersheds. The scoring system takes into account the watershed that the potential project is treating and land use categories that make up the catchment area. The scoring system is summarized in **Figure 3-17**. The percentages shown in the figure correspond to the summation of land use types associated with the water quality priorities. For the potential projects tributary to the LAR or SGR, the percentages of commercial, industrial, and transportation land uses are summed, as the priority pollutants are metals. For potential projects tributary to Peck Road Park Lake, the percentages of agricultural, commercial, educational, industrial, and open space land uses are summed because pesticides and nutrients are the water quality priorities. Potential sites that better address the water quality priorities are given higher scores.

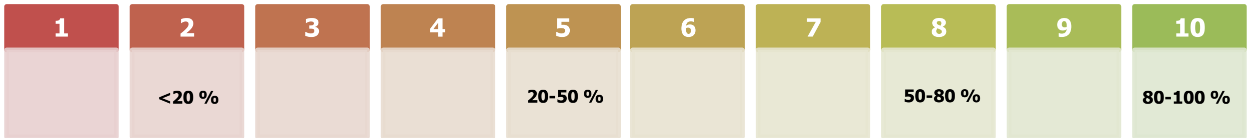


Figure 3-17 Scoring System for Catchment Area Land Use and Likely Pollutants

Weight Coefficient

A weight coefficient of two was given to this criterion because projects that address the water quality priorities should be given more consideration since they will additionally contribute to lower pollutant loads downstream, thus helping larger areas become compliant through the modeling process.

Available Information

Using the catchment delineation described previously, GIS was used to identify the land use composition within the catchment area. The LACDPW GIS land use data was used to define the following more distinct land use categories: agriculture, commercial, education, industrial, multi-family residential, single-family residential, transportation, and vacant. The land uses analyzed are consistent with those summarized in **Table 1-2** and **Figure 1-2**.

Multi-Use Opportunities and Connectivity

Definition

The "Multi-Use Opportunities and Connectivity" criterion was included to evaluate the potential projects for multi-use and connectivity opportunities. This criterion is important because these types of opportunities are encouraged in the MS4 Permit and maximize the use of public funds expended to design, implement, operate, and maintain an improvement project in the community. Potential project concepts and sites that utilize new or existing features such as public amenities (i.e., fishing, hiking trails, swimming, etc.), habitat and wildlife conservation, or stream restoration all have multi-use and connectivity opportunities. This criterion was not used in the screening process and will require a more extensive evaluation of the potential project concepts and existing habitat and environment. This ranking criterion may be used in the future to further evaluate and differentiate potential project sites.

Scoring System

The scoring system for this criterion has not yet been determined.

Weight Coefficient

A weight coefficient has not yet been defined because it is currently not being used to evaluate potential projects.

Available Information

Available information has not been evaluated for this ranking criterion. In the future, sites may be evaluated to determine if these opportunities exist. Existing site conditions will need to be evaluated to determine if the site already supports multi-use and connectivity or if these opportunities can be integrated through project implementation.

Funding Opportunities

Definition

The "Funding Opportunities" criterion was used to evaluate the potential projects for prospective funds which would be available for the project. This criterion is critical because having a funding partner makes implementation much more feasible. In addition to sharing cost, funding opportunities or partnerships may help the public perception of potential projects and help gain public support.

Scoring System
Potential project sites that have already pursued funds through available grant programs are scored the highest as demonstrated in **Figure 3-18**. Potential sites that have obvious potential partners were also scored high. All projects were given some points for this criterion because there are various grant programs that currently exist that would be applicable to regional water quality improvement projects and projects that involve watershed groups.

1	2	3	4	5	6	7	8	9	10
				Potential funds			Potential partners and funds		Already looking into it

Figure 3-18 Scoring System for Funding Opportunities

Weight Coefficient
A weight coefficient of one was given to this criterion.

Available Information
Available information regarding funding opportunities and potential partners was collected. Once selected projects are further along in the planning stages, specific funding opportunities will be identified and project sites will be evaluated to determine if project concepts can be prepared in such a way to qualify for available grants and/or loans.

Local Knowledge

Definition
The "Local Knowledge" criterion is used to give potential project sites a set amount of points based on experience and local knowledge. This criterion requires firsthand knowledge and cannot be generated through a routine or spatial analysis.

Scoring System
The scoring system for this criterion is not standardized as it is with other ranking criterion. In the Regional BMP Projects Worksheet (included in **Attachment K**), a score is given to each project site along with an explanation which justifies the score assigned. If thoughts regarding the potential project sites were neutral, a score of five was assigned.

Weight Coefficient
A weight coefficient of two was given to this criterion because local knowledge and experience provides valuable insight that a computer or spatial analysis cannot determine.

Available Information
The RH/SGRWQG members have discussed the various potential project sites and agreed upon a score based on known site conditions and public perception. During the EWMP outreach events, participating stakeholders provided comments on regional project sites that were of interest to them. These comments were also incorporated into this scoring criterion.

Seasonal High Groundwater Table Depth

Definition
The "Seasonal High Groundwater Table Depth" ranking criterion was used to evaluate the groundwater table depth within the potential project site because high groundwater depths do not support infiltration,

making retention and infiltration of the 85th percentile, 24-hour storm event difficult. The Los Angeles County Stormwater BMP Design and Maintenance Manual (LACDPW, 2009) recommends a minimum separation of ten feet between the invert of an infiltration BMP and groundwater table to protect groundwater quality.

Scoring System

Potential project sites that have deep groundwater table depths are given higher scores as demonstrated in **Figure 3-19**. The minimum groundwater table depth recorded was used for this evaluation.

1	2	3	4	5	6	7	8	9	10
				<30 ft					>30 ft

Figure 3-19 Scoring System for Seasonal High Groundwater Table Depth

Weight Coefficient

A weight coefficient of one was given to this criterion.

Available Information

LACDPW operates 60 groundwater wells within the RH/SGRWQG area based on information available on their groundwater well web page. Data is available for each of the wells dating back to at least the 1980s. The groundwater well in closest proximity to the potential project site was used as a reference and the average and minimum groundwater table depths were recorded for consideration.

Proximity to Groundwater Production Wells

Definition

The "Proximity to Groundwater Production Wells" criterion is used to identify whether the potential project site is located near a groundwater production well. The California Stormwater Quality Association (CASQA) BMP Handbook for New Development and Redevelopment (CASQA, 2003) explains that groundwater contamination should be considered as an adverse effect of infiltration BMPs; therefore, should not be close enough to contaminated groundwater drinking supplies. The Los Angeles County Stormwater BMP Design and Maintenance Manual (LACDPW, 2009) recommends a minimum of 100 feet of separation between infiltration BMPs and groundwater production wells unless sufficient pretreatment is provided.

Scoring System

Potential project sites that are more than 200 feet away from existing groundwater production wells are given higher scores, as shown in **Figure 3-20**. Sites are given a lower score if they are within 200 feet of a groundwater production well because further analysis may be required to determine if contamination will be a concern or the project would be limited to capture and use because infiltration would not be feasible.

1	2	3	4	5	6	7	8	9	10
				<200 ft					>200 ft

Figure 3-20 Scoring System for Proximity to Groundwater Production Wells

Weight Coefficient

A weight coefficient of one was given to this criterion.

Available Information

The sources listed below were reviewed for the location of groundwater production wells. The locations identified in the documents listed below were then verified using aerial imagery. Aerial imagery was also reviewed independently of the various sources.

- Water Supply Assessment for the City of Arcadia "Caruso Affiliated/Magna Entertainment Corp" (City of Arcadia, 2006)
- Environmental Assessment: Water Supply Wells for the City of Arcadia, California *Longley Well No. 3 and Camino Real Well No. 3* (EPA, 2009)
- Urban Water Management Plans (UWMPs) from 2010 posted on the State of California's Department of Water Resources website (CA.gov) for:
  - Azusa Light & Water;
  - California American Water;
  - Cities of Arcadia, Monrovia, and Sierra Madre;
  - LADWP;
  - San Gabriel Valley Water Company;
  - Upper San Gabriel Valley Municipal Water District; and
  - West Basin Municipal Water District.
- Environmental Impact Reports (EIRs) from the surrounding area

Pollutants in Soil or Groundwater

Definition

The "Pollutants in Soil or Groundwater" criterion was used to assess soil and groundwater contamination within the potential project site and surrounding areas. Identifying existing contamination is vital because infiltration projects are not desirable in areas undergoing mitigation and it would not be beneficial to implement infiltration projects in these areas knowing they may have adverse effects on groundwater quality (LACDPW, 2009).

Scoring System

As shown in **Figure 3-21**, potential project sites that are within Superfund sites are given a low score and sites with little to no soil or groundwater contamination, based on GeoTracker, are given higher scores. Sites that are identified as Superfund sites were automatically considered infeasible and eliminated from further evaluation.

1	2	3	4	5	6	7	8	9	10
Superfund Exists				≥2 GeoTracker Sites			1 GeoTracker Site		0 GeoTracker Sites

Figure 3-21 Scoring System for Pollutants in Soil or Groundwater

Weight Coefficient

A weight coefficient of one was given to this criterion.

Available Information

The location of existing Superfund sites was determined using the San Gabriel Valley Volatile Organic Compound (VOC) Contamination Maps (EPA, 2007). The California SWRCB operates a website called GeoTracker which was used to determine if soil or groundwater contamination exists near the potential project sites. GeoTracker provides information regarding the following cleanup sites: Leaking Underground Tanks (LUST), land disposal, military, Water Discharge Requirements (WDR), Department of Toxic Substances Control (DTSC), and "other." The location along with mitigation measures are provided through the website and documentation was reviewed for open sites located within approximately 1,000 feet of a potential project site. Information was reviewed for nearby sites to determine if the mitigation is in progress or if it should have been closed, but was never officially reported as closed. Data used to determine a score for this criterion only considered open cases that are still mitigating contamination.

Geotechnical Hazards

Definition

The "Geotechnical Hazards" criterion was used to assess the geotechnical hazards in the area that may prohibit the implementation of regional projects. This criterion is included so that geotechnical hazards that may present a high risk of failure or costly implementation are identified and prioritized accordingly. Areas susceptible to liquefaction and earthquake-induced landslides were evaluated to assess existing geotechnical hazards. Fault zone areas were also examined.

Scoring System

Potential project sites that are not within liquefaction or earthquake-induced landslide zones were given high scores, as illustrated in **Figure 3-22**.

1	2	3	4	5	6	7	8	9	10
	Liq. & Fault Zone Hazards			Liq. OR Fault Hazards					No Hazards

Figure 3-22 Scoring System for Geotechnical Hazards

Weight Coefficient

A weight coefficient of one was given to this criterion.

Available Information

The locations of liquefaction and earthquake-induced landslide zones were determined using maps available from the California Department of Conservation (State of California, 2014). The fault zones in the area were obtained from the California Department of Conservation, California Geological Survey (State of California, 2014). Both sources provided GIS data that was overlain with the potential project sites to determine their position relative to existing hazards. Geotechnical hazards were only noted if the potential project site was located within the hazard zone.

Soil Type

Definition

The "Soil Type" criterion was used to assess the type of soil within the potential project site and tributary catchment area, as it plays a critical role in the volume of runoff produced and the ability to infiltrate the runoff captured. The undeveloped runoff coefficient (C_u), the ratio of runoff rate to rainfall intensity, defined in the LACDPW Hydrology Manual (LACDPW, 2006), was used to score this criterion.

Scoring System

Figure 3-23 demonstrates potential project sites that have low undeveloped runoff coefficients are given higher scores, as they are associated with soils that minimize runoff and promote infiltration.

1	2	3	4	5	6	7	8	9	10
	> 0.9		0.8-0.9		0.6-0.8		0.4-0.6		< 0.4

Figure 3-23 Scoring System for Soil Type

Weight Coefficient
A weight coefficient of one was given to this criterion.

Available Information
The LACDPW Hydrology Manual (LACDPW, 2006) classifies the existing soil types in LAC and provides soil curves that identify the relationship between the undeveloped runoff coefficient and rainfall intensity. The soil types used for this analysis are illustrated in **Figure 1-3**. The dominant soil type within the potential project catchment area was identified for each of the sites and the undeveloped runoff coefficient for a rainfall intensity of two inches per hour was obtained from the soil curves. The methodology for obtaining this coefficient is further discussed in the LACDPW Hydrology Manual (LACDPW, 2006).

3.2.4.3 Screening Results

The potential project sites identified in **Table 3-4** were screened based on the criteria outlined above. The results of the screening and data used to determine the ranking are summarized in the Regional BMP Projects Worksheet provided in **Attachment K**. The worksheet only includes projects that were fully evaluated, as some projects were eliminated from the analysis because they are located in the upper portion of the watershed, receive drainage from a catchment outside of the group's jurisdiction, or are located within a Superfund site. The worksheet was completed and each project site was scored. The sites were then ranked according to each watershed, i.e., the projects within the SGR Watershed were compared to each other and not to the potential sites located in the LAR Watershed. A figure identifying the potential project site and the respective catchment area and land use are provided in **Attachment L**, while the rankings are summarized in **Table 3-6** below.

Table 3-6 Ranked Potential Regional Project Sites in the LAR Watershed

Potential Project Site	Score	Rank
Recreation Park	144	1
Arboretum of LAC	142	2
Sierra Vista Park	135	3
Royal Oaks Trail (LAR)	132	4
L. Garcia Park	129	5
Eisenhower Park	128	6
Santa Anita Golf Course Alternative 2	127	7
Hugo Reid Park[1]	126	8
Peck Road Park	125	9
Aloysia Moore Park	124	10
Bailey Canyon Park	123	11
Arcadia Golf Course	122	12
Arcadia Golf Course - Regional	122	12
Buena Vista Spreading Grounds[1]	119	14

Table 3-6 Ranked Potential Regional Project Sites in the LAR Watershed		
Potential Project Site	**Score**	**Rank**
Library Park	117	15
Arboretum of LAC – Regional	117	15
Duarte Park	114	17
Michillinda Park	114	17
Santa Anita Golf Course	112	19
Memorial Park (Sierra Madre)	101	20
Duarte Park/School	99	21
Camino Grove Park/School	95	22
Highland Oaks Elementary	94	23
Longley Way Elementary	87	24
Foothills Middle School	84	25

[1] Identified in planning documents as described in **Section 3.2.3**.

The results for the potential regional EWMP project sites in the SGR Watershed are summarized in **Table 3-7**. The results were separated by watershed because the estimated volume and load reductions are dependent on the watershed. A figure illustrating the potential project site with its catchment area and land use are provided in **Attachment L**.

Table 3-7 Ranked Potential Regional Project Sites in the SGR Watershed		
Potential Project Site	**Score**	**Rank**
LADWP Easement	145	1
Encanto Park	139	2
Memorial Park (Azusa)	131	3
Royal Oaks Trail (SGR)	131	3
Northside Park	130	5
Pioneer Park	130	5
Royal Oaks Park	129	7
Gladstone Park	125	8
Azusa Greens Country Club	123	9
Slauson Park	113	10
Royal Oaks Elementary	98	11
Gordon Sports Park/School	80	12

In some instances the potential regional project sites being evaluated were eliminated if it was determined that additional information made the project infeasible or undesirable. The project sites eliminated through partial evaluation are summarized in **Table 3-8**. Project elimination was often a result of insignificant catchment areas due to a location in the upstream portion of the catchment or contamination, including Superfund sites. Figures illustrating the potential project sites that were eliminated are provided in **Attachment L**.

Table 3-8 Eliminated Regional EWMP Project Sites		
Potential Project Site	**Watershed**	**Reason for Elimination**
Parks		
Bonita Park	LAR	Upstream in subwatershed, no significant catchment
Dalton Park	SGR	Catchment area outside RH/SGRWQG
Grand Park	LAR	Upstream in subwatershed, no significant catchment
Pamela Park	LAR	Proximity to Superfund site
Valleydale Park	SGR	Proximity to Superfund site
Zacatecas Park	SGR	Proximity to Superfund site
Golf Course		
Rancho Duarte Golf Course	SGR	Existing contamination issues
Educational Facilities		
Citrus Community College	SGR	Catchment area outside RH/SGRWQG

3.2.5 Identifying Additional Distributed BMPs

The entirety of Section 3.2.5 is superseded by the analysis presented in 2018 rEWMP, Attachment C.

3.3 Summary of BMP Performance Data

From BMP preferences to the RAA, data regarding performance of BMPs influenced many EWMP-related decisions. A statistical analysis was performed using available BMP performance data relevant to Southern California. The goal was to review and summarize data regarding performance of BMPs for reducing constituents of concern from stormwater flows. The data was reviewed and summarized based on constituents of concern from both stormwater and non-stormwater flows. The compiled dataset is extensive and can be found in **Attachment M** and **Attachment N**. The following sections provide an overview of the data sources, statistical methods, and results of the statistical analysis.

3.3.1 Data Sources

The BMP performance analysis used data collected from the International BMP Database (IBD), the most extensive effort to collect and distribute BMP performance data in the United States. The IBD is sponsored by the USEPA, Water Environment Research Foundation (WERF), the American Society of Civil Engineers (ASCE), the Environmental and Water Resources Institute (EWRI), the American Public Works Association (APWA), and the Federal Highway Administration (FHWA). The stated purpose of the database is "to provide scientifically sound information to improve the design, selection and performance of BMPs" (IBD, 2014).

Figure 3-27 illustrates the sites with available monitoring data in Southern California as of November 2013. There are 44 sites that have data within the mapped area and the sites have a total of 58 BMPs that were sampled. Each of these BMPs in the IBD was categorized to the categories and subcategories established in **Section 3.2.1** (see **Table 3-2**). Many of the BMPs, particularly bioswales, are owned and operated by the California Department of Transportation (Caltrans) and therefore implemented on roadways, maintenance stations, and park and ride facilities.

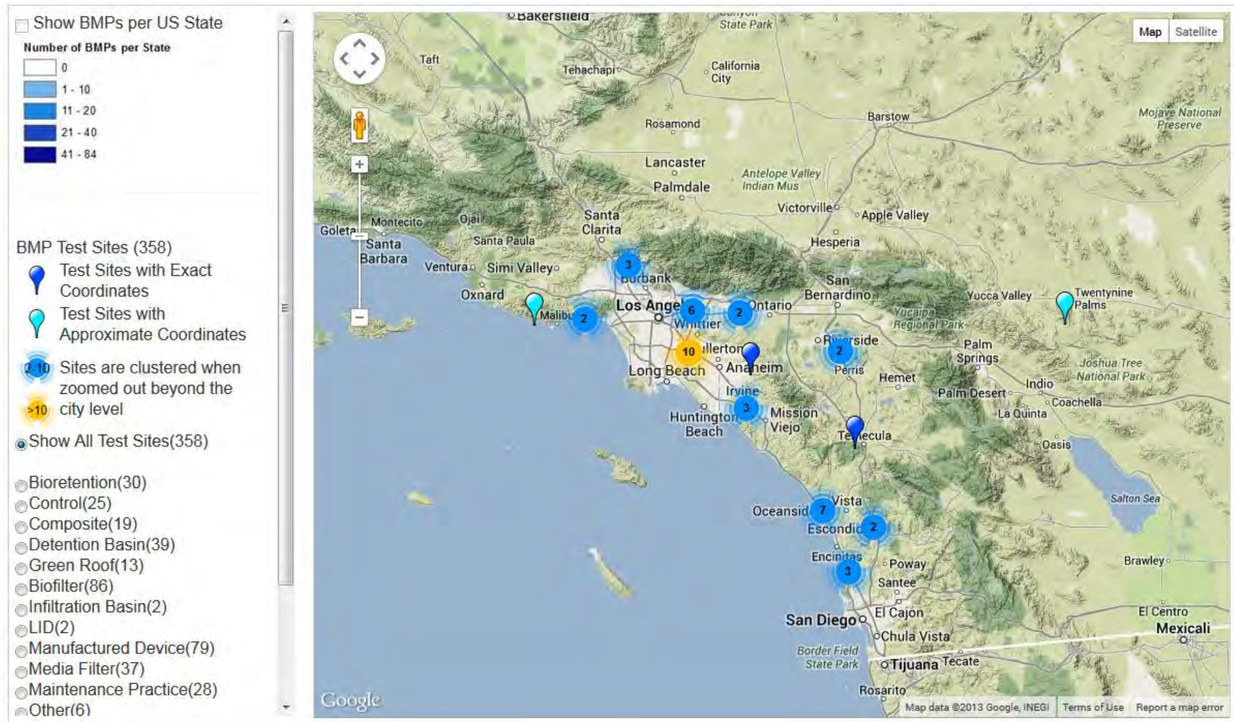


Figure 3-27 Southern California BMPs from the IBD (www.bmpdatabase.org)

3.3.2 Data Analyzed

Analysis of BMP data in the IBD collected from Southern California provides a cross-section of structural BMP results and constituents. The following provides an overview of the data characteristics:

- **BMP types:** the BMPs in the IBD were categorized according to those defined in **Section 3.2.1**, after review of the BMP design details. Five of the BMP subcategories were represented in the IBD within the Southern California region, including:
    - Constructed wetlands
    - Site-scale detention
    - Bioswales
    - Flow-through Treatment BMPs
    - Catch basin inserts
- **Constituents:** the IBD contains sample data for hundreds of constituents ranging from metals to pesticides. The analysis conducted emphasizes a subset of constituents referred to herein as "common constituents of concern," as follows:
    - Total suspended solids (TSS)
    - Fecal coliform
    - Total copper
    - Total lead
    - Total zinc

  Beyond these five constituents, the database was screened for additional constituents with sufficient data to perform analysis and obtain results. Based on this screening, an additional 18 constituents were identified, for a total of 23 constituents. To assist with organization and presentation of the results, each of the 23 constituents was categorized into four groups as follows (demonstrated in **Table 3-13**):
    - Metals
    - Bacteria
    - Solids
    - Nutrients
- **Land uses:** a majority of the BMPs are located within transportation related sites. Other major land use categories such as residential, commercial, and industrial are not heavily represented in the analysis. However, the effluent concentrations and performance metrics are generally considered applicable to non-transportation land uses. Many bioswales were included in the analysis. This allowed for grouping the bioswales into three categories: "all," "Caltrans," and "Non-Caltrans."
- **Monitoring methods:** the majority of the data from the IBD is based on flow-weighted composite (FWC) samples which is the generally preferred practice. FWC samples provide a better measurement of the total load from a storm event and most accurately portray the removal efficiency of BMPs. These types of samples can be used to generate good event mean concentrations (EMCs) that can be used to calibrate water quality models. The analysis emphasizes reduction in concentrations of constituents. Flow reduction is heavily site- and storm-specific (depending on rainfall intensity, soil types, antecedent conditions, etc.) and can be predicted through other means (e.g., modeling during the RAA).

3.3.3 Statistical Analysis

The statistical analysis performed is primarily based on three metrics:

- Tabular summary statistics of inflow and outflow from BMPs (mean, median, percentiles, etc.)
- Graphical presentation of the inflow and outflow using box plots
- Tabular presentation of constituent reductions and tests for statistical significance of differences between inflow and outflow

It is acknowledged that "percent reduction" is a BMP performance metric that deserves caveats (see the article "Voodoo Hydrology" in the July 2006 article of *Stormwater Magazine*). Percent reduction is a readily-understandable BMP performance metric, and it is also convenient for reporting a compact form (as shown in **Table 3-13**). However, BMP performance is ultimately characterized by both the reduction of pollutants from inflow to outflow and the concentration of constituents in the outflow. For this analysis, percent reduction is presented as a simple metric to compare different BMPs across different storm and land use conditions. In addition, inflow and outflow datasets were analyzed separately to characterize the quality of BMP outfalls and allow for future comparison to MS4 Permit limitations.

The approach to handling non-detects can greatly affect estimated summary statistics. For the BMP performance analysis, statistical analyses of measured concentrations were based on regression-on-order statistics (ROS). The primary advantage/purpose of the ROS approach is to account for sample limits of detection (SLODs) in samples that were non-detects (referred to as "censored"). An Excel add-in developed by Caltrans was used to generate ROS, for which the primary references for the statistical procedures are Shumway and Azari (2000) and Helsel (1990).

3.3.4 Results

The analysis performed produced thousands of statistical measures that can be used to evaluate BMPs. These results would support the RAA, by supporting assumptions regarding effluent concentrations from some BMPs. However, volume based BMPs were selected rather than treatment BMPs. The results can be used in future iterations through the adaptive management process if treatment-type BMPs are evaluated. The results are presented in formats that are designed to allow readers to focus on both absolute (inflow and outflow concentrations) and relative performance of BMPs (percent reductions) for individual constituents and groups of constituents. As mentioned previously, extensive datasets were generated and are available in **Attachment M** and **Attachment N**. The results of the analysis are presented as follows:

- **Percent removal:** the results in **Table 3-13** provide mean and median removal percentages for the BMPs and for each of the 23 POC analyzed. The table can be used to evaluate relative performance across constituent and BMP categories.

- **Inflow and outfall concentrations for common POCs:** shown in **Table 3-14** through **Table 3-18** are comparisons of standard statistics for the five available BMP categories across each of the common POCs. The corresponding box plots in **Figure 3-28** through **Figure 3-32** graphically represent the range of inflow versus outflow performance for the BMP categories.

- **Inflow and outflow concentrations for all 23 constituents:** standard statistics, including significance testing of percent reductions, for all constituents are included in **Attachment M**.

- **Performance statistics and box plots for all constituents:** extensive summary statistics and box plots of BMP performance across the BMP categories are included in **Attachment N**.

The presented box plots (**Figure 3-28** through **Figure 3-32**) include whiskers that span from the 10th to 90th percentiles and display outliers, defined as values that are more than 1.5 times the inner quartile range beyond the median. These outliers are included in all the generated summary statistics. This approach is consistent with technical memorandums on the IBD website.

Table 3-13 Mean and Median Percent Removal from Inflow to Outflow for All Pollutants and BMP Categories

Constituent Group	Pollutant	Bioswale (All)		Bioswale (Caltrans)		Bioswale (Non-Caltrans)		Constructed Wetland		Flow-Through Treatment BMP		Site Scale Detention	
		% Change, Mean	% Change, Median	% Change, Mean	% Change, Median	% Change, Mean	% Change, Median	% Change, Mean	% Change, Median	% Change, Mean	% Change, Median	% Change, Mean	% Change, Median
Metals	Total Arsenic	-51.14%	-21.85%	21.19%	29.33%	**-70.90%**	-44.19%	**-64.23%**	-65.00%	-11.57%	-18.52%	-19.56%	-24.00%
	Total Cadmium	**-51.15%**	-58.47%	-15.99%	-49.52%	**-68.14%**	-66.32%	**-74.50%**	-62.40%	1.22%	-48.00%	**-53.72%**	-49.44%
	Total Chromium	-24.85%	-42.03%	-21.11%	-28.38%	-27.37%	-61.06%	**-81.54%**	-88.30%	**-35.10%**	-37.04%	-60.67%	-50.00%
	Total Copper	**-69.02%**	-68.29%	**-59.24%**	-60.98%	**-70.39%**	-60.32%	-98.02%	-85.81%	-55.03%	-38.89%	**-51.83%**	-48.04%
	Total Iron	-57.30%	-61.20%	-48.56%	-47.57%	---	---	---	---	---	---	---	---
	Total Lead	**-75.46%**	-77.05%	**-69.92%**	-75.02%	**-76.11%**	-67.68%	-98.11%	-97.41%	**-63.71%**	-76.15%	**-66.23%**	-59.26%
	Total Nickel	**-59.02%**	-64.38%	-41.24%	-46.58%	**-69.50%**	-72.97%	-48.11%	-36.78%	-21.04%	-28.57%	-62.53%	-45.21%
	Total Zinc	**-74.08%**	-75.66%	**-71.53%**	-76.14%	**-71.42%**	-68.65%	**-84.48%**	-85.56%	**-62.40%**	-74.89%	**-68.98%**	-64.64%
Bacteria	Fecal Coliform	-13.70%	-82.00%	---	---	-13.70%	-82.00%	-94.54%	-92.69%	-26.36%	-91.43%	99.1%	41.7%
	Total Coliform	---	---	---	---	---	---	-0.18%	-62.97%	**-99.91%**	-99.90%	---	---
Solids	Total Suspended Solids	**-50.46%**	-59.21%	-24.21%	-51.28%	-61.37%	**-58.33%**	**-94.55%**	-95.22%	**-65.0%**	-82.28%	**-62.82%**	-62.00%
	Total Dissolved Solids	-3.72%	7.32%	17.58%	12.36%	-17.36%	-2.50%	**+1169%**	1739%	12.12%	16.67%	-0.29%	0.00%
	Turbidity	**-62.65%**	-50.67%	**-62.65%**	-50.67%	---	---	---	---	---	---	---	---
Nutrients	Kjeldahl nitrogen (TKN)	-18.52%	-15.00%	29.02%	16.67%	**-31.74%**	-25.24%	-22.91%	8.33%	-24.22%	-30.97%	-14.86%	-20.21%
	Nitrogen, ammonia as N	15.93%	-25.50%	40.91%	-9.04%	---	---	-61.86%	-57.14%	28.35%	50.00%	---	---
	Nitrogen, Nitrate (NO_3) as N	-12.14%	-21.25%	13.77%	-1.31%	-22.54%	-23.29%	-66.90%	-87.87%	24.13%	41.41%	-13.89%	-10.59%
	Nitrogen, Nitrite (NO_2) as N	89.01%	31.91%	89.01%	31.91%	---	---	**-100%**	-100%	---	---	---	---
	Nitrogen, unionized ammonia (NH_3) as N	---	---	---	---	---	---	---	---	**-56.11%**	-62.50%	---	---
	Organic carbon, Dissolved	-10.96%	7.50%	17.74%	34.02%	-28.27%	-14.14%	-32.54%	-40.91%	-1.43%	-7.14%	6.92%	9.09%
	Organic carbon, Total	-13.17%	0.00%	15.30%	18.18%	-29.70%	-5.56%	-23.90%	-6.67%	-4.78%	-12.79%	0.68%	6.06%
	Phosphorus as P, Dissolved	+263%	+250%	---	---	+263.42%	+250.00%	+186.92%	90.18%	-7.14%	-11.11%	-3.15%	22.22%
	Phosphorus as P, Total	+125%	+100%	+219%	+269%	92.89%	68.18%	-19.33%	-14.29%	**-34.10%**	-25.00%	**-35.61%**	-19.44%
	Phosphorus, orthophosphate as P	+369%	+553%	+531%	+795%	59.09%	31.91%	---	---	---	---	---	---

[1] Bolded, orange values indicate statistically different inflow and outflow concentrations based on 95% confidence intervals.
[2] If insufficient data were available to calculate the % removal, then --- is shown.
[3] Catch basin inserts are not shown because effluent data were insufficient.

Table 3-14 Inflow/Outflow Summary Statistics for TSS (mg/L)										
BMP Category	**No. of BMP Sampling Locations**		**No. of Samples Analyzed**		**25th Percentile**		**Median (50th Percentile)**		**75th Percentile**	
	IN	**OUT**	**IN**	**OUT**	**IN**	**OUT**	**IN**	**OUT**	**IN**	**OUT**
Site Scale Detention	5	5	76	69	75	23	100	38	169	59
Bioswales	31	31	159	103	45.0	18.0	76.0	31.0	130	54
Catch Basin Inserts	0	6	---	88	---	20	---	37.5	---	71
Flow-Through Treatment BMPs	13	13	230	218	8.875	2.875	39.5	7.00	89.25	22.25
Constructed Wetlands	1	1	13	14	140	3.50	230	11.0	255	13.5

IN = inflow; OUT = outflow

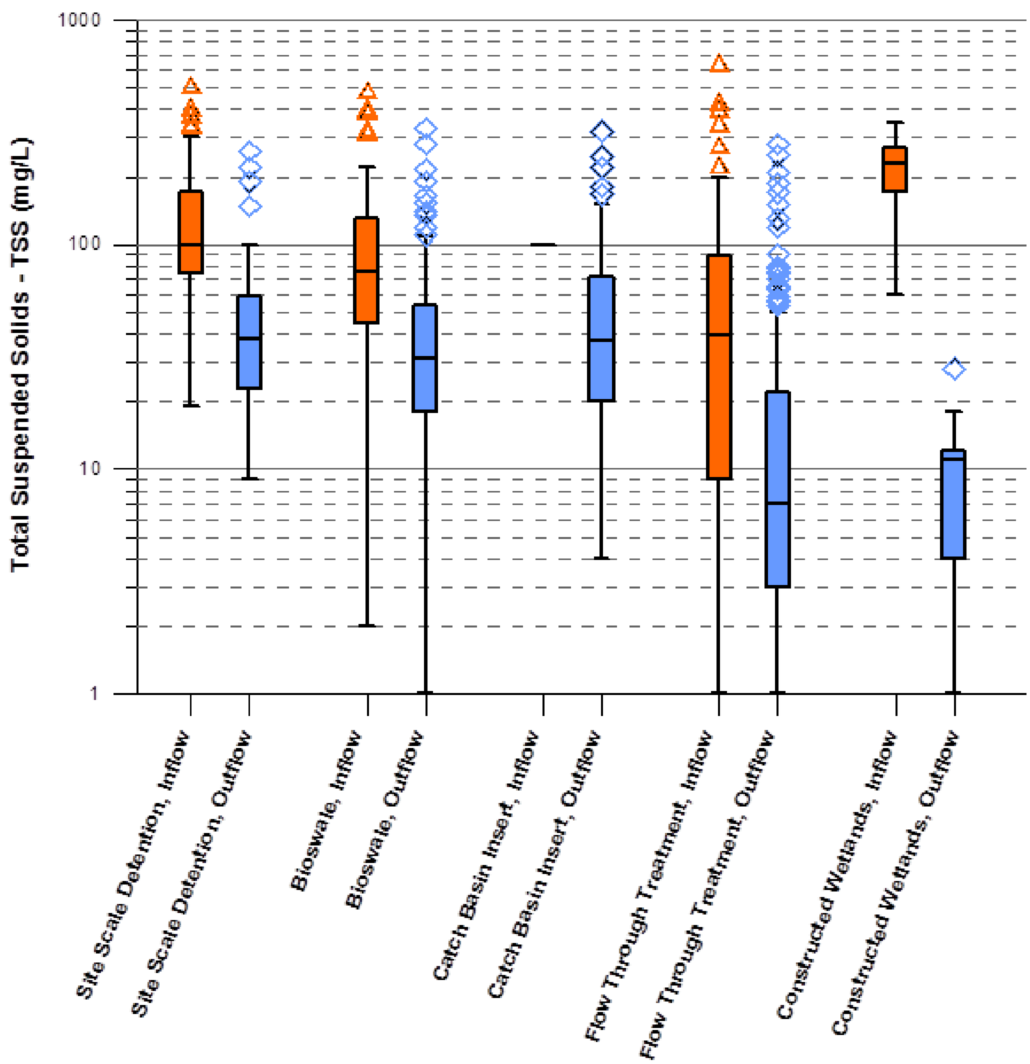


Figure 3-28 Box Plots of Inflow/Outflow TSS Concentrations in Southern California

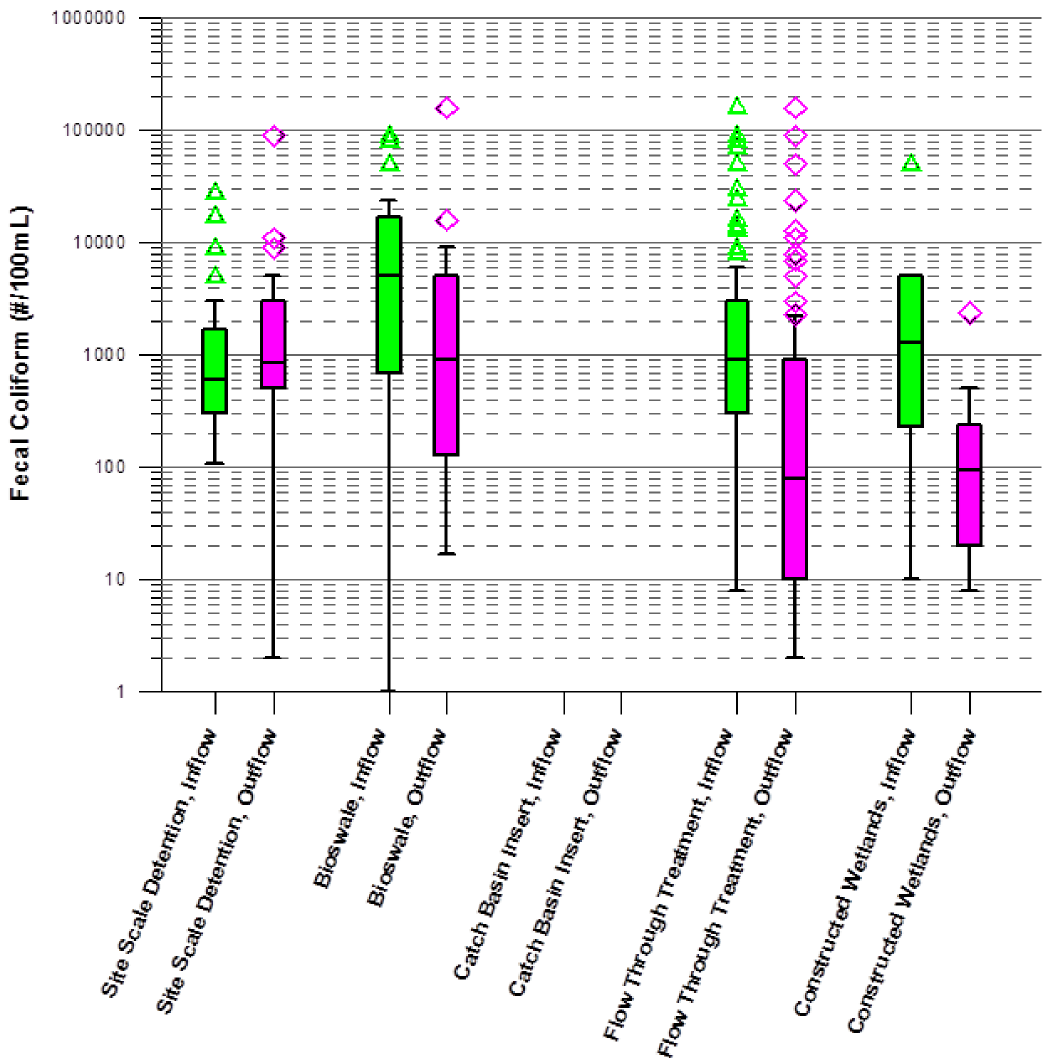
1

Table 3-15 Inflow/Outflow Summary Statistics for Fecal Coliform (#/100mL)

BMP Category	No. of BMP Sampling Locations		No. of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Site Scale Detention	9	9	34	30	300	475	600	850	1700	3075
Bioswales	8	8	33	19	500	130	5000	900	16500	5000
Catch Basin Inserts	0	6	---	---	---	---	---	---	---	---
Flow-Through Treatment BMPs	11	11	172	152	300	7.47	900	77.1	3000	797
Constructed Wetlands	2	2	13	14	230	20.0	1300	95.0	3800	255

IN = inflow; OUT = outflow

2



3
4 **Figure 3-29 Box Plots of Inflow/Outflow Fecal Coliform Concentrations in Southern**
5 **California**
6

Table 3-16 Inflow/Outflow Summary Statistics for Copper (µg/L)										
BMP Category	**No. of BMP Sampling Locations**		**No. of Samples Analyzed**		**25th Percentile**		**Median (50th Percentile)**		**75th Percentile**	
	IN	**OUT**	**IN**	**OUT**	**IN**	**OUT**	**IN**	**OUT**	**IN**	**OUT**
Site Scale Detention	5	5	76	68	26.25	15.00	39.45	20.50	63.75	28.00
Bioswales	31	31	150	100	22.00	8.23	41.00	13.00	70.50	19.90
Catch Basin Inserts	0	6	---	88	---	5.95	---	13	---	22
Flow-Through Treatment BMPs	11	11	150	146	11.98	6.20	18.00	11.00	33.00	21.25
Constructed Wetlands	2	2	21	22	11.15	5.55	62.00	8.80	110.0	14.75

IN = inflow; OUT = outflow

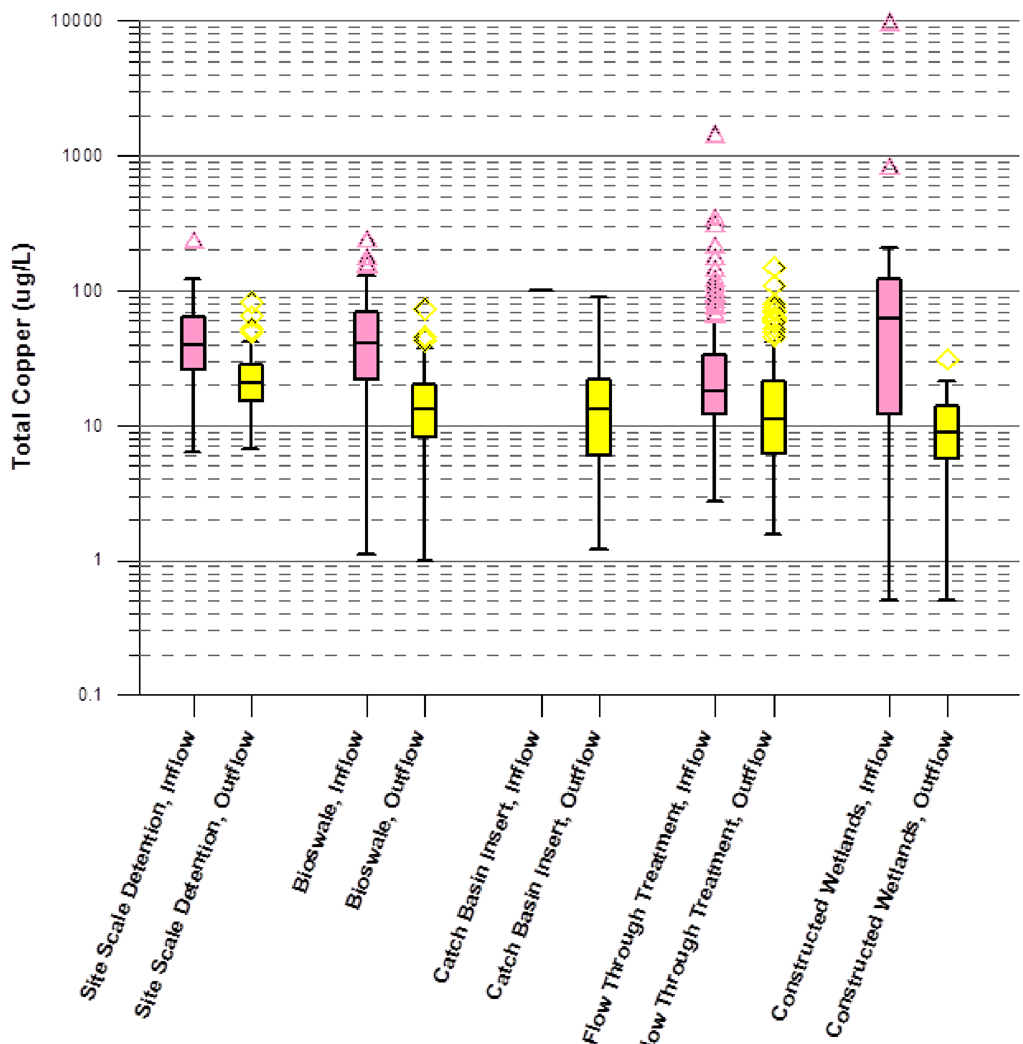


Figure 3-30 Box Plots of Inflow/Outflow Copper Concentrations in Southern California

Table 3-17 Inflow/Outflow Summary Statistics for Lead (µg/L)										
BMP Category	**No. of BMP Sampling Locations**		**No. of Samples Analyzed**		**25th Percentile**		**Median (50th Percentile)**		**75th Percentile**	
	IN	**OUT**	**IN**	**OUT**	**IN**	**OUT**	**IN**	**OUT**	**IN**	**OUT**
Site Scale Detention	5	5	76	69	34.40	13.00	54.00	22.00	108.25	36.50
Bioswales	31	31	150	100	13.92	3.53	32.89	7.55	77.75	21.50
Catch Basin Inserts	0	6	---	88	---	2.3	---	6	---	12.45
Flow-Through Treatment BMPs	11	11	149	146	6.50	1.00	13.00	3.10	25.50	7.10
Constructed Wetlands	2	2	21	22	3.32	2.70	170.0	4.40	315.00	8.32

IN = inflow; OUT = outflow

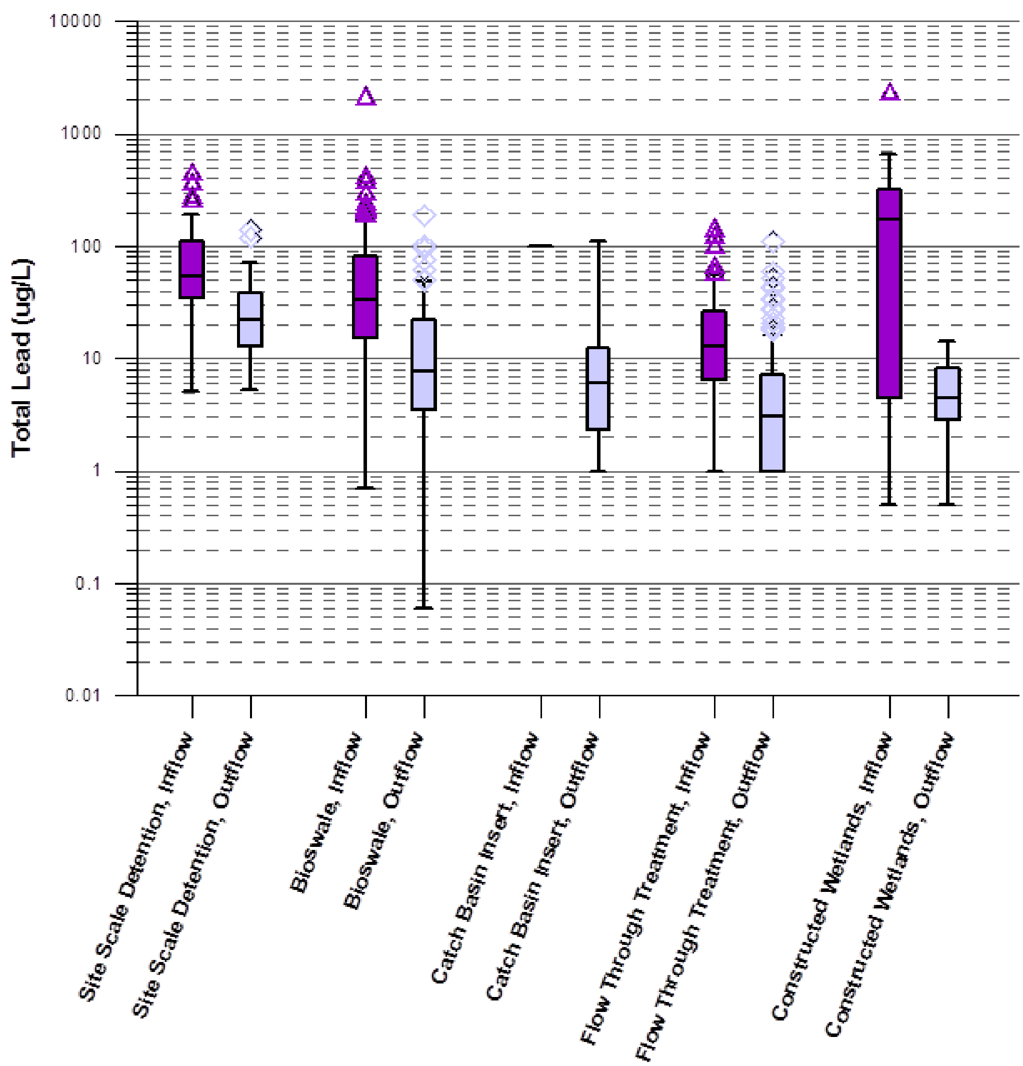


Figure 3-31 Box Plots of Inflow/Outflow Lead Concentrations in Southern California

Table 3-18 Inflow/Outflow Summary Statistics for Zinc (µg/L)

BMP Category	No. of BMP Sampling Locations		No. of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Site Scale Detention	5	5	76	68	152.75	68.25	280.00	99.00	504.75	150.00
Bioswales	31	31	150	100	110	29.5	228	55.5	360	82.5
Catch Basin Inserts	0	6	---	88	---	50.5	---	107	---	220
Flow-Through Treatment BMPs	11	11	150	146	110	23.00	221	55.5	400	131
Constructed Wetlands	2	2	21	22	109.00	28.53	270.00	39.00	450.00	84.35

IN = inflow; OUT = outflow

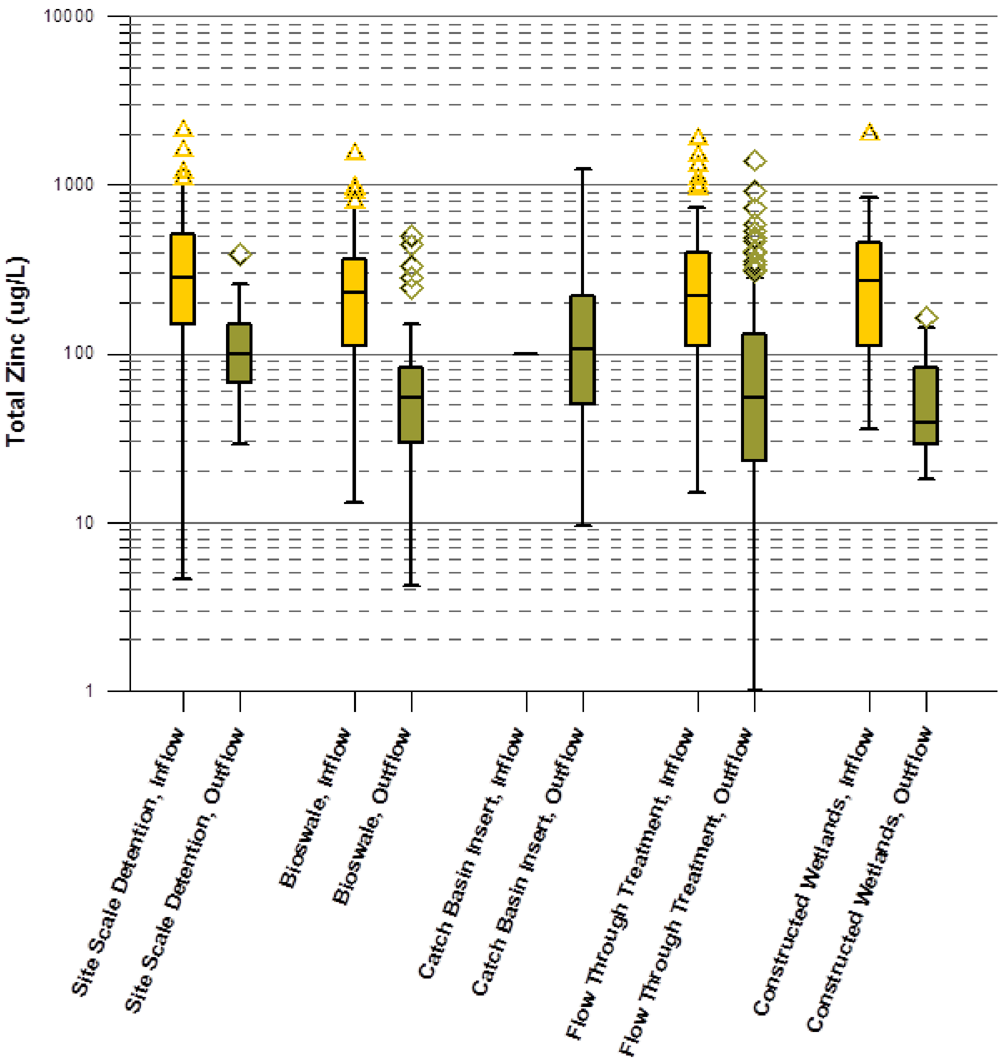


Figure 3-32 Box Plots of Inflow/Outflow Zinc Concentrations in Southern California

3.3.5 Key Observations

The statistical analysis presented has many applications, which include supporting the RAA as needed. As future applications are undertaken, the results can be analyzed in greater detail. The following general observations are highlighted:

- **Comparison of outflow quality among BMPs:** the constructed wetland (n = 2) and flow-through treatment BMPs (n = 31) generally exhibited the highest quality effluent. Reductions of TSS were generally higher compared to other BMPs and concentrations of TSS in outflows were generally lower (see **Table 3-14** and **Figure 3-28**). Elevated performance is also apparent for other constituents. The constructed wetlands exhibited exceptional reductions (>84%) of total copper, lead, and zinc. Constituents were likely reduced in the constructed wetlands by means of sedimentation, chemical and biological conversions, and uptake. The flow-through treatment BMPs in the dataset were mostly Caltrans BMPs including media filters and proprietary cartridge filters with a range of sand/peat and sand/gravel mixes.

- **BMP performance for individual constituents:** among the constituents analyzed, the percent removals were often the highest for total metals, especially lead and zinc (**Table 3-13**). The poorest performance was often for nutrients, with phosphorous concentrations increasing in some cases (likely due to leaching). For bacteria, only the constructed wetlands and flow-through treatment BMPs were able to generate outflows with median fecal coliform concentrations less than 235 MPN per 100mL (which is an applicable MS4 Permit limitation if fecal coliform is assumed equivalent to *E. coli*) (see **Table 3-15** and **Figure 3-29**).

- **Application of the data for the RAA effort:** in general, the majority of pollutant removal associated with potential stormwater BMPs in the RAA will be due to volume reduction (infiltration). The WMMS, which will be used for the RAA, is process-based and thus is able to estimate volume reduction and the proportion of inflow that is infiltrated, treated, and overflowed. Due to the model being dynamic, these proportions change from storm to storm (i.e., overflows are less frequent during small storms than large storms). Future inclusion of BMPs with a treatment component will require some assumptions regarding the quality of treated and discharged outflow (e.g., biofiltration BMPs, which have an underdrain). It is noted that only a subset of the potential BMP categories (defined in **Section 3.2.1**) had sufficient data for data analysis. As such, an important consideration will be whether BMP performance statistics of the BMPs analyzed are relevant to some of the other BMPs. For example, because biofiltration is vegetated filtration, it is reasonable to assume the performance data for the flow-through treatment (filtration) BMPs (and perhaps constructed wetlands) are applicable to biofiltration.

3.4 Proposed Control Measures

The entirety of Section 3.4 is superseded by the 2018 rEWMP Chapter 5, Chapter 6, and Attachment C.

4. Reasonable Assurance Analysis

The entirety of Section 4 is superseded by the 2018 rEWMP, Attachment C.

5. Proposed Control Measure Implementation Schedule

The entirety of Section 5 is superseded by the 2018 rEWMP Chapter 6 and Attachment C.

6. Control Measure Implementation Cost

A preliminary cost analysis has been performed based on the proposed implementation schedule described in **Section 5**, which is based on TMDL milestones. The costs for implementation were spread out when possible keeping in mind that compliance with the WQOs must be demonstrated through the RAA. This section summarizes the cost associated with the implementation of non-structural BMPs, regional projects, and distributed BMPs (green streets) and presents various funding strategies. All costs are in present value and do not account for inflation that may occur prior to implementation.

6.1-6.4

The entirety of Sections 6.1, 6.2, 6.3, and 6.4 are superseded by the 2018 rEWMP Chapter 6 and Attachment C.

6.5 Funding Strategies

The regional projects and green streets proposed in this EWMP will require a regional funding strategy, as funding opportunities will need to be identified, sought after, and/or allocated. The capital and operating costs for the proposed control measures will span over decades. Customizing the financial strategy to the preference of each jurisdiction within the RH/SGRWQG and flexibility in identifying potential funding opportunities will be important for successfully financing EWMP implementation. New revenue sources need to be identified; otherwise revenue sources currently allocated to other programs may need to be used to fund the implementation of this EWMP.

The detailed financial strategy for EWMP costs will be highly dependent on the availability of potential sources of funding, and vary by agency. The agencies within this group have historically utilized general funds to support their respective stormwater programs and may continue to do so. However, the EWMP cost estimates grossly exceed expected available general fund revenue for stormwater programs. Therefore, Group members will individually or collectively pursue funds from multiple additional sources. The financial strategy presented in this EWMP outlines a set of multiple approaches that each RH/SGRWQG Permittee may consider. Each Permittee will pursue those strategies that best fit their specific circumstances.

The annual capital improvement budget for each of the RH/SGRWQG Permittees was evaluated and compared to the amount of money needed each year to fund EWMP implementation. This comparison is presented in **Table 6-6**. The EWMP implementation cost is equal to the total cost for the specified jurisdiction divided by the proposed implementation timeline. This was done for comparison purposes and represents the average annual cost and does not include the cost associated with O&M. The table shows that none of the RH/SGRWQG members have enough money available in their capital improvement funds to cover the proposed EWMP implementation costs. It is also important to recognize that the entire capital improvement fund cannot be used to fund the stormwater program, as other capital improvements such as water and sewer upgrades are necessary to address other community needs. Information relevant to the Unincorporated County areas within the RH/SGRWQG is not readily available for inclusion. Additionally, Bradbury currently does not have a capital improvement fund. Projects in Bradbury are funded through reserves as needed; however, the funds available through reserves are extremely limited.

<table>
<tr><th colspan="5">Table 6-6 Financial Situation Summary</th></tr>
<tr><th>Jurisdiction</th><th>Annual Capital Improvement Fund Budget</th><th>Source of Funds</th><th>Collective LAR Watershed Average Annual Cost Estimate[1]</th><th>Collective SGR and Big Dalton Average Annual Cost Estimate[2]</th></tr>
<tr><td>Arcadia</td><td>$2,066,500</td><td>2014-15 Capital Improvement Fund Revenue</td><td rowspan="6">$9,542,000</td><td rowspan="6">$1,678,000</td></tr>
<tr><td>Bradbury</td><td>Unavailable</td><td></td></tr>
<tr><td>Duarte</td><td>$151,300</td><td>2014-15 Capital Improvement Fund Revenue</td></tr>
<tr><td>Monrovia</td><td>$3,600,000[3]</td><td>2015-16 Projected Capital Improvement Funds</td></tr>
<tr><td>Sierra Madre</td><td>$60,000</td><td>Planned Local and Regional BMP Funds</td></tr>
<tr><td>Unincorporated County</td><td>Unavailable</td><td>County General Fund</td></tr>
</table>

[1] Annualized over an 11-year implementation period
[2] Annualized over a 10-year implementation period
[3] Proposed funds (not yet approved)

Project funding knowledge and experience has been used to identify viable funding opportunities to assist the RH/SGRWQG in implementing proposed control measures identified in **Section 3.4**. This section explains the differences between grants and loans, both of which can be utilized as a source of funding, and provides information on current grant and loan opportunities. This section also includes high-level alternatives that can be examined as each jurisdiction moves forward as a group or individuals. The alternatives are categorized by type. Acknowledgement is given to Stormwater Funding Options – Providing Sustainable Water Quality Funding in Los Angeles County, a report authored by Ken Farfsing and Richard Watson dated May 21, 2014. The following funding strategies are further discussed in this section:

- Grants and loans;
- Fees and charges;
- Legislative and policy;
- Partnerships; and
- Investment opportunities.

The stormwater program coordinators of the RH/SGRWQG plan on evaluating opportunities to integrate EWMP goals and efforts with capital improvement projects led by other departments. For example, the green streets implementation could be incorporated into street improvement projects included in Capital Improvement Plans which would allow the projects to be partially funded.

6.5.1 Grants and Loans

The RH/SGRWQG will actively pursue financial assistance to implement the proposed control measures. Financial assistance programs are available in two common forms, grants and loans. To receive funds through a grant or loan, an application must be completed and specific eligibility requirements must be satisfied. These requirements are different depending on the grant or loan program. All assistance programs also provide a set of conditions and limitations. It is important to fully understand the differences, benefits, and drawbacks of each in order to determine which form of financial assistance is best for a given project.

Grants are awards of financial assistance, meaning the grant awardee is not required to return the money, although they may need to follow specific requirements and produce specific products. On the other hand, loans are awarded as a benefit or assistance, but the awardee is required to pay back the loan, often with interest. **Table 6-7** outlines the major differences between grants and loans.

One of the major points outlined in **Table 6-7** is the application and competition of grant programs versus loan programs. Grants often require extra work in addition to general work related to any project. Grants often require extra reports, and as mentioned, a more complex application process. Loans however have a relatively simple application process, less competition, and limited additional requirements that are often less complex. Grants will require extra work, but in return, free money is awarded.

Table 6-7 Differences Between Grants and Loans

Grants	Loans
➢ No payback required ➢ Typically complex application process ➢ Highly competitive ➢ Extensive reporting and oversight needed ➢ Matching funds generally required ➢ May favor larger/more expensive projects ➢ Some require participation with an IRWM ➢ Funding limits vary ➢ Generally limited application periods ➢ Operate under agency-specific guidelines	➢ Payback required ➢ Relatively simple application process ➢ May require getting on priority list ➢ Repayment terms vary ➢ Threshold eligibility criteria must be met ➢ Tie-in with job creation with some programs ➢ Different agencies have different requirements ➢ Maximum amount financed can be large ➢ Generally continuous application periods

Potential grant and loan financial assistance programs that the group will investigate to fund the control measures proposed in this EWMP as well as a range of stormwater programs are outlined in **Table 6-8** and detailed in **Attachment AA**. The RH/SGRWQG will make reasonable attempts to obtain funds from relevant grants and loans; however, funding is not guaranteed through these programs.

Table 6-8 Existing Grant and Loan Opportunities

Program	Type	Available Funds
Proposition 84 Stormwater Program	Grant	$250,000-$3,000,000
Proposition 84 (Chapter 2 §75026) Integrated Regional Water Management (IRWM)	Grant	Varies
Proposition 84 Urban Streams Restoration	Grant	$1,000,000
Community Action for a Renewed Environment (CARE)	Grant	$75,000-$300,000
Pollution Prevention (P2)	Grant	$20,000-$180,000
Clean Beaches Initiative (CBI)	Grant	$150,000-$5,000,000

Table 6-8 Existing Grant and Loan Opportunities

Program	Type	Available Funds
Urban Waters Small Grant	Grant	$40,000-$60,000
Environmental Education Grant and SubGrant	Grant	$75,000-$200,000
Cooperative Watershed Management Plan	Grant	$22,000-$100,000
State of California Coastal Conservancy Program	Grant	No min or max
Wildlife Conservation Board (WCB)	Grant	No min or max
Habitat Conservation Fund (HCF)	Grant	No min or max request
Land and Water Conservation Fund (LWCF)	Grant	$2,000,000
Recreational Trails Program (RTP)	Grant	No min or max
TIGER Discretionary Grant	Grant	$10,000,000 min
Environmental Solutions for Communities	Grant	$25,000-$100,000
Clean Water Act (CWA) §319(h) Non-Point Source (NPS)	Grant	$75,000-$750,000
2014 Water Bond	Grant	Not specified
Metropolitan Transit Authority (MTA) Call for Projects Program	Grant	Varies
Proposition 1B (Local Streets and Road, Congestion Relief, and Traffic Safety Account of 2006)	Grant	$400,000 min
Proposition 1B (Public Transportation Modernization, Improvement, and Service Enhancement Account [PTMISEA])	Grant	Based on population
Measure R	Grant	Not specified
Proposition A and C (Sales Tax)	Grant	Based on population
Environmental Enhancement and Mitigation (EEM) Program	Grant	$500,000
Highway Safety Improvement Program (HSIP)	Grant	$10,000,000
Active Transportation Program (ATP)	Grant	$250,000
Drought Resiliency	Grant	$300,000
Proposition 1 – Stormwater Grant Program (SWGP)	Grant	$500,000-$5,000,000
Clean Water State Revolving Fund (CWSRF)	Loan	No maximum
Infrastructure State Revolving Fund (ISRF)	Loan	$2,000,000-$10,000,000

The programs listed range from federal to state and can apply to transportation, water supply, water quality, habitat enhancement, recreation, or a range of potential project benefits. As projects are developed, the group will consider incorporating different multi-benefit components to allow the project to be eligible for different grant or loan programs.

6.5.2 Fees and Charges

Fees and charges are payments from internal departments or other external sources that can generate or reallocate funds to cover the costs associated with the proposed control measure implementation. The financial strategies associated with fees and charges are presented below. The group will evaluate these strategies as potential funding sources.

- Use existing revenue streams for stormwater/water supply/flood control projects to support stormwater quality projects as legally allowable.
- Assembly Bill (AB) 2403 – Use new state law to pass rate increases for stormwater projects that have a water supply benefit and minimize the Proposition 218 process as legally allowable.

- Establish a mitigation bank by which private developers can fund downstream control measure implementation in lieu of retaining water on private development. To get sufficient benefit from this, there would have to be a downstream control measure that would get greater water quality benefit than the retention system on the private development.
- Use and/or increase solid waste management fees to cover the cost of enhanced street sweeping and other measures to reduce trash.
- Use water rates to fund programs to reduce irrigated runoff, as legally allowable.
- Pursue a proposition 218 compliant stormwater fee or tax initiative (modified after the 2012 Clean Water Clean Beaches Initiative).

6.5.3 Legislative and Policy

The financial strategies that require legislative or policy changes that RH/SGRWQG Permittees will evaluate are summarized below:

- Lobby the Metropolitan Water District (MWD) of Southern California, or other applicable Water Districts, to reevaluate their approach for managing the Local Resource Program (LRP) to fund stormwater capture and use projects that offset the use of imported water supplies. This is related to a water rate increase in that MWD, or other Water Districts, would incorporate the costs into their imported water rates.
- Pursue pollutant source control legislation patterned after SB 346 that either limits pollutants of concern in products (e.g., copper in brake pads, or zinc in tires) or assesses a fee that can be paid for by the users of those products. The money collected through the fee can be used by local governments to mitigate those pollutants. Some examples include addressing zinc in tin roofs and chain link fences.
- Form Special Assessment Districts and tailored fees.
- Explore the use of Enhanced Infrastructure Finance Districts tailored to the RH/SGRWQG, as outlined in recently adopted (2014) California legislation SB 628.
- 2014 Water Resources Reform and Development Act of 2014 (WRRDA). Partner with the USACE to model the watershed impervious surface effects on the federal interests under WRRDA to secure USACE cost sharing for EWMP programs.
- Change legislation to allow the Los Angeles County Sanitation Districts to accept and treat stormwater. Installation of end-of-pipe treatment facilities prior to release to the Pacific Ocean.
- Consideration of the USEPA's Financial Capability Assessment Framework for Municipal Clean Water Act Requirements (**Attachment AB**) and The United States Conference of Mayors Public Water Cost Per Household: Assessing Financial Impacts of EPA Affordability Criteria in California Cities (**Attachment AC**) for assessment prior to pursuing Proposition 218 compliant stormwater fee or tax initiatives.

6.5.4 Partnerships

The RH/SGRWQG will also pursue partnerships, where possible, to identify other groups and agencies who can share the costs. A majority of the control measures proposed in this EWMP are multi-benefit. Reaching out to the community that will benefit whether it is another agency, the public, or non-governmental organizations may result in cost sharing agreements. For example, partnerships with the clubs and organizations that fund the Arboretum of LAC may be used to help fund the proposed project. Another example would be if a commercial establishment was developing or redeveloping and the RH/SGRWQG created a partnership so that during the redevelopment structural control measures could be installed. Partnerships with local water districts could also be established.

The RH/SGRWQG members also plan on evaluating the formation of a Joint Powers Authority (JPA). A JPA is a contract between multiple public agencies to exercise jointly, all powers common to each of them, for the purpose of accomplishing specific goals they may have in common. The group will evaluate this as an opportunity to jointly fund all or some aspects of EWMP implementation. This will allow each RH/SGRWQG member to spread out implementation costs over time. This will be evaluated on the basis that all members will benefit from EWMP implementation, even if their jurisdictional area does not contribute flows, as the EWMP addresses compliance as a group rather than an individual.

6.5.5 Investment Opportunities

Rather than simply finding opportunities for funding, another alternative is to invest in a study, so that future costs can be reduced. Currently, the LAR copper and lead WER SSO BPA has been approved by the Regional Board and is pending additional approvals from the State Board, Office of Administrative Law, and the USEPA. Once approved, the Basin Plan will be amended and the corresponding WQOs will be increased. This will result in a lower load reduction requirement and during the adaptive management process the proposed control measure implementation could be lessened, thus reducing the overall implementation cost.

Currently, there is discussion of a similar study being conducted for zinc in the LAR Watershed. A WER SSO study could also be conducted for the SGR for the metals that control implementation. Due to SB 346, copper loads are expected to decrease; therefore, a study may not be necessary. However, a study for lead and/or copper may be beneficial to members of the RH/SGRWQG and other jurisdictions in the County. This opportunity will be evaluated as a potential "funding strategy."

6.5.6 Future Steps

The RH/SGRWQG as a whole, as well as individual members, will prioritize and select the specific financial strategies that best fit their needs. In the near term (prior to 2017) the RH/SGRWQG members plan on evaluating the formation of a JPA and the associated terms of the agreement. The stormwater coordinators will also identify opportunities to work with other internal departments to align the goals of the EWMP with existing programs such as street improvements included in Capital Improvement Plans. The grant and loan opportunities identified in **Table 6-8** will be further evaluated over the next two years (prior to 2017); however, the RH/SGRWQG (collectively and individually) intends to pursue and further evaluate the following opportunities:

- Proposition 1 – SWGP
- Seek allocation in General Fund
- Proposition 218 stormwater fee

7. Adaptive Management Process

The EWMP is part of an adaptive management process as described in Part VI.C.8 of the MS4 Permit. Through the adaptive management process, the EWMP will be updated two years after the Regional Board Executive Officer approval and every two years thereafter, while the RAA will need to be revised and updated by 2021. The EWMP will adapt to become more effective, based on, but not limited to, the following:

- Progress towards achieving interim and/or final WQBELs/RWLs according to TMDL schedules;
- Progress towards achieving improved water quality in MS4 discharges and achieving RWLs through implementation of watershed control measures based on an evaluation of outfall-based and receiving water monitoring data;
- Achievement of interim milestones;
- Re-evaluation of the water quality priorities based on more recent water quality data for discharges from the MS4 and receiving water(s) and a reassessment of sources of pollutants;
- Availability of new information and data from sources other than the Permittees' monitoring programs that informs the effectiveness of the actions implemented;
- Regional Board recommendations; and
- Recommendations for modifications to the EWMP through a public participation process.

The adaptive nature of the EWMP allows the process to be iterative, allowing the RH/SGRWQG to identify a plan that is successful in improving water quality in the region. The data collected through implementation of the CIMP will be important when revising the EWMP every two years.

Since implementation of the EWMP will result mostly in volume reduction, checking flow rates at monitoring stations during specific storms and checking model simulations of those same storms and antecedent conditions will provide a valuable calibration check. This calibration check can be used to update the model calibration and run simulations to see if the EWMP projects need modification or stay the course. **Figure 7-1** illustrates the adaptive management process.

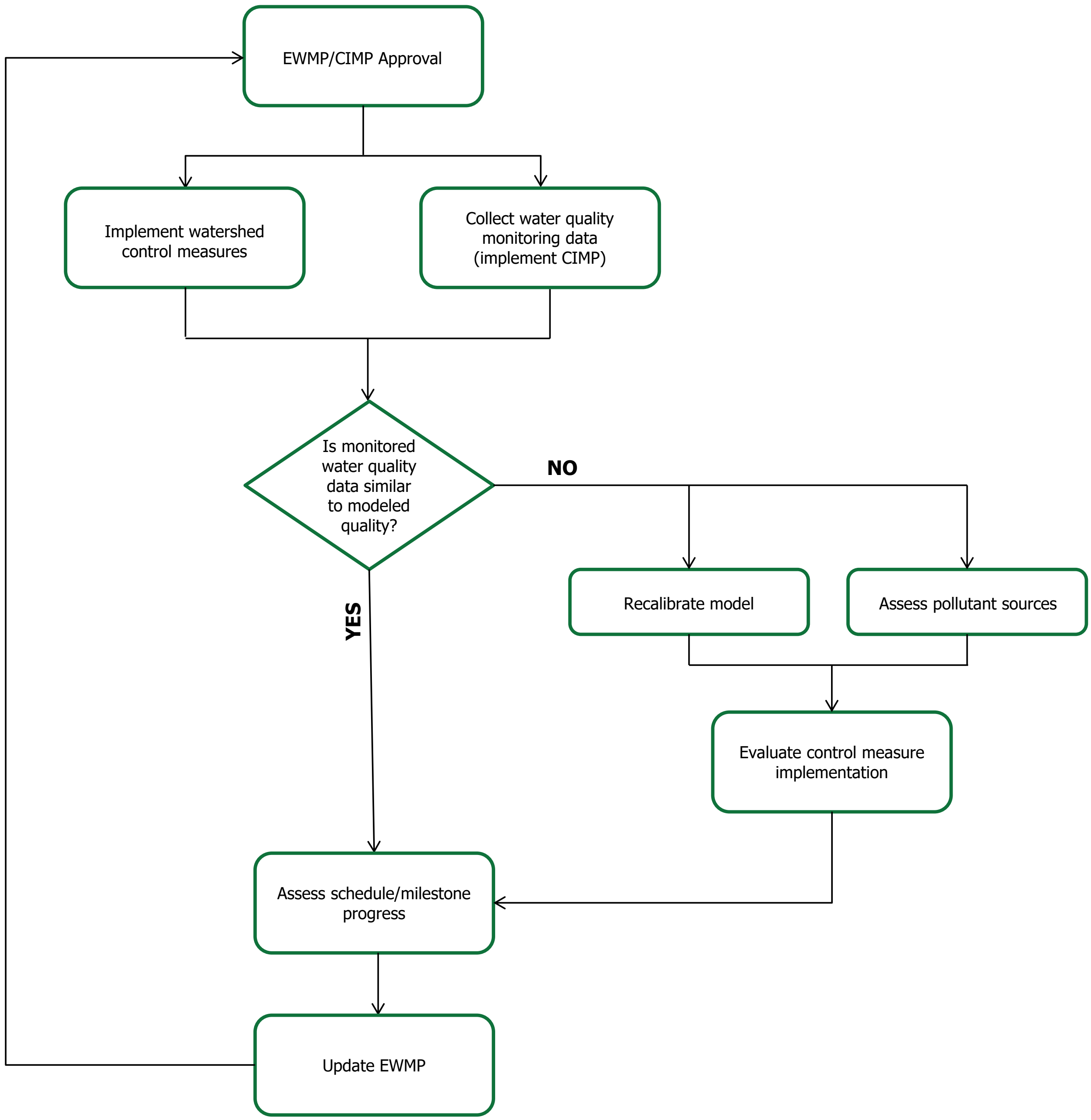


Figure 7-1 Adaptive Management Process

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Attachment A

LACFCD Background

This attachment provides background information pertaining to the Los Angeles County Flood Control District (LACFCD), and their involvement in the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) Enhanced Watershed Management Program (EWMP), supplemental to the EWMP Work Plan.

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

Unlike cities and counties, the LACFCD does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways. The LACFCD operates and maintains storm drains and other appurtenant drainage infrastructure within its service area. The LACFCD has no planning, zoning, development permitting, or other land use authority within its service area. The Permittees that have such land use authority are responsible under the MS4 Permit for inspecting and controlling pollutants from industrial and commercial facilities, development projects, and development construction sites. (MS4 Permit, Part II.E, page 17.)

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

Consistent with the role and responsibilities of the LACFCD under the MS4 Permit, the EWMPs and Coordinated Integrated Monitoring Programs (CIMPs) reflect the opportunities that are available for the LACFCD to collaborate with Permittees having land use authority over the subject watershed area. In some instances, the opportunities are minimal, however the LACFCD remains responsible for compliance with certain aspects of the MS4 Permit as discussed above.

In some instances, in recognition of the increased efficiency of implementing certain programs regionally, the LACFCD has committed to responsibilities above and beyond its obligations under the 2012 MS4 Permit. For example, although under the 2012 MS4 Permit the Public Information and Participation Program (PIPP) is a responsibility of each Permittee, the LACFCD is committed to implementing certain regional elements of the PIPP on behalf of all Permittees at no cost to the Permittees. These regional elements include:

- Maintaining a countywide hotline (888-CLEAN-LA) and website (www.888cleanla.com) for public reporting and general stormwater management information at an estimated annual cost of $250,000. Each Permittee can utilize this hotline and website for public reporting within its jurisdiction.

- Broadcasting public service announcements and conducting regional advertising campaigns at an estimated annual cost of $750,000.
- Facilitating the dissemination of public education and activity specific stormwater pollution prevention materials at an estimated annual cost of $100,000.
- Maintaining a stormwater website at an estimated annual cost of $10,000.

The LACFCD will implement these elements on behalf of all Permittees starting July 2015 and through the MS4 Permit term. With the LACFCD handling these elements regionally, Permittees can better focus on implementing local or watershed-specific programs, including student education and community events, to fully satisfy the PIPP requirements of the 2012 MS4 Permit.

Similarly, although water quality monitoring is a responsibility of each Permittee under the 2012 MS4 Permit, the LACFCD is committed to implement certain regional elements of the monitoring program. Specifically, the LACFCD will continue to conduct monitoring at the seven existing mass emissions stations required under the previous Permit. The LACFCD will also participate in the Southern California Stormwater Monitoring Coalition's Regional Bioassessment Program on behalf of all Permittees. By taking on these additional responsibilities, the LACFCD wishes to increase the efficiency and effectiveness of these programs.

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

Attachment B

Notice of Intent

This attachment includes the Notice of Intent (NOI) to proceed with the development of an Enhanced Watershed Management Program (EWMP) prepared by the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG), as discussed in **Section 1.3.1** of the RH/SGRWQG EWMP. The NOI was submitted June 27, 2013 to the Executive Officer of the California Regional Water Quality Control Board, Los Angeles Region.

City of Sierra Madre

Public Works Department
232 W. Sierra Madre Boulevard, Sierra Madre, CA 91024
phone 626.355.7135 fax 626.355.2251

June 27, 2013

Samuel Unger, Executive Officer
California Regional Water Quality Control Board, Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013
ATTN: Renee Purdy

VIA Email to:losangeles@waterboards.ca.gov,
Renee.Purdy@waterboards.ca.gov,
Rebecca.Christmann@waterboards.ca.gov

SUBJECT: NOTICE OF INTENT FOR NPDES PERMIT ORDER NO. R4-2012-0175 FOR THE RIO HONDO/SAN GABRIEL RIVER WATER QUALITY GROUP (RH/SGRWQG)

Dear Mr. Unger:

On behalf of the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG), attached is the Notice of Intent to proceed with the collaborative development of an Enhanced Watershed Management Plan (EWMP) and Coordinated Integrated Monitoring Plan (CIMP). The development of the Notice of Intent was a joint effort by the participating agencies listed below:

- City of Arcadia
- City of Azusa
- City of Bradbury
- City of Duarte
- City of Monrovia
- City of Sierra Madre
- County of Los Angeles (local portions)
- Los Angeles County Flood Control District

The NOI submittal packet includes the NOI, Letters of Intent, MOUs, as well as documentation of the compliance with the "early-action" requirements related to Low Impact Development Ordinance and Green Streets Policy.

Should you have any questions regarding this submittal, please contact me at jcarlson@cityofsierramadre.com or Rafael Casillas at rcasillas@accessduarte.com.

Sincerely,

James Carlson
Management Analyst, City of Sierra Madre

Enc. Notice of Intent

cc: City of Arcadia
City of Azusa
City of Bradbury
City of Duarte
City of Monrovia
City of Sierra Madre
County of Los Angeles (local portions)
Los Angeles County Flood Control District

NOTICE OF INTENT

Rio Hondo/San Gabriel River Water Quality Group

Enhanced Watershed Management Program (EWMP)

Submitted to:
California Regional Water Quality
Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Submitted by:
Cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, and Sierra Madre
County of Los Angeles
Los Angeles County Flood Control District

June 27, 2013

SECTION 1. WATERSHED MANAGEMENT PROGRAM TYPE SELECTION AND PERMITTEES

The Permittees of the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG), listed in Table 1, hereby provide the Los Angeles Regional Water Quality Control Board (Regional Water Board) this Notice of Intent (NOI) to develop an Enhanced Watershed Management Program (EWMP) Plan and Coordinated Integrated Monitoring Program (CIMP) Plan in accordance with Part VI.C.4.b.i and Attachment E, Part IV.C.1 of Order R4-2012-0175.

As will be summarized, the Permittees meet the LID ordinance and Green Street policy development conditions of the Order and will submit an EWMP Development Work Plan within 18 months of the effective date of this Order R4-2012-0175, which is June 28, 2014. The Draft EWMP Plan will be submitted within 30 months of the effective date of Order R4-2012-0175, which is June 28, 2015. In accordance with Attachment E, Part IV.C.3 of the Order, the Permittees will submit the CIMP plan to the Executive Officer on or before June 28, 2015.

Table 1. RH/SGRWQG Permittees
• **City of Arcadia**
• **City of Azusa**
• **City of Bradbury**
• **City of Duarte**
• **City of Monrovia**
• **City of Sierra Madre**
• **County of Los Angeles**
• **Los Angeles County Flood Control District (LACFCD)**

SECTION 2. TOTAL MAXIMUM DAILY LOAD COMPLIANCE DATES PRIOR TO APRIL 28, 2016

Total Maximum Daily Loads (TMDLs), identifying listings for impaired waters bodies for which the RH/SGRWQG subwatersheds drain to, are listed on Table 2Additionally, the San Gabriel River Metals TMDL assigns Waste Load Allocations (WLAs) to each of the RH/SGRWQG Permittees, except the City of Sierra Madre, although no Group subwatershed water bodies are identified in the TMDL as impaired. Interim and final trash TMDL and other TMDL final Water Quality Based Effluent Limitation (WQBEL) and Receiving Water Limitation (RWL) compliance deadlines, occurring prior to the final EWMP approval date of April 28, 2016 are identified in Table 3.

The RH/SGRWQG Permittees have been implementing the trash source control measures and Best Management Practices (BMPs) identified on Table 4. The Permittees will continue to implement these measures to ensure that Municipal Separate Storm Sewer System (MS4) discharges achieve compliance with the interim and final WQBELs on Table 3 during development of the EWMP. The Peck Park Trash TMDL Implementation Schedule will be developed through the EWMP Plan, in accordance with Permit Part VI.E3.

Table 2 TMDLs Applicable to the RH/SGRWQG Watershed

TMDL	Resolution Number	Effective Date	EPA Approval Date
Los Angeles River Watershed Trash TMDL	2001-013 2007-012	August 28, 2002 Reissuance September 23, 2008	August 1, 2002 July 24, 2008
Los Angeles River Nitrogen and Related Effects TMDL	2003-009 2003-016 R12-010	March 23, 2004 Interim WLA Revision September 27, 2004 Reconsideration on December 6, 2012	March 18, 2004 Not Applicable To Be Determined
Los Angeles River and Tributaries Metals TMDL	2007-014 R10-003	October 29, 2008 Reconsideration on November 3, 2011	October 29, 2008 November 3, 2011
Los Angeles River Bacteria TMDL	R10-007	March 23, 2012	March 23, 2012
Los Angeles Area Lakes USEPA TMDLs for Peck Road Lake	Not Applicable	March 26, 2012	Not Applicable
Los Angeles Area Lakes USEPA TMDLs for Santa Fe Dam Park Lake	Not Applicable	March 26, 2012	Not Applicable

Table 3 Interim and Final Trash WQBELs and Other Final WQBELs and Receiving Water Limitations Occurring Before RH/SGRWQG EWMP Plan Approval

TMDL Order	WQBEL	Interim/Final	Compliance Date
Los Angeles River Watershed Trash TMDL	20% Baseline	Interim	September 30, 2013
	10% Baseline	Interim	September 30, 2014
	3.3% Baseline	Interim	September 30, 2015
	0% Baseline	Final	September 30, 2016
Lon Angeles Nitrogen and Related Effects TMDL	10.1 mg/L NH_3-N One Hour Average	Final	December 28, 2012
	2.3 mg/L NH_3-N Thirty Day Average	Final	December 28, 2012
	1.0 mg/L NO_2-N Thirty Day Average	Final	December 28, 2012
	8 mg/L (NO_3+NO_2)-N 30 Day Average	Final	December 28, 2012

Table 4. Control Measures that will be Implemented Concurrently with EWMP Development for TMDLs

TMDL	Permittees	Implementation Plan and Control Measures	Status of Implementation
LA River Trash TMDL	Cities of Arcadia, Bradbury, Duarte, Monrovia, Sierra Madre, County of Los Angeles	Permittees are employing trash source controls, Automatic Retractable Screens, Connector Pipe Screens and other BMPs and Daily Generation Rate Studies	Conforming to interim WQBEL targets and compliance dates

SECTION 3. DEVELOPMENT OF LID ORDINANCE AND GREEN STREETS POLICY REQUIREMENT

The RH/SGR WQG Permittees have all drafted Low Impact Development (LID) ordinances and Green Streets policies. The Cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, and Sierra Madre each initiated development of their LID Ordinances and Green Streets Policies by February 26, 2013 through participating in a cost-sharing agreement with the San Gabriel Valley Council of Governments The County of Los Angeles initiated development of their LID Ordinances and Green Streets Policies by February 26, 2013 through internal processes. (Documentation of participation is provided in Appendix D). Table 5 summarizes the adoption status of the LID ordinances, while Table 6 summarizes the adoption status of the Permittees' Green Streets policies. The entire RH/SGR WQG MS4 area will soon have adopted LID ordinances and Green Streets policies. Prior to adoption, each agency should complete, under a timely if expedited schedule, an agency review, verify Municipal Code conformances, prepare and complete an environmental review, and assess compatibility with the final Los Angeles County LID Ordinance and Green Street Policy, so that they will not have to readopt the policy to utilize County Department of Public Works Plan Checking Services.

Table 5. Status of LID Ordinance Adoption Within the RH/SGRWQG WMA

Permittee	LID Ordinance (Indicate Status)	MS4 Watershed Area for which Permittee is Responsible (Sq. Miles)		MS4 Watershed Area Covered by Permittee's LID Ordinance [Sq. Miles)		Percentage of Watershed Area	
		Rio Hondo	San Gabriel River	Rio Hondo	San Gabriel River	Rio Hondo	San Gabriel River
Arcadia	Draft Ordinance	10.9	0.2	10.9	0.2	34.17%	1.04%
Azusa	Draft Ordinance	0	9.7	0	9.7	0%	50.52%
Bradbury	Draft Ordinance	0.8	1.2	0.8	1.2	2.51%	6.25%
County of Los Angeles	Draft Ordinance	2.8	2.1	2.8	2.1	8.78%	10.94%
Duarte	Draft Ordinance	1.8	4.9	1.8	4.9	5.64%	25.52%
Monrovia	Draft Ordinance	12.6	1.1	12.6	1.1	39.50%	5.73%
Sierra Madre	Draft Ordinance	3	0	3	0	9.40%	0%
LACFCD	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MS4 Watershed Area		31.9	19.2	31.9	19.2	**100%**	**100%**

Status Descriptions: Draft Ordinance – By June 28, 2013, Permittee will draft an LID Ordinance in compliance with the requirements of Order R4-2012-0175

Table 6. Status of Green Streets Policy Coverage of the MS4 Watershed Area Addressed by the EWMP

Permittee	Green Street Policy (Indicate Status)	MS4 Watershed Area for which Permittee is Responsible [Sq. Miles]		MS4 Watershed Area Covered by Permittee's LID Ordinance [Sq. Miles]		Percentage of Watershed Area	
		Rio Hondo	San Gabriel River	Rio Hondo	San Gabriel River	Rio Hondo	San Gabriel River
Arcadia	Draft Policy	10.9	0.2	10.9	0.2	34.17%	1.04%
Azusa	Draft Policy	0	9.7	0	9.7	0%	50.52%
Bradbury	Draft Policy	0.8	1.2	0.8	1.2	2.51%	6.25%
County of Los Angeles	Draft Policy	2.8	2.1	2.8	2.1	8.78%	10.94%
Duarte	Draft Policy	1.8	4.9	1.8	4.9	5.64%	25.52%
Monrovia	Draft Policy	12.6	1.1	12.6	1.1	39.50%	5.73%
Sierra Madre	In Place	3	0	3	0	9.40%	0%
LACFCD	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total MS4 Watershed Area		31.9	19.2	31.9	19.2	**100%**	**100%**

Status Descriptions: Draft Policy –By June 28, 2013, Permittee will draft a Green Street Policy in compliance with the requirements of Order R4-2012-0175.

SECTION 4. GEOGRAPHIC SCOPE OF ENHANCED WATERSHED MANAGEMENT PROGRAM:

The RH/SGRWQG includes the Cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, Sierra Madre, and the County of Los Angeles, and the LACFCD, several of which are in both the Los Angeles and San Gabriel River Watersheds. The municipalities are significantly residential and commercial in land use characteristics and have a shared perspective regarding water conservation and water quality related issues.

The headwaters of the 834 square mile Los Angeles River Watershed are primarily within the mountains of the Angeles National Forest. The watershed is bordered by the Santa Monica Mountains, the Simi Hills, the Santa Susana Mountains, the San Gabriel Mountains, the San Gabriel River and Dominguez Channel Watersheds. The river extends 40 miles across urbanized areas of the San Fernando and west San Gabriel Valleys, before flowing into the Los Angeles-Long Beach Harbor and the Pacific Ocean. The Rio Hondo is a tributary of the Los Angeles River, which receives drainage from the RH/SGRWQG Permittees via several smaller tributaries:

- Arcadia Wash drains from the Cities of Arcadia and Sierra Madre;
- Santa Anita Wash drains from Cities of Arcadia, Monrovia, Sierra Madre and County of Los Angeles;
- Sierra Madre Wash drains from the City of Sierra Madre; and
- Sawpit Wash drains from the City of Monrovia, Duarte, Bradbury, and County of Los Angeles.

Prior to draining to the Rio Hondo, the Santa Anita and Sawpit Washes drain to Peck Road Water Conservation Park (aka. Peck Road Lake). Peck Road Lake then drains to the Rio Hondo. Peck Road Lake is owned by the LACFCD and maintained by the Los Angeles County Department of Parks and Recreation.

The San Gabriel River Watershed encompasses approximately 682 square miles of Los Angeles County, northwest Orange County, and a small portion of southwest San Bernardino County. The San Gabriel River extends 60 miles from its headwaters in the mountains of the Angeles National Forest flowing primarily south across urbanized areas of the San Gabriel Valley and Los Angeles County Coastal Plain, eventually reaching the Pacific Ocean between the Cities of Seal Beach and Long Beach. The main tributaries are Walnut Creek, San Jose Creek, and Coyote Creek. Reach 5 of the San Gabriel River receives drainage from Duarte, Bradbury, Monrovia, Azusa, Arcadia, and County of Los Angeles.

About four miles below the mouth of the San Gabriel Canyon is the Santa Fe Dam and Reservoir, which is operated and maintained by the LACFCD through an easement with the United States Army Corps of Engineers (USACE). Both the Rio Hondo and San Gabriel River flow into the Whittier Narrows Reservoir and may merge behind the reservoir during large storm events. Flows from the upper watershed are directed to spreading grounds located in and adjacent to the Rio Hondo and San Gabriel Rivers.

The RH/SGRWQG watersheds encompass approximately 51 square miles and Table 7 provides a breakdown of each Permittee's land area within the two major river watersheds. Figure 1 is a map of the watershed and jurisdictional boundaries in the vicinity of the RH/SGRWQG. Of the total Los Angeles River and San Gabriel River Watershed areas, the RH/SGR WQG Permittees have jurisdiction over just 4% and 3% respectively. The Permittees do not have jurisdiction over lands owned by the State of California (CalTrans), the Federal government (Angeles National Forest), Los Angeles County Metropolitan Transportation Authority (Metro) Gold Line, and local school districts (see Table 8).

Table 7. Watershed Land Area by Permittees

Permittee	Rio Hondo		San Gabriel River	
	Land Area (Square Miles)	Percent of Total Area	Land Area (Square Miles)	Percent of Total Area
Arcadia	10.9	34.17%	0.2	1.04%
Azusa	0	0%	9.7	18.98%
Bradbury	0.8	2.51	1.2	6.25%
County of Los Angeles	2.8	8.78%	2.1	10.94%
Duarte	1.8	5.64%	4.9	25.52%
Monrovia	12.6	39.5%	1.1	5.73%
Sierra Madre	3	9.4%	0	0%
Total	**31.9**	**100%**	**19.2**	**100%**

Figure 1. RH/SGRWQG

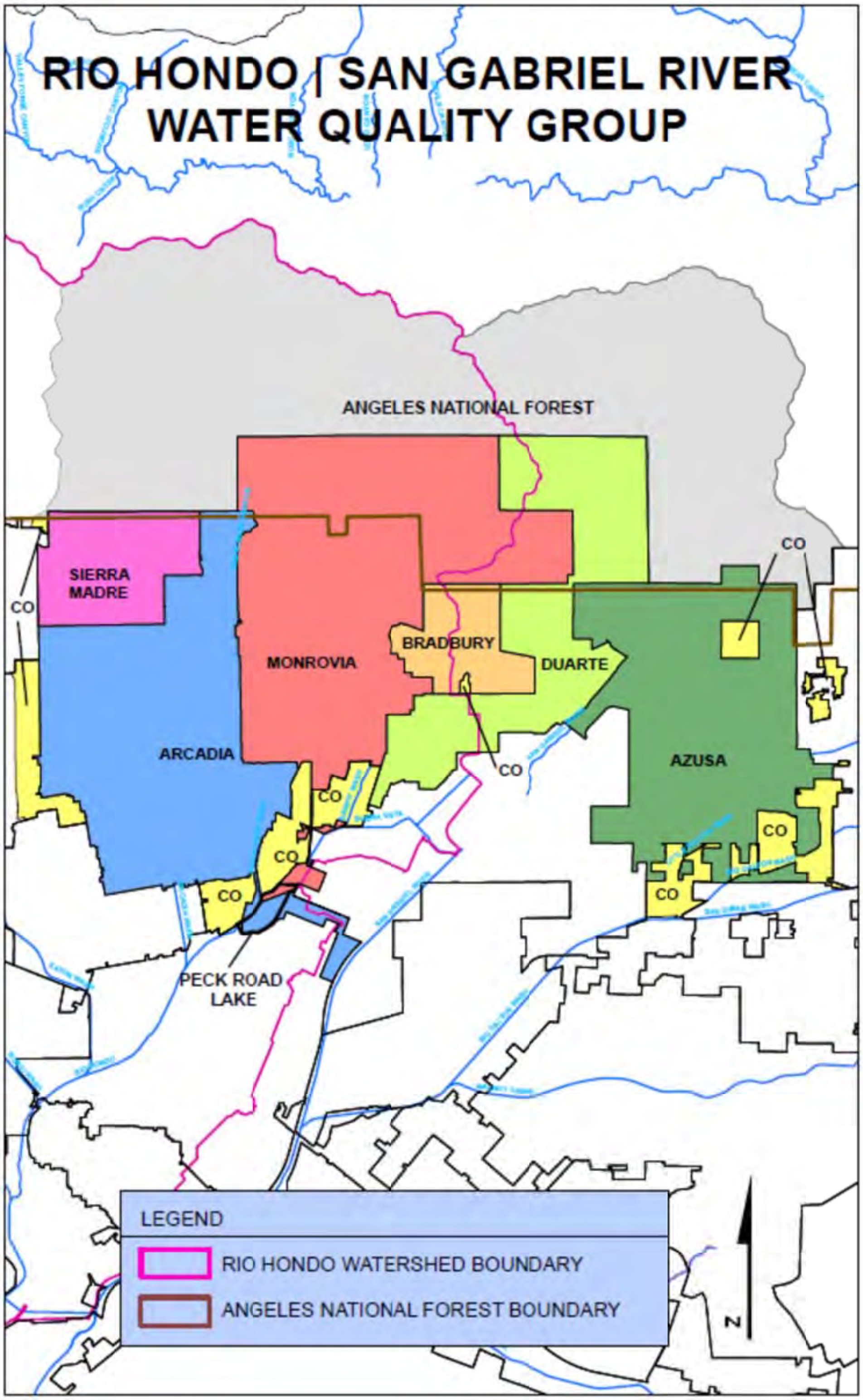


Table 8. RH/SGRWQG Watershed Land Area Distribution and EWMP Participation

Agency	EWMP Agency	Land Area (sq. miles)
Arcadia	Yes	**11.1**
Azusa	Yes	**9.7**
Bradbury	Yes	**2**
County of Los Angeles	Yes	**4.9**
Duarte	Yes	**6.7**
Monrovia	Yes	**13.7**
Sierra Madre	Yes	**3**
Los Angeles County Flood Control District	Yes	**N/A**
Angeles National Forest	No	**TBD**
Caltrans	No	**TBD**
Metro Gold Line	No	**TBD**
State of California	No	**TBD**
	RH/SGRWQG Watershed	**51.1**

SECTION 5. PLAN CONCEPT AND INTERIM MILESTONES AND DEADLINES:

The RH/SGRWQG EWMP agencies have been collaborating since the effective date of the 2012 MS4 Permit and have already selected a consultant and issued a contract for Reasonable Assurance Analysis (RAA), and development of the EWMP and CIMP. The Permittees are planning to develop implementation and compliance strategies that are based on a multi-pollutant approach with green infrastructure best management practices (BMPs) that maximize the use of urban runoff as a resource for aquifer recharge, irrigation, and other beneficial uses. The RH/SGRWQG EWMP will consider existing TMDL implementation plans, evaluate permit proposed watershed source control measures, identify enhanced projects to maximize capture of all non-stormwater runoff and stormwater from the 85^{th} percentile, 24-hour storm event, and identify additional watershed control measures for those areas of the watersheds that cannot be addressed by enhanced projects.

Plan development will be a collaborative process between the RH/SGRWQG EWMP agencies, consultant and Regional Board, coordinated by an Oversight Committee composed of members from each of the RH/SGWQG agencies and receiving local watershed stakeholders input.

Table 9 includes a listing of milestones and deadlines for the development of the EWMP.

Table 9. Enhanced Watershed Management Program & Integrated Coordinated Monitoring Program Interim Milestones and Deadlines

Milestone	Deadline
Compile technical memorandum of water quality priorities	*December 2013**
Complete internal draft of EWMP Work Plan	*April 2014**
Complete draft CIMP	*April 2014**
Submit EWMP Work Plan to Regional Water Board	June 2014
Develop interim numeric milestones for EPA developed TMDLs	*August 2014**
Conduct initial RAA based on selected watershed control measures	*December 2014**
Complete internal draft of EWMP	*April 2015**
Submit CIMP Plan to Regional Water Board	June 2015**
Submit Draft EWMP to Regional Water Board	June 2015
Submit Final EWMP to Regional Water Board (revised based on Regional Water Board comments)	January 2016

* Dates are tentative estimates and may change on an as needed basis.

** Attachment E, Part IV.C.3 of the Order.

SECTION 6. COST ESTIMATE:

The RH/SGRWQG EWMP agencies prepared a scope of work and cost estimates for developing the EWMP Work Plan, CIMP, and EWMP for the RH/SGRWQG. It is estimated that the consultant costs will be $212,076 for the CIMP, and $578,461 for the EWMP for a total of $790,537. Table 10 provides a cost break down of the main cost categories involved in EWMP and CIMP plan development. Additionally, agencies of the RH/SGRWQG will contribute several hundred thousand dollars of in-kind services toward the development of the EWMP and CIMP, including attending RH/SGRWQG and Technical Advisory Committee meetings, as well as several hundred thousand dollars for an environmental review to be developed once the EWMP and CIMP have been prepared. For a more detailed scope and cost breakdown, please see Appendix A.

The LACFCD, having no land authority over the RH/SGRWQG watershed, will contribute funds for 10% of the total Consultant EWMP and CIMP Plan development cost while the other 90% of the cost will be funded amongst the remaining Permittees, based upon their respective land area percentages in the RH/SGRWQG watershed as shown in Table 7.

Table 10.Estimated EWMP and CIMP Development Costs

Jurisdiction	Staff/In-kind Costs (EWMP & CIMP)	Consultant EWMP Plan Development	Consultant CIMP Plan Development	Consultant Environmental Review	Total Costs
TOTAL Estimated Costs	$620,000	$578,461	$212, 076	$300,000*	**$1,710,537**

* It is anticipated that Environmental Review will be required once the EWMP has been prepared. Environmental Review costs are anticipated to be approximately $300,000.

SECTION 7. PERMITTEE MEMORANDA OF UNDERSTANDING

All Permittees are committed to development and implementation of the EWMP Plan. Copies of executed Memoranda of Understanding are included in Appendix B.

SECTION 8. COMMITMENT TO IMPLEMENT A STRUCTURAL BMP OR SUITE OF BMPS:

The Permittees listed in Table 11 will implement the identified structural BMP or suite of BMPs to fulfill the obligations under Part VI.C.b.iii. (5).

Table 11. Structural BMP or Suite of BMPs to be Implemented in the EWMP Watershed(s)

Watershed	Permittee	Structural BMP or Suite of BMPs to be Implemented	Planned Implementation Date
Rio Hondo	Monrovia	***Monrovia Station Square/Transit Village Multi-Benefit Park and Greenway Project:*** Design and develop a 2.5 acre multi-benefit green space along the future Metro Gold Line Foothill Extension. The project includes a multi-use trail, native trees and shrubs, runoff storage and infiltration systems prior to discharging into Sawpit Wash and Peck Road Water Conservation Park to the south.	Spring 2015
San Gabriel River	Azusa	***Metro Gold Line Infiltration Project:*** The City of Azusa in coordination with the Foothill Construction Authority for the Gold Line Project has constructed infiltration systems at some of the major crossings in town. Infiltration will occur at the catch basins which are soft bottom. Anticipated tributary areas are approximately 17 acres and will include the rail corridor. The 10 year storm event is to be infiltrated.	Spring 2015

APPENDIX A

Detailed Cost to Develop EWMP

Table 12. Estimated Costs Per Permittee for Developing the RH/SGRWQG's EWMP & CIMP

Jurisdiction	Staff/In-Kind Costs	Consultant (EWMP & CIMP Plan Development)	Consultant Environmental Review	Total Costs (*does not include Environmental Review)
Arcadia	$91,000	$179,891.39	TBD	*$270,891
Azusa	$104,000	$153,660.80	TBD	*$257,661
Bradbury	$103,000	$39,480.59	TBD	*$142,481
Duarte	$88,000	$65,711.18	TBD	*$153,711
Monrovia	$99,000	$133,602.11	TBD	*$232,602
Sierra Madre	$45,000	$53,367.37	TBD	*$98,367
County of Los Angeles & Los Angeles County Flood Control District	$90,000	$85,769.86 $79,053.70		*$254,824
TOTAL	**$620,000**	**$790,537.00**	**~$300,000**	**$1,710,537**

APPENDIX B

Memorandum of Understanding

City of Arcadia
City of Azusa
City of Bradbury
City of Duarte
City of Monrovia
City of Sierra Madre

County of Los Angeles and Los Angeles County Flood Control District have each indicated their intent to participate in the MOU in their Letters of Intent (attached). The MOU is tentatively scheduled for the Board of Supervisors' approval on July 30, 2013, but no later than December 28, 2013.

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT,
THE COUNTY OF LOS ANGELES, AND
THE CITIES OF ARCADIA, AZUSA, BRADBURY, DUARTE, MONROVIA
AND SIERRA MADRE

REGARDING THE ADMINISTRATION AND COST SHARING FOR DEVELOPMENT OF THE ENHANCED WATERSHED MANAGEMENT PROGRAM (EWMP) FOR THE RIO HONDO/SAN GABRIEL RIVER WATER QUALITY GROUP'S WATERSHED

This Memorandum of Understanding (MOU), made and entered into as of the date of the last signature set forth below by and between the LOS ANGELES COUNTY FLOOD CONTROL DISTRICT (LACFCD), a political subdivision of the State of California, the COUNTY OF LOS ANGELES (LA COUNTY), a political subdivision of the State of California, and the CITIES OF ARCADIA, AZUSA, BRADBURY, DUARTE, MONROVIA, AND SIERRA MADRE. Collectively, these entities shall be known herein as "PARTIES" or individually as "PARTY."

WITNESSETH

WHEREAS, the Regional Water Quality Control Board, Los Angeles Region (Regional Board) adopted National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Permit Order No. R4-2012-0175 Municipal Separate Storm Sewer System (MS4 Permit); and

WHEREAS, the MS4 Permit became effective on December 28, 2012 and requires that the LACFCD, LA COUNTY, and 84 of the 88 cities (excluding Avalon, Long Beach, Palmdale, and Lancaster) within the County of Los Angeles comply with the prescribed elements of the MS4 Permit; and

WHEREAS, the PARTIES have agreed to collaborate on the compliance of certain elements of the MS4 Permit and have agreed to a cost sharing formula set forth in Table 2 of Exhibit A, which is attached and made part of this MOU; and

WHEREAS, the PARTIES agree that each shall assume full and independent responsibility for ensuring its own compliance with the MS4 Permit despite the collaborative approach of this MOU; and

WHEREAS, the PARTIES collaboratively prepared a final Scope of Work and Request for Proposal to obtain a Consultant to assist the PARTIES in complying with certain elements of the MS4 Permit, as specified in the Scope of Work, which is incorporated into this MOU by reference; and

WHEREAS, the PARTIES propose for the Consultant to prepare and deliver a Final Work Plan, Draft Enhanced Watershed Management Program (EWMP) plan, Coordinated Integrated Monitoring Plan (CIMP), Final EWMP plan, and Environmental Review as appropriate to the EWMP and CIMP (collectively, PLANS) in compliance with certain elements of the MS4 Permit, at a total cost of approximately $790,537; and

WHEREAS, the PARTIES have determined that hiring a Consultant to prepare and deliver the PLANS will be beneficial to the PARTIES and they desire to participate and will provide funding in accordance with the cost allocation in Table 2 of Exhibit A; and

WHEREAS, the PARTIES have agreed to establish an Oversight Committee (comprised of City Managers and/or designated staff from each PARTY) to provide technical oversight and project management for the development of the PLANS, and

WHEREAS, the CITY OF ARCADIA will act on behalf of the PARTIES in the administration of the Consultant services agreements for the preparation of the PLANS .

NOW, THEREFORE, in consideration of the mutual benefits to be derived by the PARTIES, and of the promises contained in this MOU, the PARTIES agree as follows:

(1) Recitals: The recitals set forth above are incorporated into this MOU.

(2) Purpose: The purpose of this MOU is to cooperatively fund the preparation of the PLANS and the submittal of the PLANS to the Regional Board.

(3) Voluntary: This MOU is voluntarily entered into for the purpose of preparing the PLANS and submitting the PLANS to the Regional Board.

(4) Terms: This MOU shall become effective the last date of execution by all Parties hereto (“Effective Date”), and shall remain in effect until the CITY OF ARCADIA has provided written notice of completion of the Scope of Work described herein, and payment by all Parties of their allocated pro-rata share hereunder. .

(5) Responsibilities of the CITY OF ARCADIA:

a. The CITY OF ARCADIA shall act as the contract manager on behalf of, and for the benefit of, PARTIES, and as such agrees to invoice the PARTIES for their pro-rata share of the cost for the preparation and delivery of the PLANS as described in Tables 2 and 3 of Exhibit A.

1. Payments to Third Parties – The CITY OF ARCADIA shall have no obligation to pay vendors or consultants any funds other than those owed for its proportional share as set forth in Table 2 of Exhibit A, and those funds remitted to the CITY OF ARCADIA following invoice. In the event

the CITY OF ARCADIA elects to make a payment on behalf of a Delinquent Party, the Delinquent Party and/or the remaining Parties shall reimburse the CITY OF ARCADIA the funds expended making the payment as described below.

b. The CITY OF ARCADIA shall solicit proposals for, award, and administer a Consultant contract(s) for the preparation and delivery of the PLANS in accordance with the Scope of Work.

c. The CITY OF ARCADIA shall utilize the funds deposited by the PARTIES only for payment of the Consultant for the preparation and completion of the PLANS.

d. The CITY OF ARCADIA shall provide the PARTIES with an electronic copy of the draft and final PLANS within 5 days of receipt from the Consultant.

e. Upon execution of this MOU, each Party shall provide the name or names of those persons from within the Party's organization who is/are to be representing said Party on the Oversight Committee. Within thirty (30) days from the Effective Date, the CITY OF ARCADIA shall notice all parties hereto of the members of the contact information for the Oversight Committee.

f. All draft and final Plans shall be reviewed by the Oversight Committee for further revision and/or completion. No PLAN OR PLANS shall be submitted to the Regional Board unless and until it/they have been approved, in writing, for submittal by all PARTIES hereto, excepting only a Party or Parties whose involvement in this MOU has been terminated.

g. The CITY OF ARCADIA shall provide an accounting upon the early termination of this MOU pursuant to paragraph (6)t.1 or 60 days after the date the Regional Board gives final approval to the last outstanding portion of the PLANS. The CITY OF ARCADIA shall return the unused portion of all funds deposited with the CITY OF ARCADIA in accordance with the cost allocation formula set forth in Table 2 of Exhibit A.

(6) THE PARTIES FURTHER AGREE:

a. The PARTIES shall make a full faith effort to cooperate with one another to achieve the purposes of this MOU by providing information about project opportunities, reviewing deliverables in a timely manner, and informing their respective administrators, agency heads, and/or governing bodies.

b. The PARTIES shall fund the cost of the preparation and delivery of the PLANS and pay the CITY OF ARCADIA for the preparation and delivery of the PLANS based on the cost allocation set forth in Table 2 of Exhibit A within 60 days of receiving an invoice.

c. Delinquent Payments – A PARTY's payment is considered delinquent 180 days after being invoiced by the CITY OF ARCADIA. The following procedures may be implemented to attain payments from the delinquent PARTY per instructions from the PARTIES: 1) verbally contact/meet with the manager from the delinquent PARTY or PARTIES; and 2) submit a formal letter to the delinquent PARTY OR PARTIES from the City of Arcadia's legal counsel. If the PARTY or PARTIES remain delinquent after the above procedures, then the CITY OF ARCADIA may notify the Regional Board that the delinquent PARTY OR PARTIES are no longer a participating member of the PLANS, and said PARTY or PARTIES shall then be deemed to have terminated its participation as a PARTY to this MOU ("EXCLUDED PARTY") and their name(s) may be removed from the PLANS. Any EXCLUDED PARTY'S delinquent amount(s) will be paid in accordance with the remaining PARTIES pro-rata share pursuant to Table 2 of Exhibit A, as adjusted to remove the EXCLUDED PARTY from the allocation. The CITY OF ARCADIA will revise Table 2 of Exhibit A to show the recalculated costs for each remaining participating PARTY; these revised exhibits will be included with the next invoice to the PARTIES. The PARTIES shall retain all contractual, legal, and equitable rights and causes of action to recover any delinquent amounts paid that were owed by an EXCLUDED PARTY or PARTIES who failed to make such payments.

d. Interest Accrual - Any interest accrued on the funds collected per this MOU during the term of this MOU shall be refunded or credited toward any amount owed at the time of the final accounting. The CITY OF ARCADIA shall report to the PARTIES the amount of the interest accrued by the collected funds at the time of the final accounting.

e. Excess Funds - Any collected funds not spent in any annual period shall be refunded or credited toward any amount owed at the time of the final accounting.

f. Each PARTY shall allow reasonable access and entry to the Consultant, on an as needed basis, during the term of this MOU to the PARTY's storm drains, channels, catch basins, and similar properties (FACILITIES) to achieve the purposes of this MOU, provided, however, that prior to entering any PARTY's facilities, the Consultant shall secure a permit of entry from the applicable PARTY.

g. To the maximum extent permitted by law, the CITY OF ARCADIA shall require the Consultant(s) retained pursuant to this MOU to agree to indemnify, defend, and hold harmless each PARTY, its special districts, elected and appointed officers, employees, and agents, from and against any and all liability, including but not limited to demands, claims, actions, fees, costs, and expenses (including attorney and expert fees), arising from or connected with the Consultant's performance of its agreement with the CITY OF ARCADIA. In addition, the CITY OF ARCADIA shall require the Consultant(s) to carry, maintain, and keep in full force and effect an insurance policy or policies, and each PARTY, its officers, employees, attorneys, and designated volunteers shall be named as additional insureds on the policy(ies) with respect to liabilities arising out of the Consultant's work. These requirements will also apply to any subcontractors hired by the Consultant(s).

h. To the maximum extent permitted by law, each PARTY shall indemnify, defend, and hold harmless each other PARTY, including its special districts, elected and appointed officers, employees, and agents, from and against any and all liability, including but not limited to demands, claims, actions, fees, costs, and expenses (including attorney and expert witness fees), arising from or connected with the respective acts of each PARTY under this MOU; provided, however, that no PARTY shall indemnify another PARTY for that PARTY's own negligence or willful misconduct.

i. In light of the provisions of Section 895.2 of the Government Code of the State of California imposing certain tort liability jointly upon public entities solely by reason of such entities being parties to an agreement (as defined in Section 895 of said Code), each of the PARTIES hereto, pursuant to the authorization contained in Section 895.4 and 895.6 of said Code, shall assume the full liability imposed upon it or any of its officers, agents, or employees, by law for injury caused by any act or omission occurring in the performance of this MOU to the same extent that such liability would be imposed in the absence of Section 895.2 of said Code. To achieve the above stated purpose, each PARTY indemnifies, defends, and holds harmless each other PARTY for any liability, cost, or expense that may be imposed upon such other PARTY solely by virtue of said Section 895.2. The provisions of Section 2778 of the California Civil Code are made a part hereof as if incorporated herein.

j. The PARTIES are, and shall at all times remain as to each other, wholly independent entities. No PARTY to this MOU shall have power to incur any debt, obligation, or liability on behalf of any other PARTY unless expressly provided to the contrary by this MOU. No employee, agent, or officer of a PARTY shall be deemed for any purpose whatsoever to be an agent, employee, or officer of another PARTY.

k. Any notices, bills, invoices, or reports relating to this MOU, and any request, demand, statement, or other communication required or permitted hereunder shall be in writing and shall be delivered to the representatives of the

PARTIES at the addresses set forth in Exhibit B attached hereto and incorporated herein by reference.

l. This MOU shall be binding upon, and shall be to the benefit of the respective successors, heirs, and assigns of each PARTY; provided, however, no PARTY may assign its respective rights or obligations under this MOU without the prior written consent of the other PARTIES.

m. This MOU is governed by, interpreted under, and construed and enforced in accordance with the laws of the State of California.

n. If any provision of this MOU shall be determined by any court to be invalid, illegal, or unenforceable to any extent, the remainder of this MOU shall not be affected, and this MOU shall be construed as if the invalid, illegal, or unenforceable provision had never been contained in this MOU.

o. All PARTIES have been represented by counsel in the preparation and negotiation of this MOU. Accordingly, this MOU shall be construed according to its fair language. Any ambiguities shall be resolved in a collaborative manner by the PARTIES and shall be rectified by amending this MOU as described in paragraph (6)r.

p. Each of the persons signing below on behalf of a PARTY represents and warrants that he or she is authorized to sign this MOU on behalf of such PARTY.

q. No PARTY shall have any financial obligation to any other PARTY to this MOU, except as herein expressly provided.

r. The terms and provisions of this MOU may not be amended, modified, or waived, except by an instrument in writing signed by all PARTIES who have not terminated their interests herein or whose involvement has not terminated by reason of non-payment. This paragraph applies to any changes proposed as a result of the following circumstances: 1) changes to the MS4 Permit terms with regards to compliance through an EWMP or CIMP; or (2) changes in the number of parties to this MOU. This list is not intended to be exhaustive.

s. This MOU may be signed in multiple counterparts with the same force and effect as if all original signatures appeared on one copy; and in the event this MOU is signed in counterparts, each counterpart shall be deemed an original and all of the counterparts shall be deemed to be one agreement.

t. Early Termination or Withdrawal

1. This MOU may be terminated upon the express written agreement of all PARTIES. If this MOU is terminated, any remaining funds not due and payable or otherwise legally committed to a Consultant(s) shall be distributed to the remaining PARTIES (not including any EXCLUDED or WITHDRAWN PARTY or PARTIES) so that all such remaining PARTIES have paid no more than their pro-rata share (in accordance with the most current allocation set forth in Table 2 of Exhibit A). Completed work shall be owned by all PARTIES at the time of completion of the work who are not EXCLUDED or WITHDRAWN PARTIES. Similarly, rights to uncompleted work by the Consultant still under contract is to be owned by the PARTY or PARTIES who are not EXCLUDED or WITHDRAWN PARTIES at such time.

2. A PARTY may withdraw from this MOU ("WITHDRAWN PARTY") upon 60 days written notice to the other PARTIES, subject to payment of any invoice received from the CITY OF ARCADIA prior to or during the 60-day notice period for its share of the cost of the work completed as of the date of its notice of withdrawal, calculated in accordance with the cost-sharing percentages set forth in Table 2 of Exhibit A. The effective withdrawal date shall be the sixtieth (60th) day after the CITY OF ARCADIA receives the withdrawing PARTY's notice to withdraw from this MOU. The CITY OF ARCADIA shall refund to the WITHDRAWN PARTY any unused funds paid by the WITHDRAWN PARTY's effective withdrawal date. All PARTIES understand, acknowledge, and agree that withdrawal from this MOU will terminate any responsibility, liability, or obligation of the WITHDRAWN PARTY under this MOU commencing on the effective withdrawal date and that the WITHDRAWN PARTY shall remain liable for its share of any loss, debt or liability incurred prior to the withdrawal date, and for any work which could not be suspended. Withdrawal from this MOU does not release any PARTY from the obligations set forth in MS4 Permit.

3. If a PARTY fails to substantially comply with any of the terms or conditions of this MOU, that PARTY shall forfeit its rights to work completed through this MOU, but no such forfeiture shall occur unless and until the defaulting PARTY has first been given notice of its default and a reasonable opportunity to cure the alleged default.

IN WITNESS WHEREOF, the PARTIES hereto have caused this MOU to be executed by their duly authorized representatives and affixed as of the date of signature of the PARTIES:

COUNTY OF LOS ANGELES,

By ______________________________ ____________________
GAIL FARBER Date

APPROVED AS TO FORM:

John F. Krattli
County Counsel

By ______________________________ ____________________
Deputy Date

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

By ______________________
Chief Engineer

APPROVED AS TO FORM:

John F. Krattli
County Counsel

By ______________________________ ____________________
Deputy Date

CITY OF _______

By ________________________________ ____________________
NAME, POSITION Date

ATTEST:
By ________________________________ ____________________
NAME, City Clerk Date

APPROVED AS TO FORM:

By ________________________________ ____________________
NAME, City Attorney Date

EXHIBIT A

Rio Hondo/San Gabriel River Water Quality Group EWMP
Funding Contributions

Table 1. Total Contract Costs

Work Scope	Cost
Project Management	$111,231
EWMP Work Plan	$146,234
CIMP	$136,464
Final EWMP	$ 394,816
Notice of Intent Review	$1,792
Total Contract Cost	**$ 790,537.00**

Table 2. Cost Allocation Formula

Party	Base Fee (10%)	Acres (Developed Land)	Percent of Area(2)	Cost based on Acres (90%)	Total Cost
City of Arcadia	$10,164.05	11	26.51%	$169.727.34	$179,891.39
City of Azusa	$10,164.05	9.3	22.41%	$143,496.75	$153,660.80
City of Bradbury	$10,164.05	1.9	4.58%	$29,316.54	$39,480.59
City of Duarte	$10,164.05	3.6	8.67%	$55,547.13	$65,711.18
City of Monrovia	$10,164.05	8	19.28%	$123,438.07	$133,602.11
City of Sierra Madre	$10,164.05	2.8	6.75%	$43,203.32	$53,367.37
County of Los Angeles	$10,164.05	4.9	11.81%	$75,605.82	$85,769.86
Los Angeles County Flood Control District(1)	$79,053.70	-	-	-	$79,053.70
Total	**$150,202.03**	**41.5**	**100%**	**$640,334.97**	**$790,537.00**

(1) Los Angeles County Flood Control District's cost share equals 10% of total contracted costs; the remaining costs are then divided by the 10% base fee and land area (90%).
(2) - Based on percent of developed land in each Party area of the total watershed area (excludes Angeles National Forest land)

On or before June 30th of each year, the Oversight Committee shall review the Cost Allocation Formula and may adjust the formula as deemed necessary for such reasons including, but not limited to, revision in Contracted Costs, Scope of Work, scheduling of work, and/or costs related to environmental review.

Table 3. Invoicing Schedule

Invoice #	Invoice Date	Percent of Cost Share Allocation

1	on or before July 2013	10% Base
2	July 2013	1/3 of land Area Allocation
3	July 2014	1/3 of land Area Allocation
4	July 2015	1/3 of land Area Allocation

On or before June 30th of each year, the Oversight Committee shall review the Invoicing Schedule may adjust the percent of Cost Share Allocations due each year as deemed necessary for such reasons including, but not limited to, revision in Contracted Costs, Scope of Work, scheduling of work, and/or costs related to environmental review.

EXHIBIT B

Rio Hondo/San Gabriel River Watershed Quality Group EWMP
Responsible Agencies Representatives

1. City of Arcadia
   240 W. Huntington Dr.
   Arcadia, CA 91006
   Representative: Vanessa Hevener
   E-mail: VHevener@ci.arcadia.ca.us
   Phone: (626) 359-7028

2. City of Azusa
   213 E. Foothill Blvd.
   Azusa, CA 91702-1395
   Representative: Carl E. Hassel
   E-mail: CHassel@ci.azusa.ca.us
   Phone: (626) 812-5064

3. City of Bradbury
   600 Winston Ave.
   Bradbury, CA 91008
   Representative: Michelle Keith
   E-mail: MKeith@CityofBradbury.org
   Phone: (626)358-3218 ext. 300

4. City of Duarte
   1600 Huntington Drive
   Duarte, CA 91010
   Party Representative: Rafael Casillas
   E-mail: RCasillas@accessduarte.com
   Phone: (626)386-6833

5. City of Monrovia
   415 S. Ivy Ave.
   Monrovia, CA 91016
   Representative: Heather Maloney
   E-mail: HMaloney@ci.monrovia.ca.us
   Phone: (626) 932-5577

6. City of Sierra Madre
   232 W. Sierra Madre Blvd
   Sierra Madre, CA 91024
   Representative: James Carlson
   E-mail: JCarlson@cityofsierramadre.com

Phone: (626) 355-7135 ext. 803

7. County of Los Angeles
Department of Public Works
Watershed Management Division, 11th Floor
900 South Fremont Avenue
Alhambra, CA 91803-1331
Representative: Gary Hildebrand
E-mail: GHILDEB@dpw.lacounty.gov
Phone: (626) 458-4300

8. Los Angeles County Flood Control District
Department of Public Works
Watershed Management Division, 11th Floor
900 South Fremont Avenue
Alhambra, CA 91803-1331
Representative: Gary Hildebrand
E-mail: GHILDEB@dpw.lacounty.gov
Phone: (626) 458-4300

CITY OF ARCADIA

By ______________________________ June 4, 2013
Dominic Lazzaretto, City Manager Date

ATTEST:

By ______________________________ June 4, 2013
Chief Deputy City Clerk Date

APPROVED AS TO FORM:

By ______________________________ June 4, 2013
Stephen P. Deitsch, City Attorney Date

CITY OF AZUSA

By ______________________________ ______________________________
Mayor Joseph R. Rocha Date

ATTEST:
By ______________________________ May 6, 2013
City Clerk Jeffrey Cornejo, Jr. Date

APPROVED AS TO FORM:

By ______________________________ 5/14/13
City Attorney Date

CITY OF BRADBURY

By ______________________________ 6-25-13
RICHARD PYCZ, MAYOR Date

ATTEST:

By Claudia Saldana 6-25-13
CLAUDIA SALDANA, City Clerk Date

APPROVED AS TO FORM:

By ______________________________ 6-25-13
CARY REISMAN, City Attorney Date

CITY OF DUARTE

By Darrell George
Darrell George, City Manager

May 14, 2013
Date

ATTEST:
By Marla Akana
Marla Akana, City Clerk

May 14, 2013
Date

APPROVED AS TO FORM:

By Dan Slater
Dan Slater, Attorney

May 14, 2013
Date

CITY OF MONROVIA

By ________________________________ 5-22-13
Laurie Lile, City Manager Date

ATTEST:
By ________________________________ 5/22/2013
Alice D. Atkins, CMC, City Clerk Date

APPROVED AS TO FORM:

By ________________________________ 5/21/2013
Craig A. Steele, City Attorney Date

By ______________________
Chief Engineer

APPROVED AS TO FORM:

John F. Krattli
County Counsel

By ______________________ ______________________
Deputy Date

CITY OF SIERRA MADRE

By ______________________ May 14, 2013
NANCY WALSH, Mayor Date

ATTEST:
By ______________________ May 14, 2013
NANCY SHOLLENBERGER, City Clerk Date

APPROVED AS TO FORM:

By ______________________ May 14, 2013
TERESA HIGHSMITH, City Attorney Date

APPENDIX C

Signed Letters of Intent

City of Arcadia
City of Azusa
City of Bradbury
City of Duarte
City of Monrovia
City of Sierra Madre
County of Los Angeles
Los Angeles County Flood Control District

City of Arcadia

Public Works Services Department

Tom Tait
Public Works Services Director

June 28, 2013

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

Attention: Renee Purdy

RE: LETTER OF INTENT PLEDGING COMMITMENT IN THE DEVELOPMENT OF AN ENHANCED WATERSHED MANAGEMENT PROGRAM AND COORDINATED INTEGRATED MONITORING PROGRAM IN COLLABORATION WITH THE RIO HONDO/SAN GABRIEL RIVER QUALITY GROUP (RH/SGRWQG)

Dear Mr. Unger:

The City of Arcadia, with this letter, pledges to collaborate with the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) in the development of an Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP) in accordance with the new MS4 Permit by Order No. R4-2012-0175. The RH/SGRWQG is comprised of the cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, Sierra Madre, the local portion of unincorporated County of Los Angeles and the Los Angeles County Flood Control District.

The City of Arcadia also pledges to share in the costs associated with the development of the Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP). A cost sharing formula has been agreed by all participating members of the Group as to the equitable distribution of cost.

Should you have any questions, please contact Vanessa Hevener at (626) 305-5327 or via email at vhevener@ci.arcadia.ca.us.

Sincerely,

Tom Tait

Tom Tait
Public Works Services Director

11800 Goldring Road
Post Office Box 60021
Arcadia, CA 91066-6021
(626) 256-6554
(626) 359-7028 Fax
www.ci.arcadia.ca.us

The Canyon City — Gateway to the American Dream

AZUSA

June 18, 2013

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

Attention: Renee Purdy

LETTER OF INTENT PLEDGING COMMITMENT IN THE DEVELOPMENT OF AN ENHANCED WATERSHED MANAGEMENT PROGRAM AND COORDINATED INTEGRATED MONITORING PROGRAM IN COLLABORATION WITH THE RIO HONDO/SAN GABRIEL RIVER WATER QUALITY GROUP (RH/SGRWQG)

Dear Mr. Unger;

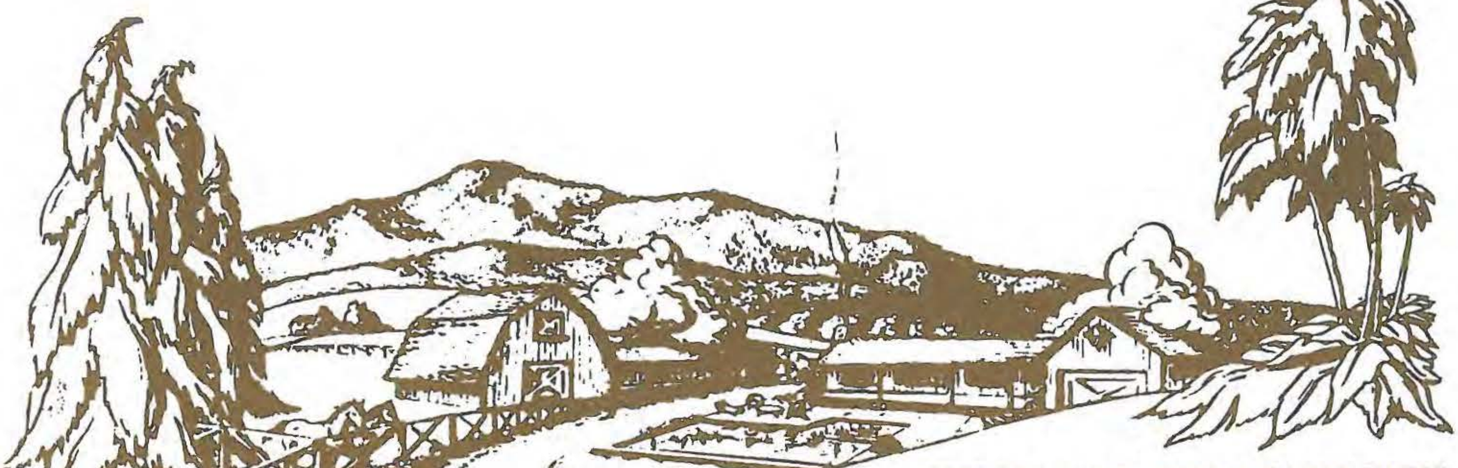
The City of Azusa, with this letter, pledges to collaborate with the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) in the development of an Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP) in accordance with the new MS4 Permit by Order No. R4-2012-0175 for submission to your Board. The RH/SGRWQG is comprised of the cities of Arcadia, Azusa, Bradbury, Duarte, Sierra Madre, Monrovia, the local portion of unincorporated County of Los Angeles and the Los Angeles County Flood Control District.

The City of Azusa also pledges to share in the costs associated with the development of the Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP). A cost sharing formula has been agreed by all participating members of the Group as to the equitable distribution of costs.

Should you have any questions, please contact me at thaes@ci.azusa.ca.us or at (626) 812-5248 or Carl Hassel, of my staff at chassel@ci.azusa.ca.us or at (626) 812-5064.

Sincerely,

Tito Haes
Assistant City Manager / Director of Public Works



CITY OF BRADBURY

Incorporated July 26, 1957

June 17, 2013

Samuel Unger, Executive Officer
Los Angeles Regional Water Control Board
320 West Fourth Street, Suite 200
Los Angeles, CA 90013

Attention: Renee Purdy

LETTER OF INTENET PLEDGING COMMITMENT IN THE DEVELOPMENT OF AN ENHANCED WATERSHED MANAGEMENT PROGRAM AND COORDINATED INTEGRATED MONITORING PROGRAM IN COLLABORATION WITH THE RIO HONDO/SAN GABRIEL RIVER WATER QUALITY GROUP (RH/SGRWQG)

Dear Mr. Unger;

The City of Bradbury, with this letter, pledges to collaborate with the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) in the development of an Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP) in accordance with the new MS4 Permit by Order No. R4-2012-0175 for submission to your Board. The RH/SGRWQG is comprised of the cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, Sierra Madre, the local portion of unincorporated County of Los Angeles and the Los Angeles County Flood Control District.

The City of Bradbury pledges to share in the costs associated with the development of the EWMP and CIMP. A cost sharing formula has been agreed by all participating members of the RH/SGRWQG as to the equitable distribution of costs.

If you have any questions, please do not hesitate to contact me at (909) 594-9702, or via email at dgilbertson@rkagroup.com.

Sincerely,

David Gilbertson
Deputy City Engineer

City of Duarte
Sixteen Hundred Huntington Drive, Duarte, California 91010-2592
Tel 626-357-7931 FAX 626-358-0018 www.accessduarte.com

June 17, 2013

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

Attention: Renee Purdy

LETTER OF INTENT PLEDGING COMMITMENT IN THE DEVELOPMENT OF AN ENHANCED WATERSHED MANAGEMENT PROGRAM AND COORIDNATED INTERGRATED MONITORING PROGRAM IN COLLABORATION WITH THE RIO HONDO/SAN GABRIEL RIVER WATER QUALITY GROUP (RH/SGRWQG)

Dear Mr. Unger;

The City of Duarte, with this letter, pledges to collaborate with the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) in the development of an Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP) in accordance with the new MS4 Permit by Order No. R4-2012-0175 for submission to your Board. The RH/SGRWQG is comprised of the cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, Sierra Madre, the local portion of unincorporated County of Los Angeles and the Los Angeles County Flood Control District.

The City of Duarte pledges to share in the costs associated with the development of the EWMP and CIMP. A cost sharing formula has been agreed by all participating member of the RH/SGRWQG as to the equitable distribution of costs.

If you have any questions, please do not hesitate to contact Rafael O. Casillas at (626) 357-7931, extension 233 or via email at rcasillas@accessduarte.com.

Sincerely,

Darrell George
City Manager

June 28, 2013

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

Attention: Renee Purdy

LETTER OF INTENT PLEDGING COMMITMENT IN THE DEVELOPMENT OF AN ENHANCED WATERSHED MANAGEMENT PROGRAM AND COORDINATED INTEGRATED MONITORING PROGRAM IN COLLABORATION WITH THE RIO HONDO/SAN GABRIEL RIVER QUALITY GROUP (RH/SGRWQG)

Dear Mr. Unger:

The City of Monrovia, with this letter, pledges to collaborate with the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) in the development of an Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP) in accordance with the new MS4 Permit by Order No. R4-2012-0175. The RH/SGRWQG is comprised of the cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, Sierra Madre, the local portion of unincorporated County of Los Angeles and the Los Angeles County Flood Control District.

The City of Monrovia also pledges to share in the costs associated with the development of the Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP). A cost sharing formula has been agreed by all participating members of the Group as to the equitable distribution of cost.

Should you have any questions, please contact Heather Maloney at hmaloney@ci.monrovia.ca.us or at (626) 932-5577.

Sincerely,

Ron Bow
Director of Public Works

cc: Heather Maloney, Senior Management Analyst
File

City of Sierra Madre

Public Works Department
232 W. Sierra Madre Boulevard, Sierra Madre, CA 91024
phone 626.355.7135 fax 626.355.2251

June 28, 2013

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

Attention: Renee Purdy

LETTER OF INTENT PLEDGING COMMITMENT IN THE DEVELOPMENT OF AN ENHANCED WATERSHED MANAGEMENT PROGRAM AND COORDINATED INTEGRATED MONITORING PROGRAM IN COLLABORATION WITH THE RIO HONDO/SAN GABRIEL RIVER QUALITY GROUP (RH/SGRWQG)

Dear Mr. Unger:

The City of Sierra Madre, with this letter, pledges to collaborate with the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) in the development of an Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP) in accordance with the new MS4 Permit by Order No. R4-2012-0175. The RH/SGRWQG is comprised of the cities of Arcadia, Azusa, Bradbury, Duarte, Monrovia, Sierra Madre, the local portion of unincorporated County of Los Angeles and the Los Angeles County Flood Control District.

The City of Sierra Madre also pledges to share in the costs associated with the development of the Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP). A cost sharing formula has been agreed by all participating members of the Group as to the equitable distribution of cost.

Should you have any questions, please contact James Carlson at jcarlson@cityofsierramadre.com or at (626) 355-7135.

Sincerely,

Bruce Inman
Director of Public Works

cc: James Carlson, Management Analyst
File

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE
REFER TO FILE: WM-7

June 24, 2013

Mr. Samuel Unger, P.E.
Executive Officer
California Regional Water Quality
Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Attention Ms. Renee Purdy

Dear Mr. Unger:

LETTER OF INTENT – COUNTY OF LOS ANGELES
RIO HONDO/SAN GABRIEL RIVER WATER QUALITY GROUP WATERSHED ENHANCED WATERSHED MANAGEMENT PROGRAM AND COORDINATED INTEGRATED MONITORING PROGRAM

The County of Los Angeles (County) submits this Letter of Intent to participate in and share the cost to develop an Enhanced Watershed Management Program (EWMP) and a Coordinated Integrated Monitoring Program (CIMP) with the Rio Hondo/San Gabriel River Water Quality Group. This Letter of Intent serves to satisfy the EWMP notification requirements of Section VI.C.4.b.iii(3) of Order No. R4-2012-0175 (Municipal Separate Storm Sewer System Permit) and the CIMP requirements of Section IV.C.1 of Attachment E of the Municipal Separate Storm Sewer System Permit.

The Rio Hondo/San Gabriel River Water Quality Group consists of the following agencies: City of Sierra Madre as the coordinating agency for EWMP and CIMP development, County, Los Angeles County Flood Control District, and cities of Arcadia, Azusa, Bradbury, Duarte, and Monrovia. The Rio Hondo/San Gabriel River Water Quality Group has included a final draft Memorandum of Understanding in Appendix 2 of the Notice of Intent. The County intends to submit a final Memorandum of Understanding to its Board of Supervisors for approval prior to December 28, 2013.

If you have any questions, please contact Ms. Angela George at (626) 458-4325 or ageorge@dpw.lacounty.gov.

Very truly yours,

for GAIL FARBER
Director of Public Works

LP:jht
P:\wmpub\Secretarial\2013 Documents\Letter\LOI - RHSGR County.doc\C13200

cc: City of Arcadia
City of Azusa
City of Bradbury
City of Duarte
City of Monrovia
City of Sierra Madre

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE
REFER TO FILE: WM-7

June 24, 2013

Mr. Samuel Unger, P.E.
Executive Officer
California Regional Water Quality
Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Attention Ms. Renee Purdy

Dear Mr. Unger:

LETTER OF INTENT – LOS ANGELES COUNTY FLOOD CONTROL DISTRICT RIO HONDO/SAN GABRIEL RIVER WATER QUALITY GROUP WATERSHED ENHANCED WATERSHED MANAGEMENT PROGRAM AND COORDINATED INTEGRATED MONITORING PROGRAM

The Los Angeles County Flood Control District (LACFCD) submits this Letter of Intent to participate in and share the cost to develop an Enhanced Watershed Management Program (EWMP) and a Coordinated Integrated Monitoring Program (CIMP) with the Rio Hondo/San Gabriel River Water Quality Group. This Letter of Intent serves to satisfy the EWMP notification requirements of Section VI.C.4.b.iii(3) of Order No. R4-2012-0175 (Municipal Separate Storm Sewer System Permit) and the CIMP requirements of Section IV.C.1 of Attachment E of the Municipal Separate Storm Sewer System Permit.

The Rio Hondo/San Gabriel River Water Quality Group consists of the following agencies: City of Sierra Madre as the coordinating agency for EWMP and CIMP development, County of Los Angeles, LACFCD, and cities of Arcadia, Azusa, Bradbury, Duarte, and Monrovia. The Rio Hondo/San Gabriel River Water Quality Group has included a final draft Memorandum of Understanding in Appendix 2 of the Notice of Intent. The LACFCD intends to submit a final Memorandum of Understanding to the County of Los Angeles Board of Supervisors (which is the LACFCD's governing body) for approval prior to December 28, 2013.

If you have any questions, please contact Ms. Terri Grant at (626) 458-4309 or tgrant@dpw.lacounty.gov.

Very truly yours,

for GAIL FARBER
Chief Engineer of the Los Angeles County Flood Control District

LP:jht
P:\wmpub\Secretarial\2013 Documents\Letter\LOI - RHSGR LACFCD.doc\C13199

cc: City of Arcadia
City of Azusa
City of Bradbury
City of Duarte
City of Monrovia
City of Sierra Madre

APPENDIX D

Documentation for Commencement of and Draft of

LID Ordinance and Green Streets Policy

San Gabriel Valley Council of Governments
1000 S. Fremont Ave. Unit 42, Alhambra, California 91803 Phone: (626) 457-1800 FAX: (626) 457-1285 E-Mail SGV@sgvcog.org

DATE: January 7, 2013

TO: LA Permit Group Authorized Voting Members

FROM: Fran Delach, Interim Executive Director

RE: LA Permit Group Technical Assistance

Requested Action
Confirm participation in the MS4 NPDES implementation technical assistance contract for the LA Permit Group by allowing the SGVCOG to retain its reimbursement from the original $5,000 payment (equal to $2,174). Responses requested by Monday, January 14th.

Background
In November 2011, the SGVCOG administered a public procurement process and contract to obtain technical assistance for the LA Permit Group in negotiations for the new National Pollutant Discharge Elimination System Municipal Separate Sanitary Storm Sewer (MS4 NPDES Permit) for Los Angeles County. The SGVCOG reached out to the cities in the LA Permit Group and asked for a voluntary financial contribution of $5,000 from each city to fund the consultant activity. At that time of the request, each city was informed that the money collected would only be used to support the procurement process and, at the end of the contract, if the amount of money collected exceeded the cost of the contract, each jurisdiction would be reimbursed a pro-rata share of the cost.

Contributions were received from a total of 41 cities (38 cities contributed $5,000 each, 1 city contributed $500 and two contributed in-kind services) totaling $190,500. The technical consultant contract was awarded to Larry Walker and Associates, totaling $107,888, leaving $82,612 in remaining funds. This would provide a reimbursement of $2,174 to each city that contributed $5,000.

The new MS4 NPDES Permit was adopted by the Los Angeles Regional Water Quality Control Board (LARWQCB) on November 8, 2012. There is a significant amount of both technical and administrative work required to meet the permit requirements within the first 6-months. Cities could benefit from collaboration developing model documents for some of the required work, such as LID Ordinances and Green Streets Policies.

Role of SGVCOG
Given the SGVCOG's administration of the previous technical consulting service contract, in December 2012, the LA Permit Group asked the SGVCOG about the possibility of using the funds remaining from the original technical services contract to support an additional technical

consulting services contract to assist in compliance efforts related to the permit. To support this process, the SGVCOG is asking participating cities if they would be interested in having the SGVCOG retain its reimbursement allocation in order to fund a new technical consulting services contract to assist cities in compliance with the new MS4 NPDES permit. The contract will be to complete the proposed scope of work, which can be found in the next section.

No additional funds will be collected in support of this project; only money remaining from the original contract will be used. As in the original contract, the SGVCOG will only administer the contract and will receive no supplemental funding.

Proposed Scope of Work

The new MS4 NPDES Permit for Los Angeles County contains many new requirements and includes the option for permittees to participate in a watershed management plan (WMP) or enhanced watershed management plan (EWMP). The Permit requires that cities revise development standards and Ordinance to reflect the new permit requirements, requiring an LID Ordinance. Additionally, participation in a WMP or EWMP requires the implementation of a Green Streets Policy and the submittal of a Notice of Intent and proof that the permittee has entered into a Memorandum of Agreement with other participating agencies.

To assist cities with some of the initial work efforts, the LA Permit Group is seeking technical consulting services to include the following scope of work:

- ✓ **Draft Notification of Intent letter:** The consultant would draft a notification of intent letter that includes the information and data that cities would be required to submit for participation in a WMP or EWMP. It would also provide instructions or alternatives for permittees to consider as they apply the documents to their respective municipality/watershed. Both of these documents would serve as a template for permittees to modify for their specific use.
- ✓ **Prepare template for Watershed MOUs:** The consultant would draft a template memorandum of understanding – as required to be submitted to the Regional Board by cities electing to participate in a WMP or EWMP.
- ✓ **Prepare a Draft LID Ordinance:** The permit specifies low impact development (LID) requirements for priority development projects and requires that a LID Ordinance be developed to incorporate these new requirements. The consultant would prepare a draft ordinance based on the City of Los Angeles' current LID ordinance and the new Permit requirements.
- ✓ **Draft Green Street Policy:** The permit encourages the development of a green street policy and requires such a policy for those agencies planning to participate in a WMP or EWMP. The consultant will develop a draft policy based on the Cities of Los Angeles' and Santa Monica's current green street policies that is consistent with the Permit requirements.
- ✓ **Presentation of work and review:** The consultant would attend LA Permit Group meetings to present and discussed the requested work documents and would provide revisions as requested by the LA Permit Group.

Attachment 1

Intent to Participate

The City of __**ARCADIA**___________ is interested in obtaining a technical assistance consultant for to assist with implementation efforts related to the new National Pollutant Discharge Elimination System Municipal Separate Sanitary Storm Sewer (MS4 NPDES Permit). The San Gabriel Valley Council of Governments is requesting permission to use your existing funding balance of $2,174 to fund this consultant. Below I have indicated my City's interest in participating.

- ☑ Yes, the City is interested in participating and you may use our existing funding balance of $2,174 towards to the consultant costs.

- ☐ The City is interested in more information.

- ☐ No, the City is not interested in participating; please issue a reimbursement payment of $2,174.

Please sign below and return this form via fax or email to the contacts listed below or mail using the enclosed envelope **no later than Monday, January 14th, 2013.**

Fax Number: (626) 457-1285
Email Address: csims@sgvcog.org

Name _**Tom Tait**___________________________

Title _**Public Works Services Director**_______________

Signature Tom Tait

Date _**January 14, 2013**______________________

Attachment 1

Intent to Participate

The City of Azusa is interested in obtaining a technical assistance consultant for to assist with implementation efforts related to the new National Pollutant Discharge Elimination System Municipal Separate Sanitary Storm Sewer (MS4 NPDES Permit). The San Gabriel Valley Council of Governments is requesting permission to use your existing funding balance of $2,174 to fund this consultant. Below I have indicated my City's interest in participating.

- [x] Yes, the City is interested in participating and you may use our existing funding balance of $2,174 towards to the consultant costs.

- [ ] The City is interested in more information.

- [ ] No, the City is not interested in participating; please issue a reimbursement payment of $2,174.

Please sign below and return this form via fax or email to the contacts listed below or mail using the enclosed envelope **no later than Monday, January 14th, 2013.**

Fax Number: (626) 457-1285
Email Address: csims@sgvcog.org

Name: Tito Haes

Title: Public Works Director / Asst City Mgr

Signature: [signature]

Date: 1/14/13

Attachment 1

Intent to Participate

The City of Bradbury is interested in obtaining a technical assistance consultant for to assist with implementation efforts related to the new National Pollutant Discharge Elimination System Municipal Separate Sanitary Storm Sewer (MS4 NPDES Permit). The San Gabriel Valley Council of Governments is requesting permission to use your existing funding balance of $2,174 to fund this consultant. Below I have indicated my City's interest in participating.

- [x] Yes, the City is interested in participating and you may use our existing funding balance of $2,174 towards to the consultant costs.

- [ ] The City is interested in more information.

- [ ] No, the City is not interested in participating; please issue a reimbursement payment of $2,174.

Please sign below and return this form via fax or email to the contacts listed below or mail using the enclosed envelope **no later than Monday, January 14th, 2013.**

Fax Number: (626) 457-1285
Email Address: csims@sgvcog.org

Name Michelle Keith

Title City Manager

Signature

Date 1/14/13

Attachment 1

Intent to Participate

The City of Duarte is interested in obtaining a technical assistance consultant for to assist with implementation efforts related to the new National Pollutant Discharge Elimination System Municipal Separate Sanitary Storm Sewer (MS4 NPDES Permit). The San Gabriel Valley Council of Governments is requesting permission to use your existing funding balance of $2,174 to fund this consultant. Below I have indicated my City's interest in participating.

☒ Yes, the City is interested in participating and you may use our existing funding balance of $2,174 towards to the consultant costs.

☐ The City is interested in more information.

☐ No, the City is not interested in participating; please issue a reimbursement payment of $2,174.

Please sign below and return this form via fax or email to the contacts listed below or mail using the enclosed envelope **no later than Monday, January 14th, 2013.**

Fax Number: (626) 457-1285
Email Address: csims@sgvcog.org

Name	Rafael O. Casillas, PE
Title	Public Works Manager
Signature	Rafael O Casillas
Date	January 14, 2013

Attachment 1

Intent to Participate

The City of Monrovia is interested in obtaining a technical assistance consultant for to assist with implementation efforts related to the new National Pollutant Discharge Elimination System Municipal Separate Sanitary Storm Sewer (MS4 NPDES Permit). The San Gabriel Valley Council of Governments is requesting permission to use your existing funding balance of $2,174 to fund this consultant. Below I have indicated my City's interest in participating.

- [x] Yes, the City is interested in participating and you may use our existing funding balance of $2,174 towards to the consultant costs.

- [ ] The City is interested in more information.

- [ ] No, the City is not interested in participating; please issue a reimbursement payment of $2,174.

Please sign below and return this form via fax or email to the contacts listed below or mail using the enclosed envelope **no later than Monday, January 14th, 2013.**

Fax Number: (626) 457-1285
Email Address: csims@sgvcog.org

Name Ron Bow

Title Director of Public Works

Signature

Date 1/14/2013

Intent to Participate

The City of Sierra Madre is interested in obtaining a technical assistance consultant for to assist with implementation efforts related to the new National Pollutant Discharge Elimination System Municipal Separate Sanitary Storm Sewer (MS4 NPDES Permit). The San Gabriel Valley Council of Governments is requesting permission to use your existing funding balance of $2,174 to fund this consultant. Below I have indicated my City's interest in participating.

- [x] Yes, the City is interested in participating and you may use our existing funding balance of $2,174 towards to the consultant costs.

- [ ] The City is interested in more information.

- [ ] No, the City is not interested in participating; please issue a reimbursement payment of $2,174.

Please sign below and return this form via fax or email to the contacts listed below or mail using the enclosed envelope **no later than Monday, January 14th, 2013.**

Fax Number: (626) 457-1285
Email Address: csims@sgvcog.org

Name	Elaine I. Aguilar
Title	City Manager
Signature	
Date	January 14, 2013

Attachment 4.

AGREEMENT FOR CONSULTANT SERVICES

This Agreement for Consultant Services ("Agreement"), is made and entered into this ___ day of February 2013 ("Effective Date"), by and between the San Gabriel Valley Council of Governments ("SGVCOG") and Larry Walker Associates, Inc. ("Consultant").

In consideration of the mutual covenants and conditions set forth herein, the parties agree as follows:

1. Term of Agreement.

Subject to the provisions of Section 17, the term of this Agreement shall be from the Effective Date through June 30, 2013. Such term may be extended upon written agreement of both parties to this Agreement.

2. Scope of Services.

Consultant shall provide the SGVCOG consultant services in accordance with the proposal attached hereto as Exhibit "A" and incorporated herein by reference. The SGVCOG shall determine within the term of this Agreement whether it will direct Consultant to perform the Optional Task identified in Exhibit A. Consultant shall not be compensated for any services rendered in connection with its performance of this Agreement, which are in addition to or outside of those described in this Section 2, unless such additional services are authorized in advance and in writing by the SGVCOG. Consultant shall be compensated for any such additional authorized services in the amounts and in the manner agreed to in writing by the SGVCOG.

3. Compensation and Method of Payment.

(a) The total compensation to be paid to Consultant pursuant to this Agreement shall not exceed $52,690. Consultant shall be compensated in the manner and in the amounts specified in Exhibit A.

(b) Each month Consultant shall furnish to SGVCOG an original invoice for all work performed and expenses incurred during the preceding month. SGVCOG shall independently review each invoice submitted by the Consultant to determine whether the work performed and expenses incurred are in compliance with the provisions of this Agreement. In the event that no charges or expenses are disputed, the invoice shall be approved and paid according to the terms set forth in subsection (c). In the event any charges or expenses are disputed by SGVCOG, SGVCOG shall withhold that portion of the invoice that is in dispute and remit the remainder.

(c) Except as to any charges for work performed or expenses incurred by Consultant to the extent disputed by SGVCOG, SGVCOG will use its best efforts to cause Consultant to be paid within thirty (30) days of receipt of Consultant's invoice.

4. Consultant's Books and Records.

Consultant shall maintain any and all documents and records demonstrating or relating to Consultant's performance of services pursuant to this Agreement. Consultant shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, or other documents or records evidencing or relating to work, services, expenditures and disbursements charged to SGVCOG pursuant to this Agreement. Any and all such documents or records shall be maintained in accordance with generally accepted accounting principles and shall be sufficiently complete and detailed so as to permit an accurate evaluation of the services provided by Consultant pursuant to this Agreement. Any and all such documents or records shall be maintained for three years from the date of execution of this Agreement and to the extent required by laws relating to audits of public agencies and their expenditures.

5. Ownership of Documents

All original maps, models, designs, drawings, photographs, studies, survey, reports, data, notes, computer files, files and other documents prepared, developed or discovered by Consultant in the course of providing any services pursuant to this Agreement shall be the sole property of the SGVCOG and may be used, reused or otherwise disposed of by the SGVCOG without the permission of the Consultant. Upon satisfactory completion of, or in the event of expiration, termination, suspension, or abandonment of this Agreement, Consultant shall turn over to SGVCOG all such maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents which Consultant may have temporarily retained for use by Consultant staff. With respect to computer files, Consultant shall make available to the SGVCOG, upon reasonable written request by the SGVCOG, the necessary computer software and hardware for purposes of accessing, compiling, transferring and printing computer files.

6. Status of Consultant.

(a) Consultant is and shall at all times remain a wholly independent contractor and not an officer, employee or agent of SGVCOG. Consultant shall have no authority to bind SGVCOG in any manner, nor to incur any obligation, debt or liability of any kind on behalf of or against SGVCOG, whether by contract or otherwise, unless such authority is expressly conferred under this Agreement or is otherwise expressly conferred in writing by SGVCOG.

(b) The personnel performing the services under this Agreement on behalf of Consultant shall at all times be under Consultant's exclusive direction and control. Neither SGVCOG, nor any elected or appointed boards, officers, officials, employees, members or agents of SGVCOG, shall have control over the conduct of Consultant or any of Consultant's officers, employees or agents, except as set forth in this Agreement. Consultant shall not at any time or in any manner represent that Consultant or any of Consultant's officers, employees or agents are in any manner officials, officers, employees, members or agents of SGVCOG.

(c) Neither Consultant, nor any of Consultant's officers, employees or agents, shall obtain any rights to retirement, health care or any other benefits which may otherwise accrue to SGVCOG's employees. Consultant expressly waives any claim Consultant may have to any such rights.

7. Deficient Services.

Consultant represents and warrants that it has the qualifications, experience and facilities necessary to properly perform the services required under this Agreement in a thorough, competent and professional manner. Consultant shall at all times faithfully, competently and to the best of its ability, experience and talent, perform all services described herein. In meeting its obligations under this Agreement, Consultant shall employ, at a minimum, generally accepted standards and practices utilized by persons engaged in providing services similar to those required of Consultant under this Agreement. SGVCOG may disapprove services that do not conform to these standards and practices and may withhold or deny compensation for deficient services. Upon disapproval of services by SGVCOG, Consultant shall immediately re-perform, at its own costs, the services that are deficient. SGVCOG must notify Consultant in writing of the existence of such deficient services within a reasonable time, not to exceed sixty (60) days after its discovery thereof, but in no event later than one (1) year after the completion of such deficient services. No approval, disapproval, or omission to provide approval or disapproval shall release Consultant from any responsibility under this Agreement.

8. Compliance With Applicable Laws; Permits and Licenses.

Consultant shall keep itself informed of and comply with all applicable federal, state and local laws, statutes, codes, ordinances, regulations and rules in effect during the term of this Agreement. Consultant shall obtain any and all licenses, permits and authorizations necessary to perform the services set forth in this Agreement. Neither SGVCOG, nor any elected or appointed boards, officers, officials, employees, members or agents of SGVCOG, shall be liable, at law or in equity, as a result of any failure of Consultant to comply with this Section 8.

9. Nondiscrimination.

Consultant shall not discriminate in any way against any person on the basis of race, color, religious creed, national origin, ancestry, sex, age, physical handicap, pregnancy, medical condition or marital status in connection with or related to the performance of this Agreement.

10. Unauthorized Aliens.

Consultant hereby promises and agrees to comply with all of the provisions of the Federal Immigration and Nationality Act, 8 U.S.C.A. §§ 1101, et seq., as amended, and in connection therewith, shall not employ unauthorized aliens as defined therein. Should Consultant so employ such unauthorized aliens for the performance of work and/or services covered by this Agreement, and should any liability or sanctions be imposed against SGVCOG for such use of unauthorized aliens, Consultant hereby agrees to and shall reimburse SGVCOG for the cost of all such liabilities or sanctions imposed, together with any and all costs, including reasonable attorney fees, incurred by SGVCOG.

11. Conflicts of Interest

Consultant covenants that neither it, nor any officer or principal of its firm, has or shall acquire any interest, directly or indirectly, (but not including ownership of stock in a publicly traded company), which would conflict in any manner with the interests of SGVCOG or which would in any way hinder Consultant's performance of services under this Agreement. Consultant further covenants that in the performance of this Agreement, no person having any such interest shall be employed by it as an officer, employee, agent or subcontractor without the express written consent of the SGVCOG. Consultant agrees to at all times avoid conflicts of interest or the appearance of any conflicts of interest with the interests of SGVCOG in the performance of this Agreement.

12. Confidential Information; Release of Information.

(a) All information gained or work product produced by Consultant in performance of this Agreement shall be considered confidential, unless such information is in the public domain or already known to Consultant. Consultant shall not release or disclose any such information or work product to persons or entities other than SGVCOG without prior written authorization from the SGVCOG, except as may be required by law. Consultant, its officers, employees, agents or subcontractors, shall not, without so approved in writing by the SGVCOG. Consultant agrees to provide SGVCOG with copies of required policies or certificates evidencing the required policies upon request.

(b) Consultant shall provide and maintain insurance acceptable to the SGVCOG in full force and effect throughout the term of this Agreement, against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by Consultant, its agents, representatives or employees. Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII. Consultant shall provide the following scope and limits of insurance:

(1) Minimum Scope of Insurance. Coverage shall be at least as broad as:

A. Insurance Services Office form Commercial General Liability coverage (Occurrence Form CG 0001).

B. Insurance Services Office form number CA 0001 (Ed. 1/87) covering Automobile Liability, including code 1 "any auto" and endorsement CA 0025, or equivalent forms subject to the written approval of the SGVCOG.

C. Workers' Compensation insurance as required by the Labor Code of State of California and Employer's Liability insurance and covering all persons providing services on behalf of the Consultant and all risks to such persons under this Agreement.

D. Errors and omissions liability insurance appropriate to the Consultant's profession.

(2) Limits of Insurance. Consultant shall maintain limits of insurance no less than:

A. General Liability: $1,000,000 general aggregate for bodily injury, personal injury and property damage.

B. Automobile Liability: $1,000,000 per accident for bodily injury and property damage.

C. Workers' Compensation and Employer's Liability: Workers' Compensation as required by the Labor Code of the State of California and Employers Liability limits of $1,000,000 per accident.

D. Errors and Omissions Liability: $1,000,000 per claim and aggregate.

(c) Other Provisions. Insurance policies required by this Agreement shall contain the following provisions:

(1) All Policies. Each insurance policy required by this Section 13 shall be endorsed and state the coverage shall not be cancelled by the insurer or Consultant except after 30 days' prior written notice by Certified mail, return receipt requested, has been given to SGVCOG. Consultant shall provide to SGVCOG notice of suspension or voiding of coverage, or reduction in coverage, or limits below those required in this Section 14.

(2) General Liability and Automobile Liability Coverages.

A. SGVCOG, and its respective elected and appointed officers, officials, members and employees are to be covered as additional insureds as respects: liability arising out of activities Consultant performs; products and completed operations of Consultant; premises owned, occupied or used by Consultant; or automobiles owned, leased, hired or borrowed by Consultant. The coverage shall contain no special limitations on the scope of protection afforded to SGVCOG, and its respective elected and appointed officers, officials, members or employees.

B. Consultant's insurance coverage shall be primary insurance with respect to SGVCOG, and its respective elected and appointed officials, its officers, members and employees. Any insurance or self insurance maintained by SGVCOG, and its respective elected and appointed officers, officials, members or employees, shall apply in excess of, and not contribute with, Consultant's insurance.

C. Consultant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

D. Any failure to comply with the reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to SGVCOG, and its respective elected and appointed officers, officials, members or employees.

(3) Workers' Compensation and Employer's Liability Coverage. Unless the SGVCOG otherwise agrees in writing, the insurer shall agree to waive all rights of subrogation against SGVCOG, and its respective elected and appointed officers, officials, members and employees for losses arising from services performed by Consultant.

(d) Other Requirements. Consultant agrees to deposit with SGVCOG, at or before the effective date of this contract, certificates of insurance necessary to satisfy SGVCOG that Consultant has complied with the insurance provisions of this Agreement. The SGVCOG's general counsel may require that Consultant furnish SGVCOG with copies of original endorsements effecting coverage required by this Section. The certificates and endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. SGVCOG reserves the right to inspect complete, certified copies of all required insurance policies, at any time.

(1) Consultant shall furnish certificates and endorsements from each subcontractor identical to those Consultant provides.

(2) Any deductibles or self-insured retentions must be declared to and approved by SGVCOG, such approval not to be unreasonably withheld.

(3) The procuring of such required policy or policies of insurance shall not be construed to limit Consultant's liability hereunder nor to fulfill the indemnification provisions and requirements of this Agreement.

15. Assignment.

The expertise and experience of Consultant are material considerations for this Agreement. SGVCOG has an interest in the qualifications of and capability of the persons and entities who will fulfill the duties and obligations imposed upon Consultant under this Agreement. In recognition of that interest, Consultant shall not assign or transfer this Agreement or any portion of this Agreement or the performance of any of Consultant's duties or obligations under this Agreement without the prior written consent of the SGVCOG. Any attempted assignment shall be ineffective, null and void, and shall constitute a material breach of this Agreement entitling SGVCOG to any and all remedies at law or in equity, including summary termination of this Agreement.

16. Continuity of Personnel.

Consultant may not replace key staff, set forth in Consultant's Proposal, unless their employment is terminated or their replacement is agreed upon by the SGVCOG. The SGVCOG must approve replacement staff before the replacement staff are assigned to perform services under this Agreement. SGVCOG reserves the right to request that Consultant replace a staff person assigned to perform services under this Agreement in the event the SGVCOG, in its sole discretion, determines such a replacement is necessary. Replacement staff in every case are subject to SGVCOG approval prior to assignment to perform services under this Agreement.

17. Termination of Agreement.

SGVCOG may terminate this Agreement, with or without cause, at any time by giving thirty (30) days written notice of termination to Consultant. In the event such notice is given, Consultant shall cease immediately all work in progress. Consultant may terminate this Agreement at any time upon thirty (30) days written notice of termination to SGVCOG. If either Consultant or SGVCOG fail to perform any material obligation under this Agreement, then, in addition to any other remedies, either Consultant, or SGVCOG may terminate this Agreement immediately upon written notice. Upon termination of this Agreement, Consultant shall furnish to SGVCOG a final invoice for work performed and expenses incurred by Consultant, prepared as set forth in Section 3 of this Agreement. This final invoice shall be reviewed and paid in the same manner as set forth in Section 3 of this Agreement.

18. Default.

In the event that Consultant is in default under the terms of this Agreement, the SGVCOG shall not have any obligation or duty to continue compensating Consultant for any work performed after the date of default and may terminate this Agreement immediately by written notice to the Consultant. For purposes of this section only, "date of default" shall be deemed to be the date that SGVCOG personally delivers or transmits by facsimile a Notice of Default to the person(s) at the address or facsimile number as set forth in Section 19 of this Agreement. "Default" shall mean the failure to perform the terms, covenants or conditions of this Agreement.

19. Notices.

All notices required or permitted to be given under this Agreement shall be in writing and shall be personally delivered, or sent by facsimile or certified mail, postage prepaid and return receipt requested, addressed as follows:

To SGVCOG:

Francis Delach
Interim Executive Director
San Gabriel Valley Council of Governments
The Alhambra
1000 South Fremont Avenue, Unit #42
Building A-10, Suite 10220
Alhambra, CA 91803

with a copy to:

Richard D. Jones
General Counsel
San Gabriel Valley Council of Governments
Jones & Mayer
3777 N. Harbor Blvd
Fullerton, CA 92835

To Consultant:

Larry Walker Associates, Inc.
720 Wilshire Blvd, Suite 204
Santa Monica, CA 90401
Attention: Malcolm Walker

Notice shall be deemed effective on the date personally delivered or transmitted by facsimile or, if mailed, three (3) days after deposit of the same in the custody of the United States Postal Service.

20. Authority To Execute.

The person or persons executing this Agreement on behalf of Consultant represents and warrants that he/she/they has/have the authority to so execute this Agreement and to bind Consultant to the performance of its obligations hereunder.

21. Binding Effect.

This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties.

22. Waiver.

Waiver by any party to this Agreement of any term, condition, or covenant of this Agreement shall not constitute a waiver of any other term, condition, or covenant. Waiver by any party of any breach of the provisions of this Agreement shall not constitute a waiver of any other provision, nor a waiver of any subsequent breach or violation of any provision of this Agreement. Acceptance by SGVCOG of any work or services by Consultant shall not constitute a waiver of any of the provisions of this Agreement.

23. Law To Govern; Venue.

This Agreement shall be interpreted, construed and governed according to the laws of the State of California. In the event of litigation between the parties, venue in state trial courts shall lie exclusively in the County of Los Angeles. In the event of litigation in a U.S. District Court, venue shall lie exclusively in the Central District of California, in Los Angeles.

24. Attorney Fees, Costs and Expenses.

In the event litigation or other proceeding is required to enforce or interpret any provision of this Agreement, the prevailing party in such litigation or other proceeding shall be entitled to an award of reasonable attorney fees, costs and expenses, in addition to any other relief to which it may be entitled.

25. Entire Agreement.

This Agreement, including the attached Exhibit "A" which is incorporated herein by this reference, is the entire, complete, final and exclusive expression of the parties with respect to the matters addressed therein and supersedes all other agreements or understandings, whether oral or written, or entered into between Consultant and SGVCOG prior to the execution of this Agreement. No statements, representations or other agreements, whether oral or written, made by any party which are not embodied herein shall be valid and binding. No amendment to this Agreement shall be valid and binding unless in writing duly executed by the parties or their authorized representatives. Any attempt to waive the requirement for a written amendment shall be void.

26. Section Headings.

The section headings contained in this Agreement are for convenience and identification only and shall not be deemed to limit or define the contents to which they relate.

27. Severability.

If any term, condition or covenant of this Agreement is declared or determined by any court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions of this Agreement shall not be affected thereby and the Agreement shall be read and construed without the invalid, void or unenforceable provision(s).

28. Time is of the Essence.

Time is of the essence in the performance of this Agreement.

29. Excusable Delays.

Consultant shall not be liable for damages, including liquidated damages, if any, caused by delay in performance or failure to perform due to causes beyond the control of Consultant. Such causes include, but are not limited to, acts of God, acts of the public enemy, acts of federal, state or local governments, court orders, fires, floods, epidemics, strikes, embargoes, and unusually severe weather. The term and price of this Agreement shall be equitably adjusted for any delays due to such causes.

Attachment 4.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed the day and year first above written.

LARRY WALKER ASSOCIATES, INC.

By Malcolm Walker

Title Vice President

SAN GABRIEL VALLEY COUNCIL OF GOVERNMENTS

By [signature]

Title Interim Executive Director

APPROVED AS TO FORM:

[signature]

Richard D. Jones, General Counsel

MEMORANDUM

Public Works Services Department

DATE: June 25, 2013

TO: MS4 NPDES Permit File

FROM: Vanessa Hevener, Environmental Services Officer

SUBJECT: **Draft Low Impact Development Ordinance and Draft Green Streets Policy Status**

This memo is to document that the Draft LID Ordinance and Draft Green Streets Policy developed by Larry Walker and Associates on behalf of the LA Permit Group have been distributed via email on April 24, 2013 to key personnel in the Development Services Department for discussion. A meeting has been tentative scheduled in July/August 2013 with staff in both Public Works Services and Development Services Departments.

City of Arcadia

Public Works Services Department

Tom Tait
Public Works Services Director

Please note: *Gray shading in the draft LID Ordinance indicates areas that are optional and/or areas where the City may wish to provide more detail.*

ORDINANCE NO.______________________

An ordinance amending [MUNICIPAL CODE SECTION REFERENCE(S)] of the [CITY NAME] Municipal Code to expand the applicability of the existing [NAME OF POST-CONSTRUCITON REQUIREMENTS – LIKELY “SUSMP” FOR MOST MUNICIPALITIES] requirements by imposing Low Impact Development (LID) strategies on projects that require building permits and/or encroachment permits.

Findings.

(A) The [CITY NAME] is authorized by Article XI, §5 and §7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity.

(B) The [CITY NAME] has authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity which might degrade the quality of waters of the State.

(C) The city is a permittee under the “Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4,” issued by the California Regional Water Quality Control Board--Los Angeles Region,” (Order No. R4-2012-0175) which also serves as an NPDES Permit under the Federal Clean Water Act (NPDES No. CAS004001), as well as Waste Discharge Requirements under California law (the “Municipal NPDES permit”). In order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program, the Municipal NPDES permit requires permittees to develop and implement a LID Ordinance.

(D) The [CITY NAME] has applied an integrated approach to incorporate wastewater, stormwater and runoff, and recycled water management into a single strategy through its Integrated Resources Plan.

(E) The [CITY NAME] is committed to a stormwater management program that protects water quality and water supply by employing watershed-based approaches that balance environmental, social, and economic considerations.

11800 Goldring Road
Post Office Box 60021
Arcadia, CA 91066-6021
(626) 256-6554
(626) 359-7028 Fax
www.ci.arcadia.ca.us

(F) Urbanization has led to increased impervious surface areas resulting in increased water runoff causing the transport of pollutants to downstream receiving waters.

(G) The [CITY NAME] needs to take a new approach to managing rainwater and urban runoff while mitigating the negative impacts of development and urbanization.

(H) LID is widely recognized as a sensible approach to managing the quantity and quality of storm water and non-stormwater runoff by setting standards and practices to maintain or restore the natural hydrologic character of a development site, reduce off-site runoff, improve water quality, and provide groundwater recharge.

(I) It is the intent of the [CITY NAME] to replace the existing Standard Urban Stormwater Mitigation Plan (SUSMP) requirements by providing stormwater and rainwater LID strategies for Development and Redevelopment projects as defined under "Applicability." Where there are conflicts between this Ordinance and previously adopted SUSMP or LID Manuals, the standards in this Ordinance shall prevail.

[MUNICIPAL CODE SECTION REFERENCE(S)] of the [CITY NAME] Municipal Code is amended in its entirety to read as follows:

Definitions.

Except as specifically provided herein, any term used in this [SECTION REFERENCE] shall be defined as that term in the current Municipal NPDES permit, or if it is not specifically defined in either the Municipal NPDES permit, then as such term is defined in the Federal Clean Water Act, as amended, and/or the regulations promulgated thereunder. If the definition of any term contained in this chapter conflicts with the definition of the same term in the current Municipal NPDES permit, then the definition contained in the Municipal NPDES permit shall govern. The following words and phrases shall have the following meanings when used in this chapter:

Automotive Service Facility means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5541, 5511, provided that these facilities have no outside activities or materials that may be exposed to stormwater (Source: Order No. R4-2012-0175).

Basin Plan means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments (Source: Order No. R4-2012-0175).

Best Management Practice (BMP) means practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water (Source: Order No. R4-2012-0175).

Biofiltration means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales (Modified from: Order No. R4-2012-0175).

Bioretention means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in the Municipal NPDES permit, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by the Municipal NPDES permit as biofiltration (Modified from: Order No. R4-2012-0175).

Bioswale means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes (Source: Order No. R4-2012-0175).

City means the [CITY NAME].

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

Commercial Malls means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers (Source: Order No. R4-2012-0175).

Construction Activity means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that result in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See “Routine Maintenance” definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan (Source: Order No. R4-2012-0175).

Control means to minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities (Source: Order No. R4-2012-0175).

Development means construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Directly Adjacent means situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area (Source: Order No. R4-2012-0175).

Discharge means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

Disturbed Area means an area that is altered as a result of clearing, grading, and/or excavation (Source: Order No. R4-2012-0175).

Flow-through BMPs means modular, vault type “high flow biotreatment” devices contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain (Modified from: Order No. R4-2012-0175).

General Construction Activities Storm Water Permit (GCASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from construction activities under certain conditions.

General Industrial Activities Storm Water Permit (GIASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

Green Roof means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain (Source: Order No. R4-2012-0175).

Hazardous Material(s) means any material(s) defined as hazardous by Division 20, Chapter 6.95 of the California Health and Safety Code.

Hillside means a property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes (Source: Order No. R4-2012-0175).

Hydromodification means the alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. Hydromodification can cause excessive erosion and/or sedimentation rates, causing excessive turbidity, channel aggradation and/or degradation. (Source: GCASP)

Impervious Surface means any man-made or modified surface that prevents or significantly reduces the entry of water into the underlying soil, resulting in runoff from the surface in greater quantities and/or at an increased rate, when compared to natural conditions prior to development. Examples of places that commonly exhibit impervious surfaces include parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from paving, compacted gravel, compacted earth, and oiled earth.

Industrial Park means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry (Source: Order No. R4-2012-0175).

Infiltration BMP means a LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement (Source: Order No. R4-2012-0175).

LID means Low Impact Development. LID consists of building and landscape features designed to retain or filter stormwater runoff (Source: Order No. R4-2012-0175).

MS4 means Municipal Separate Storm Sewer System (MS4). The MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a combined sewer; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

(40 CFR § 122.26(b)(8)) (Source: Order No. R4-2012-0175)

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405. The term includes an "approved program" (Source: Order No. R4-2012-0175).

Natural Drainage System means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system (Source: Order No. R4-2012-0175).

New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision (Source: Order No. R4-2012-0175).

Non-Stormwater Discharge means any discharge to a municipal storm drain system that is not composed entirely of stormwater (Source: Order No. R4-2012-0175).

Parking Lot means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces (Source: Order No. R4-2012-0175).

Person means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, state, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine and the singular shall include the plural where indicated by the context.

Planning Priority Projects means development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s) (Modified from: Order No. R4-2012-0175).

Pollutant means any "pollutant" defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Sec. 13373. Pollutants may include, but are not limited to the following:

(1) Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash, and sludge).

(2) Metals (such as cadmium, lead, zinc, copper, silver, nickel, chromium, and non- metals such as phosphorus and arsenic).

(3) Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants, and grease).

(4) Excessive eroded soil, sediment, and particulate materials in amounts that may adversely affect the beneficial use of the receiving waters, flora, or fauna of the State.

(5) Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables, and show facilities).

(6) Substances having characteristics such as pH less than 6 or greater than 9, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus.

Project means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code §21065) (Source: Order No. R4-2012-0175).

Rainfall Harvest and Use means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department (Source: Order No. R4-2012-0175).

Receiving Water means “water of the United States” into which waste and/or pollutants are or may be discharged (Source: Order No. R4-2012-0175).

Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Regional Board means the California Regional Water Quality Control Board, Los Angeles Region.

Restaurant means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812) (Source: Order No. R4-2012-0175).

Retail Gasoline Outlet means any facility engaged in selling gasoline and lubricating oils (Source: Order No. R4-2012-0175).

Routine Maintenance

Routine maintenance projects include, but are not limited to projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.

3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.
4. Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
5. Repair leaks

Routine maintenance does not include construction of new** lines or facilities resulting from
compliance with applicable codes, standards and regulations.

* Update existing lines includes replacing existing lines with new materials or pipes.

** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines (Source: Order No. R4-2012-0175).

Significant Ecological Areas (SEAs) means an area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.
2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.
3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.
4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.
5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.
6. Areas important as game species habitat or as fisheries.
7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.
8. Special areas (Source: Order No. R4-2012-0175).

Site means land or water area where any “facility or activity” is physically located or conducted, including adjacent land used in connection with the facility or activity (Source: Order No. R4-2012-0175).

Storm Drain System means any facilities or any part of those facilities, including streets, gutters, conduits, natural or artificial drains, channels, and watercourses that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the [CITY NAME].

Storm Water or Stormwater means water that originates from atmospheric moisture (rain or snow) and that falls onto land, water, or other surfaces. Without any change in its meaning, this term may be spelled or written as one word or two separate words.

Stormwater Runoff means that part of precipitation (rainfall or snowmelt) which travels across a surface to the storm drain system or receiving waters.

SUSMP means the Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP was required as part of the previous Municipal NPDES Permit (Order No. 01-182, NPDES No. CAS004001) and required plans that designate best management practices (BMPs) that must be used in specified categories of development projects.

Urban Runoff means surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial, or industrial activities involving the use of potable and non-potable water.

[MUNICIPAL CODE SECTION REFERENCE(S)] is amended to read as follows:

SEC. [X]. STORMWATER POLLUTION CONTROL MEASURES FOR DEVELOPMENT PLANNING AND CONSTRUCTION ACTIVITIES

(A) Objective. The provisions of this section contain requirements for construction activities and facility operations of Development and Redevelopment projects to comply with the current "Municipal NPDES permit," lessen the water quality impacts of development by using smart growth practices, and integrate LID design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use. LID shall be inclusive of previously adopted SUSMP requirements.

(B) Scope. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment projects and authorizes the [CITY NAME] to further define and adopt stormwater pollution control measures, to develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies, and to grant waivers or alternate compliance as allowed by the Municipal NPDES permit and collect fees from projects granted exceptions. . Except as otherwise provided herein, the [CITY NAME] shall administer, implement and enforce the provisions of this Section. Guidance documents supporting implementation of requirements in this Ordinance are hereby incorporated by reference, including SUSMP and LID Manuals.

(C) Applicability. The following Development and Redevelopment projects, termed "Planning Priority Projects," shall comply with the requirements of [SECTION NUMBER]:

(1) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.

(2) Industrial parks 10,000 square feet or more of surface area.

(3) Commercial malls 10,000 square feet or more of surface area.

(4) Retail gasoline outlets with 5,000 square feet or more of surface area.

(5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of surface area.

(6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.

(7) Streets and roads construction of 10,000 square feet or more of impervious surface area.

(8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.

(9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will:

a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and

b. Create 2,500 square feet or more of impervious surface area

(10) Single-family hillside homes.

(11) Redevelopment Projects

a. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.

b. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.

c. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

d. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

e. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

(12) Any other project as deemed appropriate by the Director.

(D) Effective Date. The Planning and Land Development requirements contained in this Ordinance shall become effective XX days from the adoption of the Ordinance. This includes Planning Priority Projects that are discretionary permit projects or project phases that have not been deemed complete for processing, or discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals within 90 days of adoption of the Ordinance. Projects that have been deemed complete within 90 days of adoption of the Ordinance are not subject to the requirements of this Chapter.

(E) **Stormwater Pollution Control Requirements.** The Site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

(1) A new single-family hillside home development shall include mitigation measures to:

a. Conserve natural areas;

b. Protect slopes and channels;

c. Provide storm drain system stenciling and signage;

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and

e. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.

(2) Street and road construction of 10,000 square feet or more of impervious surface shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) to the maximum extent practicable.

(3) The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:

a. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

i. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

ii. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

b. Minimize hydromodification impacts to natural drainage systems as defined in the Municipal NPDES Permit. Hydromodification requirements are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

c. When, as determined by the [APPROVING AGENCY], 100 percent onsite retention of the SWQDv is technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted LID Plan. The technical infeasibility may result from conditions that may include, but are not limited to:

i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.

ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;

iii. Locations within 100 feet of a groundwater well used for drinking water;

iv. Brownfield development sites or other locations where pollutant mobilization is a documented concern;

v. Locations with potential geotechnical hazards;

vi. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

d. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the Municipal NPDES Permit.

i. Additional alternative compliance options such as offsite infiltration may be available to the project Site. The project Site should contact the [APPROVING AGENCY] to determine eligibility. Alternative compliance options are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

e. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per the Municipal NPDES Permit.

Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

i. 0.2 inches per hour, or
ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

f. A Multi-Phased Project may comply with the standards and requirements of this section for all of its phases by: (a) designing a system acceptable to the [APPROVING AGENCY] to satisfy these standards and requirements for the entire Site during the first phase, and (b) implementing these standards and requirements for each phase of Development or Redevelopment of the Site during the first phase or prior to commencement of construction of a later phase, to the extent necessary to treat the stormwater from such later phase. For purposes of this section, "Multi-Phased Project" shall mean any Planning Priority Project implemented over more than one phase and the Site of a Multi-Phased Project shall include any land and water area designed and used to store, treat or manage stormwater runoff in connection with the Development or Redevelopment, including any tracts, lots, or parcels of real property, whether Developed or not, associated with, functionally connected to, or under common ownership or control with such Development or Redevelopment.

(E) Other Agencies of the [CITY NAME]. All [CITY NAME] departments, offices, entities and agencies, shall establish administrative procedures necessary to implement the provisions of this Article on their Development and Redevelopment projects and report their activities annually to the [REPSONSIBLE AGENCY].

(F) Validity. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance are declared to be severable.

(G) Certification. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy.

I hereby certify that this ordinance was passed by the Council of the [CITY NAME], at its meeting of ______________________.

[NAME], City Clerk

By ____________________________
Deputy

Approved _______________________

____
Mayor

Approved as to Form and Legality
[NAME], City Attorney

By _______________________________________
[NAME]
Deputy City Attorney

Date _____________________________

File No. __________________________

City of
Arcadia

Public Works
Services
Department

Tom Tait
Public Works Services Director

Green Street Policy

Purpose

The City of [INSERT CITY NAME] [DEPARTMENT OF PUBLIC WORKS] shall implement green street BMPs for transportation corridors associated with new and redevelopment street and roadway projects, including Capital Improvement Projects (CIPs). This policy is enacted to demonstrate compliance with the NPDES MS4 Permit for the Los Angeles Region (Order No. R4-2012-0175).

Green streets are an amenity that provides many benefits including water quality improvement, groundwater replenishment, creation of attractive streetscapes, creation of parks and wildlife habitats, and pedestrian and bicycle accessibility. Green streets are defined as right-of-way areas that incorporate infiltration, biofiltration, and/or storage and use BMPs to collect, retain, or detain stormwater runoff as well as a design element that creates attractive streetscapes.

Policy

A. Application. The [DEPARTMENT OF PUBLIC WORKS] shall require new development and/or redevelopment streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs. Transportation corridors projects are major arterials as defined in the [CITY'S] General Plan which add at least 10,000 square feet of impervious surface. Routine maintenance or repair and linear utility projects are excluded from these requirements. Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained.

Alternate A (without General Plan reference).

Application. The [DEPARTMENT OF PUBLIC WORKS] shall require new development and/or redevelopment streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs. Transportation corridors projects are roadway projects that add at least 10,000 square feet of impervious surface. Routine maintenance or repair and linear utility projects are excluded from these requirements. Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained.

Alternatives to the 10,000 sf threshold: Use other mechanism in lieu of the 10,000 sf of impervious area to determine threshold for green streets requirements.

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Post Office Box 60021
Arcadia, CA 91066-6021
(626) 256-6554
(626) 359-7028 Fax
www.ci.arcadia.ca.us

As an example, City of Santa Monica utilizes construction costs (>$500,000) as the trigger for green street BMPs. Another option would be to establish a threshold of either the 10,000 sf impervious area or construction cost >$500,000 whichever is smaller.
Alternatives to the major arterial: Use another General Plan defined street classification, such as secondary arterials, and define the transportation corridor as all that type of street and larger arterials.

B. Amenities. The [DEPARTMENT OF PUBLIC WORKS] shall consider opportunities to replenish groundwater, create attractive streetscapes, create parks and wildlife habitats, and provide pedestrian and bicycle accessibility through new development and redevelopment of streets and roadway projects and CIPs.

C. Guidance. The [DEPARTMENT OF PUBLIC WORKS] shall use the City of Los Angeles Green Streets guidance, USEPA's *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets*[1], or equivalent guidance developed by the [DEPARTMENT OF PUBLIC WORKS] for use in public and private developments.

D. Retrofit Scope. The [DEPARTMENT OF PUBLIC WORKS] shall use the City's Watershed Management Program or Enhanced Watershed Management Program to identify opportunities for green street BMP retrofits. Final decisions regarding implementation will be determined by the [CITY ENGINEER] based on the availability of adequate funding.

E. Training. The [DEPARTMENT OF PUBLIC WORKS] shall incorporate aspects of green streets into internal annual staff trainings.

[1] EPA-833-F-08-009, December 2008.

DRAFT LID ORDINANCE

ORDINANCE NO.________________________

An ordinance amending [MUNICIPAL CODE SECTION REFERENCE(S)] of the City of Azusa Municipal Code to expand the applicability of the existing [NAME OF POST-CONSTRUCITON REQUIREMENTS – LIKELY "SUSMP" FOR MOST MUNICIPALITIES] requirements by imposing Low Impact Development (LID) strategies on projects that require building permits and/or encroachment permits.

Findings.

(A) The City of Azusa is authorized by Article XI, §5 and §7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity.

(B) The City of Azusa has authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity which might degrade the quality of waters of the State.

(C) The city is a permittee under the "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4," issued by the California Regional Water Quality Control Board--Los Angeles Region," (Order No. R4-2012-0175) which also serves as an NPDES Permit under the Federal Clean Water Act (NPDES No. CAS004001), as well as Waste Discharge Requirements under California law (the "Municipal NPDES permit"). In order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program, the Municipal NPDES permit requires permittees to develop and implement a LID Ordinance.

(D) The City of Azusa has applied an integrated approach to incorporate wastewater, stormwater and runoff, and recycled water management into a single strategy through its Integrated Resources Plan.

(E) The City of Azusa is committed to a stormwater management program that protects water quality and water supply by employing watershed-based approaches that balance environmental, social, and economic considerations.

(F) Urbanization has led to increased impervious surface areas resulting in increased water runoff causing the transport of pollutants to downstream receiving waters.

(G) The City of Azusa needs to take a new approach to managing rainwater and urban runoff while mitigating the negative impacts of development and urbanization.

(H) LID is widely recognized as a sensible approach to managing the quantity and quality of storm water and non-stormwater runoff by setting standards and practices to maintain or restore the natural hydrologic character of a development site, reduce off-site runoff, improve water quality, and provide groundwater recharge.

(I) It is the intent of the City of Azusa to replace the existing Standard Urban Stormwater Mitigation Plan (SUSMP) requirements by providing stormwater and rainwater LID strategies for Development and Redevelopment projects as defined under "Applicability." Where there are conflicts between this Ordinance and previously adopted SUSMP or LID Manuals, the standards in this Ordinance shall prevail.

[MUNICIPAL CODE SECTION REFERENCE(S)] of the City of Azusa Municipal Code is amended in its entirety to read as follows:

Definitions.

Except as specifically provided herein, any term used in this [SECTION REFERENCE] shall be defined as that term in the current Municipal NPDES permit, or if it is not specifically defined in either the Municipal NPDES permit, then as such term is defined in the Federal Clean Water Act, as amended, and/or the regulations promulgated thereunder. If the definition of any term contained in this chapter conflicts with the definition of the same term in the current Municipal NPDES permit, then the definition contained in the Municipal NPDES permit shall govern. The following words and phrases shall have the following meanings when used in this chapter:

Automotive Service Facility means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5541, 5511, provided that these facilities have no outside activities or materials that may be exposed to stormwater (Source: Order No. R4-2012-0175).

Basin Plan means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments (Source: Order No. R4-2012-0175).

Best Management Practice (BMP) means practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water (Source: Order No. R4-2012-0175).

Biofiltration means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales (Modified from: Order No. R4-2012-0175).

Bioretention means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in the Municipal NPDES permit, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by the Municipal NPDES permit as biofiltration (Modified from: Order No. R4-2012-0175).

Bioswale means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes (Source: Order No. R4-2012-0175).

City means the City of Azusa.

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

Commercial Malls means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers (Source: Order No. R4-2012-0175).

Construction Activity means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that result in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See "Routine Maintenance" definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan (Source: Order No. R4-2012-0175).

Control means to minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities (Source: Order No. R4-2012-0175).

Development means construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Directly Adjacent means situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area (Source: Order No. R4-2012-0175).

Discharge means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

Disturbed Area means an area that is altered as a result of clearing, grading, and/or excavation (Source: Order No. R4-2012-0175).

Flow-through BMPs means modular, vault type "high flow biotreatment" devices contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain (Modified from: Order No. R4-2012-0175).

General Construction Activities Storm Water Permit (GCASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from construction activities under certain conditions.

General Industrial Activities Storm Water Permit (GIASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

Green Roof means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain (Source: Order No. R4-2012-0175).

Hazardous Material(s) means any material(s) defined as hazardous by Division 20, Chapter 6.95 of the California Health and Safety Code.

Hillside means a property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes (Source: Order No. R4-2012-0175).

Hydromodification means the alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. Hydromodification can cause excessive erosion and/or sedimentation rates, causing excessive turbidity, channel aggradation and/or degradation. (Source: GCASP)

Impervious Surface means any man-made or modified surface that prevents or significantly reduces the entry of water into the underlying soil, resulting in runoff from the surface in greater quantities and/or at an increased rate, when compared to natural conditions prior to development. Examples of places that commonly exhibit impervious surfaces include parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from paving, compacted gravel, compacted earth, and oiled earth.

Industrial Park means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry (Source: Order No. R4-2012-0175).

Infiltration BMP means a LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement (Source: Order No. R4-2012-0175).

LID means Low Impact Development. LID consists of building and landscape features designed to retain or filter stormwater runoff (Source: Order No. R4-2012-0175).

MS4 means Municipal Separate Storm Sewer System (MS4). The MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a combined sewer; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

(40 CFR § 122.26(b)(8)) (Source: Order No. R4-2012-0175)

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405. The term includes an "approved program" (Source: Order No. R4-2012-0175).

Natural Drainage System means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system (Source: Order No. R4-2012-0175).

New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision (Source: Order No. R4-2012-0175).

Non-Stormwater Discharge means any discharge to a municipal storm drain system that is not composed entirely of stormwater (Source: Order No. R4-2012-0175).

Parking Lot means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces (Source: Order No. R4-2012-0175).

Person means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, state, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine and the singular shall include the plural where indicated by the context.

Planning Priority Projects means development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s) (Modified from: Order No. R4-2012-0175).

Pollutant means any "pollutant" defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Sec. 13373. Pollutants may include, but are not limited to the following:

(1) Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash, and sludge).

(2) Metals (such as cadmium, lead, zinc, copper, silver, nickel, chromium, and non- metals such as phosphorus and arsenic).

(3) Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants, and grease).

(4) Excessive eroded soil, sediment, and particulate materials in amounts that may adversely affect the beneficial use of the receiving waters, flora, or fauna of the State.

(5) Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables, and show facilities).

(6) Substances having characteristics such as pH less than 6 or greater than 9, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus.

Project means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code §21065) (Source: Order No. R4-2012-0175).

Rainfall Harvest and Use means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department (Source: Order No. R4-2012-0175).

Receiving Water means "water of the United States" into which waste and/or pollutants are or may be discharged (Source: Order No. R4-2012-0175).

Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Regional Board means the California Regional Water Quality Control Board, Los Angeles Region.

Restaurant means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812) (Source: Order No. R4-2012-0175).

Retail Gasoline Outlet means any facility engaged in selling gasoline and lubricating oils (Source: Order No. R4-2012-0175).

Routine Maintenance
Routine maintenance projects include, but are not limited to projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.

3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.
4. Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
5. Repair leaks

Routine maintenance does not include construction of new** lines or facilities resulting from compliance with applicable codes, standards and regulations.

* Update existing lines includes replacing existing lines with new materials or pipes.

** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines (Source: Order No. R4-2012-0175).

Significant Ecological Areas (SEAs) means an area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.
2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.
3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.
4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.
5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.
6. Areas important as game species habitat or as fisheries.
7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.
8. Special areas (Source: Order No. R4-2012-0175).

Site means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity (Source: Order No. R4-2012-0175).

Storm Drain System means any facilities or any part of those facilities, including streets, gutters, conduits, natural or artificial drains, channels, and watercourses that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City of Azusa.

Storm Water or Stormwater means water that originates from atmospheric moisture (rain or snow) and that falls onto land, water, or other surfaces. Without any change in its meaning, this term may be spelled or written as one word or two separate words.

Stormwater Runoff means that part of precipitation (rainfall or snowmelt) which travels across a surface to the storm drain system or receiving waters.

SUSMP means the Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP was required as part of the previous Municipal NPDES Permit (Order No. 01-182, NPDES No. CAS004001) and required plans that designate best management practices (BMPs) that must be used in specified categories of development projects.

Urban Runoff means surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial, or industrial activities involving the use of potable and non-potable water.

[MUNICIPAL CODE SECTION REFERENCE(S)] is amended to read as follows:

SEC. [X]. STORMWATER POLLUTION CONTROL MEASURES FOR DEVELOPMENT PLANNING AND CONSTRUCTION ACTIVITIES

(A) Objective. The provisions of this section contain requirements for construction activities and facility operations of Development and Redevelopment projects to comply with the current "Municipal NPDES permit," lessen the water quality impacts of development by using smart growth practices, and integrate LID design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use. LID shall be inclusive of previously adopted SUSMP requirements.

(B) Scope. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment projects and authorizes the City of Azusa to further define and adopt stormwater pollution control measures, to develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies, and to grant waivers or alternate compliance as allowed by the Municipal NPDES permit and collect fees from projects granted exceptions. . Except as otherwise provided herein, the City of Azusa shall administer, implement and enforce the provisions of this Section. Guidance documents supporting implementation of requirements in this Ordinance are hereby incorporated by reference, including SUSMP and LID Manuals.

(C) Applicability. The following Development and Redevelopment projects, termed "Planning Priority Projects," shall comply with the requirements of [SECTION NUMBER]:

(1) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.

(2) Industrial parks 10,000 square feet or more of surface area.

(3) Commercial malls 10,000 square feet or more of surface area.

(4) Retail gasoline outlets with 5,000 square feet or more of surface area.

(5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of surface area.

(6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.

(7) Streets and roads construction of 10,000 square feet or more of impervious surface area.

(8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.

(9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will:

a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and

b. Create 2,500 square feet or more of impervious surface area

(10) Single-family hillside homes.

(11) Redevelopment Projects

a. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.

b. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.

c. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

d. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

e. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

(12) Any other project as deemed appropriate by the Director.

(D) Effective Date. The Planning and Land Development requirements contained in this Ordinance shall become effective XX days from the adoption of the Ordinance. This includes Planning Priority Projects that are discretionary permit projects or project phases that have not been deemed complete for processing, or discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals within 90 days of adoption of the Ordinance. Projects that have been deemed complete within 90 days of adoption of the Ordinance are not subject to the requirements of this Chapter.

(E) Stormwater Pollution Control Requirements. The Site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

(1) A new single-family hillside home development shall include mitigation measures to:

a. Conserve natural areas;

b. Protect slopes and channels;

c. Provide storm drain system stenciling and signage;

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and

e. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.

(2) Street and road construction of 10,000 square feet or more of impervious surface shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) to the maximum extent practicable.

(3) The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:

a. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

i. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

ii. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

b. Minimize hydromodification impacts to natural drainage systems as defined in the Municipal NPDES Permit. Hydromodification requirements are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

c. When, as determined by the [APPROVING AGENCY], 100 percent onsite retention of the SWQDv is technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted LID Plan. The technical infeasibility may result from conditions that may include, but are not limited to:

i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.

ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;

iii. Locations within 100 feet of a groundwater well used for drinking water;

iv. Brownfield development sites or other locations where pollutant mobilization is a documented concern;

v. Locations with potential geotechnical hazards;

vi. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

d. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the Municipal NPDES Permit.

i. Additional alternative compliance options such as offsite infiltration may be available to the project Site. The project Site should contact the [APPROVING AGENCY] to determine eligibility. Alternative compliance options are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

e. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per the Municipal NPDES Permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

   i. 0.2 inches per hour, or
   ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

f. A Multi-Phased Project may comply with the standards and requirements of this section for all of its phases by: (a) designing a system acceptable to the [APPROVING AGENCY] to satisfy these standards and requirements for the entire Site during the first phase, and (b) implementing these standards and requirements for each phase of Development or Redevelopment of the Site during the first phase or prior to commencement of construction of a later phase, to the extent necessary to treat the stormwater from such later phase. For purposes of this section, "Multi-Phased Project" shall mean any Planning Priority Project implemented over more than one phase and the Site of a Multi-Phased Project shall include any land and water area designed and used to store, treat or manage stormwater runoff in connection with the Development or Redevelopment, including any tracts, lots, or parcels of real property, whether Developed or not, associated with, functionally connected to, or under common ownership or control with such Development or Redevelopment.

(E) Other Agencies of the City of Azusa. All City of Azusa departments, offices, entities and agencies, shall establish administrative procedures necessary to implement the provisions of this Article on their Development and Redevelopment projects and report their activities annually to the [REPSONSIBLE AGENCY].

(F) Validity. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance are declared to be severable.

(G) Certification. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy.

I hereby certify that this ordinance was passed by the Council of the City of Azusa, at its meeting of ________________________.

Jeffrey Corenjo, Jr., City Clerk

By ______________________________
Deputy

Approved ______________________

____
Joseph R. Rocha, Mayor

Approved as to Form and Legality
BBK representative, TBD, City Attorney

By ______________________________
City Attorney

Date ______________________

File No. ______________________

DRAFT Green Street Policy

Purpose

The City of Azusa DEPARTMENT OF PUBLIC WORKS shall implement green street BMPs for transportation corridors associated with new and redevelopment street and roadway projects, including Capital Improvement Projects (CIPs). This policy is enacted to demonstrate compliance with the NPDES MS4 Permit for the Los Angeles Region (Order No. R4-2012-0175).

Green streets are an amenity that provides many benefits including water quality improvement, groundwater replenishment, creation of attractive streetscapes, creation of parks and wildlife habitats, and pedestrian and bicycle accessibility. Green streets are defined as right-of-way areas that incorporate infiltration, biofiltration, and/or storage and use BMPs to collect, retain, or detain stormwater runoff as well as a design element that creates attractive streetscapes.

Policy

A. Application. The DEPARTMENT OF PUBLIC WORKS shall require new development and/or redevelopment streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs. Transportation corridors projects are major arterials as defined in the CITY'S General Plan which add at least 10,000 square feet of impervious surface. Routine maintenance or repair and linear utility projects are excluded from these requirements. Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained.

   Alternate A (without General Plan reference).

   Application. The DEPARTMENT OF PUBLIC WORKS shall require new development and/or redevelopment streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs. Transportation corridors projects are roadway projects that add at least 10,000 square feet of impervious surface. Routine maintenance or repair and linear utility projects are excluded from these requirements. Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained.

Alternatives to the 10,000 sf threshold: Use other mechanism in lieu of the 10,000 sf of impervious area to determine threshold for green streets requirements. As an example, City of Santa Monica utilizes construction costs (>$500,000) as the trigger for green street BMPs. Another option would be to establish a threshold of either the 10,000 sf impervious area or construction cost >$500,000 whichever is smaller.

Alternatives to the major arterial: Use another General Plan defined street classification, such as secondary arterials, and define the transportation corridor as all that type of street and larger arterials.

B. Amenities. The DEPARTMENT OF PUBLIC WORKS shall consider opportunities to replenish groundwater, create attractive streetscapes, create parks and wildlife habitats, and provide pedestrian and bicycle accessibility through new development and redevelopment of streets and roadway projects and CIPs.

C. Guidance. The DEPARTMENT OF PUBLIC WORKS shall use the City of Los Angeles Green Streets guidance, USEPA's *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets*[1], or equivalent guidance developed by the DEPARTMENT OF PUBLIC WORKS for use in public and private developments.

D. Retrofit Scope. The DEPARTMENT OF PUBLIC WORKS shall use the City's Watershed Management Program or Enhanced Watershed Management Program to identify opportunities for green street BMP retrofits. Final decisions regarding implementation will be determined by the CITY ENGINEER based on the availability of adequate funding.

E. Training. The DEPARTMENT OF PUBLIC WORKS shall incorporate aspects of green streets into internal annual staff trainings.

CITY OF AZUSA
ENGINEERING DIVISION

MEMORANDUM

TO: MS4 NPDES (EWMP) Permit File

FROM: Carl Hassel, Assistant Director of Public Works / City Engineer

DATE: June 26, 2013

SUBJECT: Draft Low Impact Development (LID) Ordinance and draft Green Streets Policy status

As a requirement of the new MS4 Permit, cities are to have in place a LID Ordinance and Green Streets Policy for the future. At the time of the submittal of the NOI at the end of this month, The LID Ordinance and Green Streets Policy are in draft form and will be included in the NOI submittal that the Rio Hondo/San Gabriel River Watershed Quality Control Group are preparing.

The LA Permit Group hired Larry Walker and Associates, a consultant, with permission from the cities from the LA Permit Group to provide services including preparation of a draft LID Ordinance and Green Streets Policy.

On May 16th, 2013, I met with Conal McNamara, Assistant Director of Economic and Community Development, to review the draft LID ordinance and the draft Green Streets Policy. He was in agreement with the drafts and that the City will look to further advance the work but that the bulk of the work is complete. He was in agreement that it would be fine to submit them with the MS4 Permit NOI.

On May 20th, 2013, I checked with Tito Haes, the Assistant City Manager/Director of Public Works regarding the submittal of the draft LID ordinance and the draft Green Streets Policy and he was fine with the submittal but that we would need to look toward any changes to make it fit with the community and to get Council approval before they would be instituted.

It was indicated to me that all parties involved were aware of the implications of the LID Ordinance and the Green Streets Policy and that once adopted they would be part of the conditions of approval for developments or included in CIP's that the City of Azusa conducts.

Carl E. Hassel, P.E.

City of Bradbury

Memorandum

DATE: **June 3, 2013**

TO: David Gilbertson, Assistant City Engineer

CC: Michelle Keith, City Manager

SUBJECT: **Draft Green Street Policy**

Green Street Policy

Purpose

The City of Bradbury shall implement green street BMPs for transportation corridors associated with new and redevelopment street and roadway projects, including Capital Improvement Projects (CIPs). This policy is enacted to demonstrate compliance with the NPDES MS4 Permit for the Los Angeles Region (Order No. R4-2012-0175).

Green streets are an amenity that provides many benefits including water quality improvement, groundwater replenishment, creation of attractive streetscapes, creation of parks and wildlife habitats, and pedestrian and bicycle accessibility. Green streets are defined as right-of-way areas that incorporate infiltration, biofiltration, and/or storage and use BMPs to collect, retain, or detain stormwater runoff as well as a design element that creates attractive streetscapes.

Policy

A. Application. The City shall require new development and/or redevelopment streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs. Transportation corridors projects are major arterials as defined in the [CITY'S] General Plan which add at least 10,000 square feet of impervious surface. Routine maintenance or repair and linear utility projects are excluded from these requirements Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained and new impervious surface is not added.

Comment [m1]: Decision point on how to define transportation corridors. Is the preference to use the 10,000 sf threshold from the Land Development section of the Permit or to use a street type definition from the General Plan, e.g. major arterials.

Alternatives:
Use other mechanism in lieu of the 10,000 sf of impervious area to determine threshold for green streets requirements. As an example, City of Santa Monica utilizes construction costs (>$500,000) as the trigger for green street BMPs. Another option would be to establish a threshold of either the 10,000 sf impervious area or construction cost >$500,000 whichever is smaller.

B. Amenities. The City shall consider opportunities to replenish groundwater, create attractive streetscapes, create parks and wildlife habitats, and provide pedestrian and bicycle accessibility through new development and redevelopment of streets and roadway projects and CIPs.

C. Guidance. The City shall use the City of Los Angeles Green Streets guidance, USEPA's *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets*[1], or equivalent guidance for use in public and private developments.

D. Retrofit Scope. The City shall use the City's Enhanced Watershed Management Program to identify opportunities for green street BMP retrofits. Final decisions regarding implementation will be determined by the City Council based on the availability of adequate funding.

E. Training. The City's contract City Engineer shall incorporate aspects of green streets into internal annual staff trainings.

[1] EPA-833-F-08-009, December 2008.

City of Bradbury
Memorandum

DATE: **June 3, 2013**

TO: Michelle Keith, City Manager
Anne McIntosh, City Planner

FROM: David Gilbertson, Assistant City Engineer

SUBJECT: **Draft LID Ordinance**

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Below is the Draft LID Ordinance that key City staff needs to review. We need to discuss the revision and several critical issues of the Ordinance such as bonding amounts and the levying of fines.

ORDINANCE NO. XX

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF BRADBURY, CALIFORNIA, AMENDING SECTION________ OF THE CITY OF BRADBURY MUNICIPLE CODE TO EXPAND THE APPLICABILITY OF THE EXISTING STANDARD URBAN STORMWATER MITIGATION PLAN (SUSMP) REQUIREMENTS BY IMPOSING LOW IMPACT DEVELOPMENT (LID) STRATEGIES ON THE PROJECTS REQUIRING BUILDING PERMITS.

WHEREAS, The City of Bradbury is authorized by Article XI, §5 and §7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity.

WHEREAS, The City of Bradbury has authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity which might degrade the quality of waters of the State.

WHEREAS, The city is a permittee under the “Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4,” issued by the California Regional Water Quality Control Board--Los Angeles Region,” (Order No. R4-2012-0175) which also serves as an NPDES Permit under the Federal Clean Water Act (NPDES No. CAS004001), as well as Waste Discharge Requirements under California law (the “Municipal NPDES permit”). In order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program, the Municipal NPDES permit requires permittees to develop and implement a LID Ordinance.

WHEREAS, The City of Bradbury has applied an integrated approach to incorporate wastewater, stormwater and runoff, and recycled water management into a single strategy through its Integrated Resources Plan.

WHEREAS, The City of Bradbury is committed to a stormwater management program that protects water quality and water supply by employing watershed-based approaches that balance environmental, social, and economic considerations.

~~**WHEREAS,** Urbanization has led to increased impervious surface areas resulting in increased water runoff and less percolation to groundwater aquifers causing the transport of pollutants to downstream receiving waters.~~

~~**WHEREAS,** The City of Bradbury needs to take a new approach to managing rainwater and urban runoff while mitigating the negative impacts of development and urbanization.~~

~~**WHEREAS,** LID is widely recognized as a sensible approach to managing the quantity and quality of stormwater runoff by setting standards and practices to maintain or restore the natural hydrologic character of a development site, reduce off-site runoff, improve water quality, and provide groundwater recharge.~~

WEREAS, It is the intent of the City of Bradbury to expand the applicability of the existing Standard Urban Stormwater Mitigation Plan (SUSMP) requirements by providing stormwater and rainwater LID strategies for Development and Redevelopment projects as defined under "Applicability."

[MUNICIPAL CODE SECTION REFERENCE(S)] OF THE CITY OF BRADBURY MUNICIPAL CODE IS AMENDED IN ITS ENTIRETY TO READ AS FOLLOWS:

Definitions.

Except as specifically provided herein, any term used in this section shall be defined as that term in the current Municipal NPDES permit, or if it is not specifically defined in either the Municipal NPDES permit, then as such term is defined in the Federal Clean Water Act, as amended, and/or the regulations promulgated thereunder. If the definition of any term contained in this chapter conflicts with the definition of the same term in the current Municipal NPDES permit, then the definition contained in the Municipal NPDES permit shall govern. The following words and phrases shall have the following meanings when used in this chapter:

Automotive Service Facility means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5541, 5511, provided that these facilities have no outside activities or materials that may be exposed to stormwater (Source: Order No. R4-2012-0175).

Basin Plan means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments (Source: Order No. R4-2012-0175).

Best Management Practice (BMP) means practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water (Source: Order No. R4-2012-0175).

Biofiltration means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales (Modified from: Order No. R4-2012-0175).

Bioretention means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in the Municipal NPDES permit, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by the Municipal NPDES permit as biofiltration (Modified from: Order No. R4-2012-0175).

Bioswale means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes (Source: Order No. R4-2012-0175).

City means the City of Bradbury

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

Commercial Malls means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers (Source: Order No. R4-2012-0175).

Construction Activity means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that result in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See "Routine Maintenance" definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan (Source: Order No. R4-2012-0175).

Control means to minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities (Source: Order No. R4-2012-0175).

Development means construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Directly Adjacent means situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area (Source: Order No. R4-2012-0175).

Discharge means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

Disturbed Area means an area that is altered as a result of clearing, grading, and/or excavation (Source: Order No. R4-2012-0175).

Flow-through BMPs means modular, vault type “high flow biotreatment” devices contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain (Modified from: Order No. R4-2012-0175).

General Construction Activities Storm Water Permit (GCASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from construction activities under certain conditions.

General Industrial Activities Storm Water Permit (GIASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

Green Roof means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain (Source: Order No. R4-2012-0175).

Hazardous Material(s) means any material(s) defined as hazardous by Division 20, Chapter 6.95 of the California Health and Safety Code.

Hillside means a property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes (Source: Order No. R4-2012-0175).

Impervious Surface means any man-made or modified surface that prevents or significantly reduces the entry of water into the underlying soil, resulting in runoff from the surface in greater quantities and/or at an increased rate, when compared to natural conditions prior to development. Examples of places that commonly exhibit impervious surfaces include parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from paving, compacted gravel, compacted earth, and oiled earth.

Industrial Park means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry (Source: Order No. R4-2012-0175).

Infiltration BMP means a LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement (Source: Order No. R4-2012-0175).

LID means Low Impact Development. LID consists of building and landscape features designed to retain or filter stormwater runoff (Source: Order No. R4-2012-0175).

MS4 means Municipal Separate Storm Sewer System (MS4). The MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a combined sewer; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

(40 CFR § 122.26(b)(8)) (Source: Order No. R4-2012-0175)

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405. The term includes an “approved program” (Source: Order No. R4-2012-0175).

Natural Drainage System means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system (Source: Order No. R4-2012-0175).

New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision (Source: Order No. R4-2012-0175).

Non-Stormwater Discharge means any discharge to a municipal storm drain system that is not composed entirely of stormwater (Source: Order No. R4-2012-0175).

Parking Lot means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces (Source: Order No. R4-2012-0175).

Person means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, state, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine and the singular shall include the plural where indicated by the context.

Planning Priority Projects means development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s) (Modified from: Order No. R4-2012-0175).

Pollutant means any “pollutant” defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Sec. 13373. Pollutants may include, but are not limited to the following:

(1) Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash, and sludge).

(2) Metals (such as cadmium, lead, zinc, copper, silver, nickel, chromium, and non- metals such as phosphorus and arsenic).

(3) Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants, and grease).

(4) Excessive eroded soil, sediment, and particulate materials in amounts that may adversely affect the beneficial use of the receiving waters, flora, or fauna of the State.

(5) Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables, and show facilities).

(6) Substances having characteristics such as pH less than 6 or greater than 9, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus.

Project means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code §21065) (Source: Order No. R4-2012-0175).

Rainfall Harvest and Use means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department (Source: Order No. R4-2012-0175).

Receiving Water means “water of the United States” into which waste and/or pollutants are or may be discharged (Source: Order No. R4-2012-0175).

Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Regional Board means the California Regional Water Quality Control Board, Los Angeles Region.

Restaurant means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812) (Source: Order No. R4-2012-0175).

Retail Gasoline Outlet means any facility engaged in selling gasoline and lubricating oils (Source: Order No. R4-2012-0175).

Routine Maintenance
Routine maintenance projects include, but are not limited to projects conducted to:
1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.
4. Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
5. Repair leaks

Routine maintenance does not include construction of new** lines or facilities resulting from compliance with applicable codes, standards and regulations.
* Update existing lines includes replacing existing lines with new materials or pipes.
** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines (Source: Order No. R4-2012-0175).

Significant Ecological Areas (SEAs) means an area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:
1. The habitat of rare, endangered, and threatened plant and animal species.
2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.
3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.
4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.
5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.
6. Areas important as game species habitat or as fisheries.

7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.
8. Special areas (Source: Order No. R4-2012-0175).

Site means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity (Source: Order No. R4-2012-0175).

Storm Drain System means any facilities or any part of those facilities, including streets, gutters, conduits, natural or artificial drains, channels, and watercourses that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City of Bradbury.

Storm Water or Stormwater means water that originates from atmospheric moisture (rain or snow) and that falls onto land, water, or other surfaces. Without any change in its meaning, this term may be spelled or written as one word or two separate words.

Stormwater Runoff means that part of precipitation (rainfall or snowmelt) which travels across a surface to the storm drain system or receiving waters.

SUSMP means the Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP was required as part of the previous Municipal NPDES Permit (Order No. 01-182, NPDES No. CAS004001) and required plans that designate best management practices (BMPs) that must be used in specified categories of development projects.

Urban Runoff means surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial, or industrial activities involving the use of potable and non-potable water.

[MUNICIPAL CODE SECTION REFERENCE(S)] is amended to read as follows:

SEC. [X]. STORMWATER POLLUTION CONTROL MEASURES FOR DEVELOPMENT PLANNING AND CONSTRUCTION ACTIVITIES

(A) Objective. The provisions of this section contain requirements for construction activities and facility operations of Development and Redevelopment projects to comply with the current "Municipal NPDES permit," lessen the water quality impacts of development by using smart growth practices, and integrate LID design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use. LID shall be inclusive of SUSMP requirements.

(B) Scope. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment projects and authorizes the City of Bradbury to further define and adopt stormwater pollution control measures, develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies, grant waivers from the requirements of the Standard Urban Stormwater Mitigation Plan, and collect funds for projects that are granted waivers. Except as otherwise provided herein, the City of Bradbury shall administer, implement and enforce the provisions of this Section.

(C) Applicability. The following Development and Redevelopment projects, termed "Planning Priority Projects," shall comply with the requirements of [SECTION NUMBER]:

(1) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.

(2) Industrial parks 10,000 square feet or more of surface area.

(3) Commercial malls 10,000 square feet or more of surface area.

(4) Retail gasoline outlets with 5,000 square feet or more of surface area.

(5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of surface area.

(6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.

(7) Streets and roads construction of 10,000 square feet or more of impervious surface area.

(8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.

(9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will:

a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and

b. Create 2,500 square feet or more of impervious surface area

(10) Single-family hillside homes.

(11) Redevelopment Projects

a. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.

b. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.

c. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

d. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

e. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

(D) Effective Date. The Planning and Land Development requirements contained in Section 7 of Order No. R4-2012-0175 shall become effective 90 days from the adoption of the Order (February 6, 2013). This includes Planning Priority Projects that are discretionary permit projects or project phases that have not been deemed complete for processing, or discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals within 90 days of adoption of the Order. Projects that have been deemed complete within 90 days of adoption of the Order are not subject to the requirements Section 7.

(E) Stormwater Pollution Control Requirements. The Site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

(1) A new single-family hillside home development shall include mitigation measures to:

a. Conserve natural areas;

b. Protect slopes and channels;

c. Provide storm drain system stenciling and signage;

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and

e. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.

(2) Street and road construction of 10,000 square feet or more of impervious surface shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) to the maximum extent practicable.

(3) The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:

a. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

   i. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

   ii. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

b. Minimize hydromodification impacts to natural drainage systems as defined in the Municipal NPDES Permit. Hydromodification requirements are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

c. When, as determined by the [APPROVING AGENCY(City of Bradbury?)], 100 percent onsite retention of the SWQDv is technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted LID Plan. The technical infeasibility may result from conditions that may include, but are not limited to:

   i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.

   ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;

   iii. Locations within 100 feet of a groundwater well used for drinking water;

   iv. Brownfield development sites or other locations where pollutant mobilization is a documented concern;

   v. Locations with potential geotechnical hazards;

   vi. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

d. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the Municipal NPDES Permit.

   i. Additional alternative compliance options such as offsite infiltration may be available to the project Site. The project Site should contact the [APPROVING AGENCY(City of Bradbury?)] to determine eligibility. Alternative compliance options are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

e. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per the Municipal NPDES Permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

   i. 0.2 inches per hour, or
   ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

f. A Multi-Phased Project may comply with the standards and requirements of this section for all of its phases by: (a) designing a system acceptable to the [APPROVING AGENCY] to satisfy these standards and requirements for the entire Site during the first phase, and (b) implementing these standards and requirements for each phase of Development or Redevelopment of the Site during the first phase or prior to commencement of construction of a later phase, to the extent necessary to treat the stormwater from such later phase. For purposes of this section, “Multi-Phased Project” shall mean any Planning Priority Project implemented over more than one phase and the Site of a Multi-Phased Project shall include any land and water area designed and used to store, treat or manage stormwater runoff in connection with the Development or Redevelopment, including any tracts, lots, or parcels of real property, whether Developed or not, associated with, functionally connected to, or under common ownership or control with such Development or Redevelopment.

~~**(E) Other Agencies of the City of Bradbury.** All City of Bradbury departments, offices, entities and agencies, shall establish administrative procedures necessary to implement the provisions of this Article on their Development and Redevelopment projects and report their activities annually to the [REPSONSIBLE AGENCY].~~

(F) Validity. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance are declared to be severable.

(G) Certification. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy.

PASSED, APPROVED, AND ADOPTED this XX day of XX, 2013.

____
MAYOR

ATTEST:

I, Claudia Saldana, City Clerk of the City of Bradbury, do hereby certify that the foregoing ordinance, being Ordinance No. XXX, was duly passed by the City Council of the City of Bradbury, signed by the Mayor of said City, and attested by the City Clerk, all at a regular meeting of the City Council held on the XXth day of XX, 2013, that it was duly posted and that the same was passed and adopted by the following vote:

AYES:
NAYS:
ABSENT:

Claudia Saldana
CITY CLERK

APPROVED AS TO FORM:

Cary Reisman
CITY ATTORNEY

City of Duarte

City of Duarte

1600 Huntington Drive, Duarte, CA 91010 - (626) 357-7931 - FAX (626) 358-0018

ORDINANCE NO.__________________________

An ordinance amending [MUNICIPAL CODE SECTION REFERENCE(S)] of the ~~[CITY NAME]~~City of Duarte Municipal Code to expand the applicability of the existing ~~[NAME OF POST CONSTRUCITON REQUIREMENTS – LIKELY "SUSMP" FOR MOST MUNICIPALITIES]~~STORMWATER AND URBAN RUNOFF POLLUTION CONTROL requirements by imposing Low Impact Development (LID) strategies on projects that require building permits and/or encroachment permits.

Findings.

(A) The ~~[CITY NAME]~~City of Duarte is authorized by Article XI, §5 and §7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity.

(B) The ~~[CITY NAME]~~City of Duarte has authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity which might degrade the quality of waters of the State.

(C) The city is a permittee under the "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4," issued by the California Regional Water Quality Control Board--Los Angeles Region," (Order No. R4-2012-0175) which also serves as an NPDES Permit under the Federal Clean Water Act (NPDES No. CAS004001), as well as Waste Discharge Requirements under California law (the "Municipal NPDES permit"). In order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program, the Municipal NPDES permit requires permittees to develop and implement a LID Ordinance.

(D) The ~~[CITY NAME]~~ City of Duarte has applied an integrated approach to incorporate wastewater, stormwater and runoff, and recycled water management into a single strategy through its Integrated Resources Plan.

(E) The ~~[CITY NAME]~~City of Duarte is committed to a stormwater management program that protects water quality and water supply by employing watershed-based approaches that balance environmental, social, and economic considerations.

(F) Urbanization has led to increased impervious surface areas resulting in increased water runoff causing the transport of pollutants to downstream receiving waters.

(G) The ~~[CITY NAME]~~City of Duarte needs to take a new approach to managing rainwater and urban runoff while mitigating the negative impacts of development and urbanization.

(H) LID is widely recognized as a sensible approach to managing the quantity and quality of storm water and non-stormwater runoff by setting standards and practices to maintain or restore the natural hydrologic character of a development site, reduce off-site runoff, improve water quality, and provide groundwater recharge.

(I) It is the intent of the ~~[CITY NAME]~~ City of Duarte to replace the existing Standard Urban Stormwater Mitigation Plan (SUSMP) requirements by providing stormwater and rainwater LID strategies for Development and Redevelopment projects as defined under "Applicability." Where there are conflicts between this Ordinance and previously adopted SUSMP or LID Manuals, the standards in this Ordinance shall prevail.

[MUNICIPAL CODE SECTION REFERENCE(S)] of the ~~[CITY NAME]~~City of Duarte Municipal Code is amended in its entirety to read as follows:

Definitions.

Except as specifically provided herein, any term used in this [SECTION REFERENCE] shall be defined as that term in the current Municipal NPDES permit, or if it is not specifically defined in either the Municipal NPDES permit, then as such term is defined in the Federal Clean Water Act, as amended, and/or the regulations promulgated thereunder. If the definition of any term contained in this chapter conflicts with the definition of the same term in the current Municipal NPDES permit, then the definition contained in the Municipal NPDES permit shall govern. The following words and phrases shall have the following meanings when used in this chapter:

Automotive Service Facility means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5541, 5511, provided that these facilities have no outside activities or materials that may be exposed to stormwater (Source: Order No. R4-2012-0175).

Basin Plan means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments (Source: Order No. R4-2012-0175).

Best Management Practice (BMP) means practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water (Source: Order No. R4-2012-0175).

Biofiltration means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales (Modified from: Order No. R4-2012-0175).

Bioretention means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in the Municipal NPDES permit, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by the Municipal NPDES permit as biofiltration (Modified from: Order No. R4-2012-0175).

Bioswale means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes (Source: Order No. R4-2012-0175).

City means the ~~[CITY NAME].~~City of Duarte

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

Commercial Malls means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers (Source: Order No. R4-2012-0175).

Construction Activity means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that result in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See "Routine Maintenance" definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan (Source: Order No. R4-2012-0175).

Control means to minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities (Source: Order No. R4-2012-0175).

Development means construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Directly Adjacent means situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area (Source: Order No. R4-2012-0175).

Discharge means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

Disturbed Area means an area that is altered as a result of clearing, grading, and/or excavation (Source: Order No. R4-2012-0175).

Flow-through BMPs means modular, vault type "high flow biotreatment" devices contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain (Modified from: Order No. R4-2012-0175).

General Construction Activities Storm Water Permit (GCASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from construction activities under certain conditions.

General Industrial Activities Storm Water Permit (GIASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

Green Roof means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain (Source: Order No. R4-2012-0175).

Hazardous Material(s) means any material(s) defined as hazardous by Division 20, Chapter 6.95 of the California Health and Safety Code.

Hillside means a property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes (Source: Order No. R4-2012-0175).

Hydromodification means the alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. Hydromodification can cause excessive erosion and/or sedimentation rates, causing excessive turbidity, channel aggradation and/or degradation. (Source: GCASP)

Impervious Surface means any man-made or modified surface that prevents or significantly reduces the entry of water into the underlying soil, resulting in runoff from the surface in greater quantities and/or at an increased rate, when compared to natural conditions prior to development. Examples of places that commonly exhibit impervious surfaces include parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from paving, compacted gravel, compacted earth, and oiled earth.

Industrial Park means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry (Source: Order No. R4-2012-0175).

Infiltration BMP means a LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement (Source: Order No. R4-2012-0175).

LID means Low Impact Development. LID consists of building and landscape features designed to retain or filter stormwater runoff (Source: Order No. R4-2012-0175).

MS4 means Municipal Separate Storm Sewer System (MS4). The MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a combined sewer; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

(40 CFR § 122.26(b)(8)) (Source: Order No. R4-2012-0175)

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405. The term includes an "approved program" (Source: Order No. R4-2012-0175).

Natural Drainage System means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system (Source: Order No. R4-2012-0175).

New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision (Source: Order No. R4-2012-0175).

Non-Stormwater Discharge means any discharge to a municipal storm drain system that is not composed entirely of stormwater (Source: Order No. R4-2012-0175).

Parking Lot means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces (Source: Order No. R4-2012-0175).

Person means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, state, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine and the singular shall include the plural where indicated by the context.

Planning Priority Projects means development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s) (Modified from: Order No. R4-2012-0175).

Pollutant means any "pollutant" defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Sec. 13373. Pollutants may include, but are not limited to the following:

(1) Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash, and sludge).

(2) Metals (such as cadmium, lead, zinc, copper, silver, nickel, chromium, and non-metals such as phosphorus and arsenic).

(3) Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants, and grease).

(4) Excessive eroded soil, sediment, and particulate materials in amounts that may adversely affect the beneficial use of the receiving waters, flora, or fauna of the State.

(5) Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables, and show facilities).

(6) Substances having characteristics such as pH less than 6 or greater than 9, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus.

Project means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code §21065) (Source: Order No. R4-2012-0175).

Rainfall Harvest and Use means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department (Source: Order No. R4-2012-0175).

Receiving Water means "water of the United States" into which waste and/or pollutants are or may be discharged (Source: Order No. R4-2012-0175).

Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Regional Board means the California Regional Water Quality Control Board, Los Angeles Region.

Restaurant means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812) (Source: Order No. R4-2012-0175).

Retail Gasoline Outlet means any facility engaged in selling gasoline and lubricating oils (Source: Order No. R4-2012-0175).

Routine Maintenance
Routine maintenance projects include, but are not limited to projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.
4. Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
5. Repair leaks

Routine maintenance does not include construction of new** lines or facilities resulting from
compliance with applicable codes, standards and regulations.
* Update existing lines includes replacing existing lines with new materials or pipes.
** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines (Source: Order No. R4-2012-0175).

Significant Ecological Areas (SEAs) means an area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.
2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.

3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.
4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.
5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.
6. Areas important as game species habitat or as fisheries.
7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.
8. Special areas (Source: Order No. R4-2012-0175).

Site means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity (Source: Order No. R4-2012-0175).

Storm Drain System means any facilities or any part of those facilities, including streets, gutters, conduits, natural or artificial drains, channels, and watercourses that are used for the purpose of collecting, storing, transporting or disposing of stormwater ~~and are located within the [CITY NAME]~~.

Storm Water or Stormwater means water that originates from atmospheric moisture (rain or snow) and that falls onto land, water, or other surfaces. Without any change in its meaning, this term may be spelled or written as one word or two separate words.

Stormwater Runoff means that part of precipitation (rainfall or snowmelt) which travels across a surface to the storm drain system or receiving waters.

SUSMP means the Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP was required as part of the previous Municipal NPDES Permit (Order No. 01-182, NPDES No. CAS004001) and required plans that designate best management practices (BMPs) that must be used in specified categories of development projects.

Urban Runoff means surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial, or industrial activities involving the use of potable and non-potable water.

[MUNICIPAL CODE SECTION REFERENCE(S)] is amended to read as follows:

SEC. [X]. STORMWATER POLLUTION CONTROL MEASURES FOR DEVELOPMENT PLANNING AND CONSTRUCTION ACTIVITIES

(A) Objective. The provisions of this section contain requirements for construction activities and facility operations of Development and Redevelopment projects to comply with the current "Municipal NPDES permit," lessen the water quality impacts of development by using smart growth practices, and integrate LID design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use. LID shall be inclusive of previously adopted SUSMP requirements.

(B) Scope. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment projects and authorizes the ~~[CITY NAME]~~City of Duarte to further define and adopt stormwater pollution control measures, to develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies, and to grant waivers or alternate compliance as allowed by the Municipal NPDES permit and collect fees from projects granted exceptions. . Except as otherwise provided herein, the ~~[CITY NAME]~~City of Duarte shall administer, implement and enforce the provisions of this Section. Guidance documents supporting implementation of requirements in this Ordinance are hereby incorporated by reference, including SUSMP and LID Manuals.

(C) Applicability. The following Development and Redevelopment projects, termed "Planning Priority Projects," shall comply with the requirements of [SECTION NUMBER]:

(1) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.

(2) Industrial parks 10,000 square feet or more of surface area.

(3) Commercial malls 10,000 square feet or more of surface area.

(4) Retail gasoline outlets with 5,000 square feet or more of surface area.

(5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of surface area.

(6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.

(7) Streets and roads construction of 10,000 square feet or more of impervious surface area.

(8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.

(9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will:

a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and

b. Create 2,500 square feet or more of impervious surface area

(10) Single-family hillside homes.

(11) Redevelopment Projects

a. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.

b. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.

c. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

d. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

e. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

(12) Any other project as deemed appropriate by the Director.

(D) Effective Date. The Planning and Land Development requirements contained in this Ordinance shall become effective XX days from the adoption of the Ordinance. This includes Planning Priority Projects that are discretionary permit projects or project phases that have not been deemed complete for processing, or discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals within 90 days of adoption of the Ordinance. Projects that have been deemed complete within 90 days of adoption of the Ordinance are not subject to the requirements of this Chapter.

(E) Stormwater Pollution Control Requirements. The Site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

(1) A new single-family hillside home development shall include mitigation measures to:

a. Conserve natural areas;

b. Protect slopes and channels;

c. Provide storm drain system stenciling and signage;

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and

e. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.

(2) Street and road construction of 10,000 square feet or more of impervious surface shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) to the maximum extent practicable.

(3) The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:

a. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

i. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

ii. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

b. Minimize hydromodification impacts to natural drainage systems as defined in the Municipal NPDES Permit. Hydromodification requirements are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

c. When, as determined by the [APPROVING AGENCY], 100 percent onsite retention of the SWQDv is technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted LID Plan. The technical infeasibility may result from conditions that may include, but are not limited to:

i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.

ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;

iii. Locations within 100 feet of a groundwater well used for drinking water;

iv. Brownfield development sites or other locations where pollutant mobilization is a documented concern;

v. Locations with potential geotechnical hazards;

vi. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

d. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the Municipal NPDES Permit.

i. Additional alternative compliance options such as offsite infiltration may be available to the project Site. The project Site should contact the [APPROVING AGENCY] to determine eligibility. Alternative compliance options are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

e. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per the Municipal NPDES Permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

   i. 0.2 inches per hour, or
   ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

f. A Multi-Phased Project may comply with the standards and requirements of this section for all of its phases by: (a) designing a system acceptable to the [APPROVING AGENCY] to satisfy these standards and requirements for the entire Site during the first phase, and (b) implementing these standards and requirements for each phase of Development or Redevelopment of the Site during the first phase or prior to commencement of construction of a later phase, to the extent necessary to treat the stormwater from such later phase. For purposes of this section, "Multi-Phased Project" shall mean any Planning Priority Project implemented over more than one phase and the Site of a Multi-Phased Project shall include any land and water area designed and used to store, treat or manage stormwater runoff in connection with the Development or Redevelopment, including any tracts, lots, or parcels of real property, whether Developed or not, associated with, functionally connected to, or under common ownership or control with such Development or Redevelopment.

(E) Other Agencies of the ~~[CITY NAME]~~City of Duarte. All ~~[CITY NAME]~~City of Duarte departments, offices, entities and agencies, shall establish administrative procedures necessary to implement the provisions of this Article on their Development and Redevelopment projects and report their activities annually to the [REPSONSIBLE AGENCY].

(F) Validity. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance are declared to be severable.

(G) Certification. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy.

I hereby certify that this ordinance was passed by the Council of the ~~[CITY NAME]~~City of Duarte, at its meeting of ______________________.

[NAME], City Clerk

By ____

Deputy

Approved ____________________________

____

____

Mayor

Approved as to Form and Legality
[NAME], City Attorney

By ____
[NAME]
Deputy City Attorney

Date ________________________________

File No. ____________________________

MEMORANDUM

To: MS4 NPDES Permit File

From: Rafael Casillas, P.E., Public Works Manager

Date: June 26, 2013

Subject: Draft Low Impact Development Ordinance and Draft Green Streets Policy

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The Director of Community Development, City Engineer and Public Works Manager reviewed and discussed the template Draft Low Impact Development (LID) Ordinance and Draft Green Streets Policy that was developed by Larry Walker and Associates on behalf of the Los Angeles Permit Group. The Los Angeles Permit Group members are seeking clarification from the Regional Board staff on the deadline for applicability and final Ordinance and Policy adoption. The proposed LID Ordinance and Green Streets Policy implementation will be incorporated into the Municipal Code.

City of Duarte
1600 Huntington Drive, Duarte, CA 91010 - (626) 357-7931 - FAX (626) 358-0018

Green Street Policy (DRAFT)

Purpose

The City of Duarte Departm [illegible] f Community Developmen [illegible] nt green street BMPs for transportation corridors as [illegible] new and re [illegible] et and roadway projects, including Capital Improve [illegible] acted to demonstrate compliance with the NPDES MS4 Permit fo [illegible] geles R [illegible] No. R4-2012-0175).

Green streets are an amenity that provides ma [illegible] s including water quality improvement, groundwater replenishment, creation of attr [illegible] capes, creation of parks and wildlife habitats, and pedestrian and bicycle acc [illegible] re defined as right-of-way areas that incorporate infiltration, biofil [illegible] se BMPs to collect, retain, or detain stormwater runoff as wel [illegible] es attractive streetscapes.

Policy

A. Application. T [illegible] ent of Commu [illegible] lopment shall require new development and/or redev [illegible] reets and roadw [illegible] ts and CIP projects conducted within the right-of-way [illegible] tation corridors t [illegible] ate green street BMPs. Transportation corridors pro [illegible] adway projects [illegible] t least 10,000 square feet of impervious surface. Rou [illegible] nance or repair [illegible] utility pro [illegible] e excluded from these requirements [illegible] aintenance inc [illegible] y seals, [illegible] d reconstruction of the road or street [illegible] ginal line an [illegible] e mainta [illegible]

B. Amenities. The De [illegible] ities to replenish groundwate [illegible] e habitats, and provide pedestrian and bic [illegible] edevelopment of streets and roadway projects and CIPs.

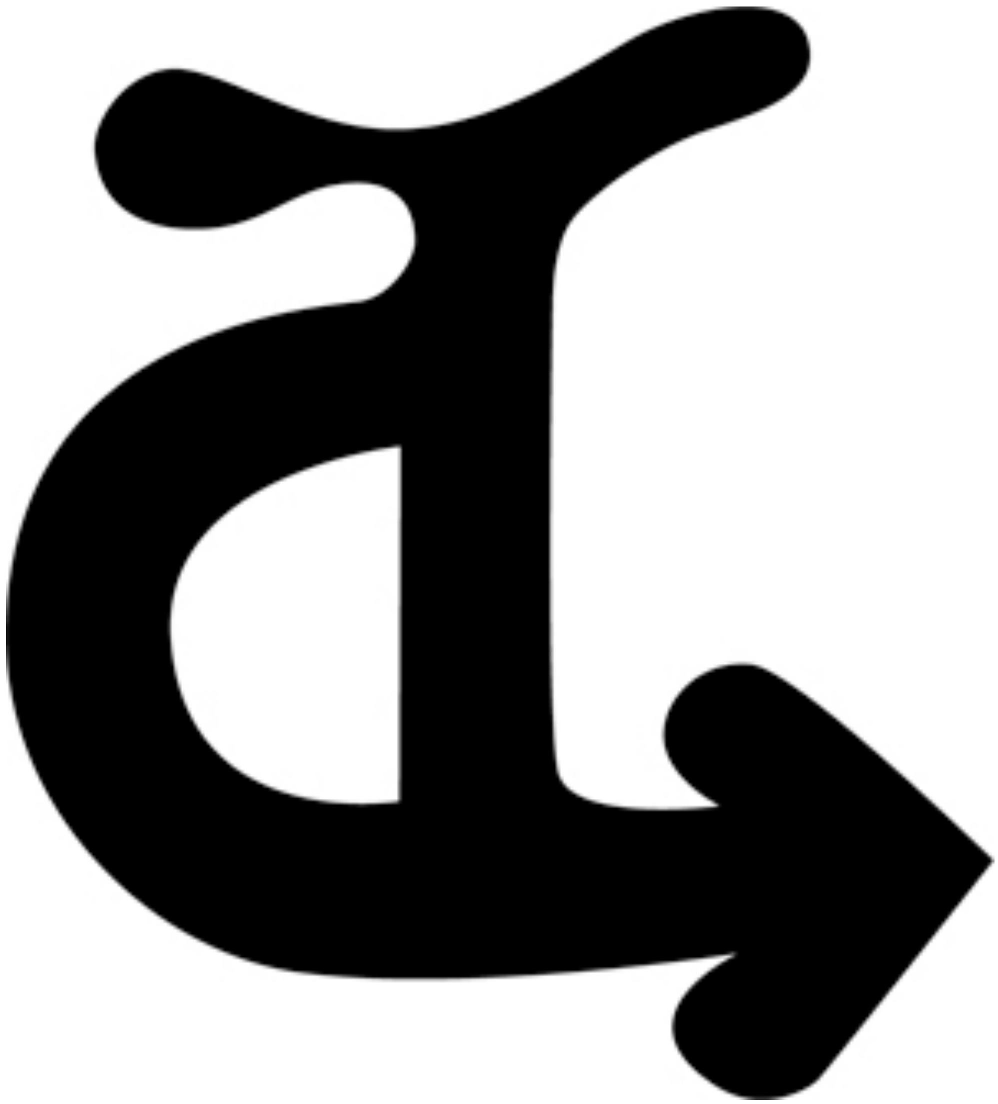
C. Guidance. The Department of Community Development sh [illegible] City of Los Angeles Green Streets guidance, USEPA's *Managing Wet Weather wi [illegible] een Infrastructure Municipal Handbook: Green Streets*[1], or equivalent guidance developed by the Department of Community Development for use in public and private developments.

D. Retrofit Scope. The Department of Community Development shall use the City's Watershed Management Program or Enhanced Watershed Management Program to identify opportunities

[1] EPA-833-F-08-009, December 2008.

for green street BMP retrofits. Final decisions regarding implementation will be determined by the City Engineer based on the availability of adequate funding.

E. Training. The Department of Community Development shall incorporate aspects of green streets into internal annual staff trainings.



City of MONROVIA 1887
Department of Public Works

CITY OF MONROVIA

File No. X.XX
Administrative Policy

Subject: GREEN STREETS POLICY **(DRAFT)**

Effective Date: **TBD**

I. POLICY OBJECTIVE

The City of Monrovia provides that the City of Monrovia shall *require the implementation of* green street BMPs for transportation corridors associated with new and redevelopment streets, shall implement green street BMPs for transportation corridors associated with roadway projects, including Capital Improvement Projects (CIPs). This policy is enacted to demonstrate compliance with the NPDES MS4 Permit for the Los Angeles Region (Order No. R4-2012-0175).

Green streets are an amenity that provides many benefits including water quality improvement, groundwater replenishment, creation of attractive streetscapes, creation of parks and wildlife habitats, and pedestrian and bicycle accessibility. Green streets are defined as right-of-way areas that incorporate infiltration, biofiltration, and/or storage and use BMPs to collect, retain, or detain stormwater runoff as well as a design element that creates attractive streetscapes.

II. AUTHORITY

Green Streets Policy as adopted by the City Council

III. ASSIGNED RESPOSIBILITIES

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The *Department of Public Works* shall condition projects pertaining to new and redevelopment of transportation corridors to implement green street BMPs. These project conditional shall apply to privately developed new and redevelopment streets. Additionally, the Department of Public Works shall ensure that green street BMPs for transportation corridors associated with roadway projects, including Capital Improvement Projects (CIPs), are implemented.

IV. APPLICABILITY

TBD

The Department of Public Works shall require new development and/or redevelopment streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs. Transportation corridors projects are *major arterials as defined in the City's General Plan* which add at least 10,000 square feet of impervious surface. Routine maintenance or repair and linear utility projects are excluded from these requirements. Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained.

V. POLICY

A. The *Department of Public Works* shall consider opportunities to replenish groundwater, create attractive streetscapes, create parks and wildlife habitats, and provide pedestrian and bicycle accessibility through new development and redevelopment of streets and roadway projects and CIPs.

B. The *Department of Public Works and Department of Community* Development shall use the City of Los Angeles Green Streets guidance, USEPA's *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets*[1], or equivalent guidance developed by the City] for use in public and private developments.

C. The *Department of Public Works and Department of Community* shall use the City's Watershed Management Program or Enhanced Watershed Management Program to identify opportunities for green street BMP retrofits. Final decisions regarding implementation will be determined by the *Director of Public Works* based on the availability of adequate funding.

D. The *Department of Public Works* shall incorporate aspects of green streets into internal annual staff trainings.

[1] EPA-833-F-08-009, December 2008.

DRAFT

Items highlighted in grey are optional clauses

ORDINANCE NO. 201X-XX

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF MONROVIA, CALIFORNIA AMENDING CHAPTER 12.36 OF TITLE 12 (STORMWATER AND URBAN RUNOFF POLLUTION CONTROL) OF THE MONROVIA MUNICIPAL CODE ESTABLISHING LOW IMPACT DEVELOPMENT REQUIREMENTS FOR NEW AND REDEVELOPED PROPERTIES

THE CITY COUNCIL OF THE CITY OF MONROVIA, CALIFORNIA does ordain as follows:

SECTON 1. Chapter 12.36 of Title 12 of the Monrovia Municipal Code is hereby amended by adding the following findings to Sections 12.36.020 as follows:

(H) The City of Monrovia is authorized by Article XI, §5 and §7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity.

(I) The City of Monrovia has authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity which might degrade the quality of waters of the State.

(J) The city is a permittee under the "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4," issued by the California Regional Water Quality Control Board--Los Angeles Region," (Order

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No. R4-2012-0175) which also serves as an NPDES Permit under the Federal Clean Water Act (NPDES No. CAS004001), as well as Waste Discharge Requirements under California law (the "Municipal NPDES permit"). In order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program, the Municipal NPDES permit requires permittees to develop and implement a LID Ordinance.

(K) The City of Monrovia has applied an integrated approach to incorporate wastewater, stormwater and runoff, and recycled water management into a single strategy through its Integrated Resources Plan.

(L) The City of Monrovia is committed to a stormwater management program that protects water quality and water supply by employing watershed-based approaches that balance environmental, social, and economic considerations.

(M) Urbanization has led to increased impervious surface areas resulting in increased water runoff causing the transport of pollutants to downstream receiving waters.

(N) The City of Monrovia needs to take a new approach to managing rainwater and urban runoff while mitigating the negative impacts of development and urbanization.

(O) LID is widely recognized as a sensible approach to managing the quantity and quality of storm water and non-stormwater runoff by setting standards and practices to maintain or restore the natural hydrologic character of a development site, reduce off-site runoff, improve water quality, and provide groundwater recharge.

(P) It is the intent of the City of Monrovia to replace the existing Standard Urban Stormwater Mitigation Plan (SUSMP) requirements by providing stormwater and rainwater LID strategies for Development and Redevelopment projects as defined under "Applicability." Where there are conflicts between this Ordinance and previously adopted SUSMP or LID Manuals, the standards in this Ordinance shall prevail.

SECTON 2. Chapter 12.36 of Title 12 of the Monrovia Municipal Code is hereby amended by amending the following definitions to Sections 12.36.040 as follows:
Except as specifically provided herein, any term used in this [SECTION REFERENCE] shall be defined as that term in the current Municipal NPDES permit, or if it is not specifically defined in either the Municipal NPDES permit, then as such term is defined in the Federal Clean Water Act, as amended, and/or the regulations promulgated thereunder. If the definition of any term contained in this chapter conflicts with the definition of the same term in the current Municipal NPDES permit, then the definition contained in the Municipal NPDES permit shall govern. The following words and phrases shall have the following meanings when used in this chapter:

AUTOMOTIVE SERVICE FACILITY. A facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5541, 5511, provided that these facilities have no outside activities or materials that may be exposed to stormwater (Source: Order No. R4-2012-0175).

BEST MANAGEMENT PRACTICE (BMP). Practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water (Source: Order No. R4-2012-0175).

REPLACE "CONSTRUCTION" WITH "CONSTRUCTION ACTIVITY". Any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that result in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See "Routine Maintenance" definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan (Source: Order No. R4-2012-0175).

POLLUTANT. Any "pollutant" defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Sec. 13373. Pollutants may include, but are not limited to the following:

(1) Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash, and sludge).

(2) Metals (such as cadmium, lead, zinc, copper, silver, nickel, chromium, and non- metals such as phosphorus and arsenic).

(3) Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants, and grease).

(4) Excessive eroded soil, sediment, and particulate materials in amounts that may adversely affect the beneficial use of the receiving waters, flora, or fauna of the State.

(5) Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables, and show facilities).

(6) Substances having characteristics such as pH less than 6 or greater than 9, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus.

(7) ??? Need to check on revision to #7

DEVELOPMENT. Construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

DISCHARGE. Any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

PLANNING PRIORITY PROJECTS. Development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s) (Modified from: Order No. R4-2012-0175).

PROJECT. All development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code §21065) (Source: Order No. R4-2012-0175).

REDEVELOPMENT. Land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

STANDARD URBAN STORM WATER MITIGATION PLAN OR SUSMP. The Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP was required as part of the previous Municipal NPDES Permit (Order No. 01-182, NPDES No. CAS004001) and required plans that designate best management practices (BMPs) that must be used in specified categories of development projects.

URBAN RUNOFF. Surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial, or industrial activities involving the use of potable and non-potable water.

STORMWATER RUNOFF. That part of precipitation (rainfall or snowmelt) which travels across a surface to the storm drain system or receiving waters.

SECTON 3. Chapter 12.36 of Title 12 of the Monrovia Municipal Code is hereby amended by adding the following definitions to Sections 12.36.040 as follows:

BASIN PLAN. The Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments (Source: Order No. R4-2012-0175).

BIOFILTRATION. A LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales (Modified from: Order No. R4-2012-0175).

BIORETENTION. A LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in the Municipal

NPDES permit, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by the Municipal NPDES permit as biofiltration (Modified from: Order No. R4-2012-0175).

BIOSWALE. A LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes (Source: Order No. R4-2012-0175).

~~**City** means the City of Monrovia.~~

CLEAN WATER ACT (CWA). The Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

COMMERCIAL MALLS. Any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers (Source: Order No. R4-2012-0175).

~~**Control** means to minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities (Source: Order No. R4-2012-0175).~~

~~**Directly Adjacent** means situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area (Source: Order No. R4-2012-0175).~~

~~**Disturbed Area** means an area that is altered as a result of clearing, grading, and/or excavation (Source: Order No. R4-2012-0175).~~

FLOW-THROUGH BMPS. Modular, vault type "high flow biotreatment" devices contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain (Modified from: Order No. R4-2012-0175).

GENERAL CONSTRUCTION ACTIVITIES STORM WATER PERMIT (GCASP). The general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from construction activities under certain conditions.

GENERAL INDUSTRIAL ACTIVITIES STORM WATER PERMIT (GIASP). The general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

GREEN ROOF. A LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain (Source: Order No. R4-2012-0175).

HAZARDOUS MATERIAL(S). Any material(s) defined as hazardous by Division 20, Chapter 6.95 of the California Health and Safety Code.

~~**Hillside** means a property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes (Source: Order No. R4-2012-0175).~~

HYDROMODIFICATION. The alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. Hydromodification can cause excessive erosion and/or sedimentation rates, causing excessive turbidity, channel aggradation and/or degradation. (Source: GCASP)

IMPERVIOUS SURFACE. Any man-made or modified surface that prevents or significantly reduces the entry of water into the underlying soil, resulting in runoff from the surface in greater quantities and/or at an increased rate, when compared to natural conditions prior to development. Examples of places that commonly exhibit impervious surfaces include parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from paving, compacted gravel, compacted earth, and oiled earth.

INDUSTRIAL PARK. Land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry (Source: Order No. R4-2012-0175).

INFILTRATION BMP. A LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement (Source: Order No. R4-2012-0175).

LID. Low Impact Development. LID consists of building and landscape features designed to retain or filter stormwater runoff (Source: Order No. R4-2012-0175).

MS4. Municipal Separate Storm Sewer System (MS4). The MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;

(ii) Designed or used for collecting or conveying stormwater;

(iii) Which is not a combined sewer; and

(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

(40 CFR § 122.26(b)(8)) (Source: Order No. R4-2012-0175)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405. The term includes an "approved program" (Source: Order No. R4-2012-0175).

NATURAL DRAINAGE SYSTEM. A drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system (Source: Order No. R4-2012-0175).

~~**New Development** means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision (Source: Order No. R4-2012-0175).~~

~~**Non-Stormwater Discharge** means any discharge to a municipal storm drain system that is not composed entirely of stormwater (Source: Order No. R4-2012-0175).~~

~~**Parking Lot** means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces (Source: Order No. R4-2012-0175).~~

PERSON. Any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, state, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine and the singular shall include the plural where indicated by the context.

RAINFALL HARVEST AND USE. A LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department (Source: Order No. R4-2012-0175).

RECEIVING WATER . "Water of the United States" into which waste and/or pollutants are or may be discharged (Source: Order No. R4-2012-0175).

~~**Regional Board** means the California Regional Water Quality Control Board, Los Angeles Region.~~

~~**Restaurant** means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812) (Source: Order No. R4-2012-0175).~~

~~**Retail Gasoline Outlet** means any facility engaged in selling gasoline and lubricating oils (Source: Order No. R4-2012-0175).~~

ROUTINE MAINTENANCE. Routine maintenance projects include, but are not limited to projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.

2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.

3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.

4. Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
5. Repair leaks

Routine maintenance does not include construction of new** lines or facilities resulting from compliance with applicable codes, standards and regulations.
* Update existing lines includes replacing existing lines with new materials or pipes.
** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines (Source: Order No. R4-2012-0175).

SIGNIFICANT ECOLOGICAL AREAS (SEAS). An area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.

2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.

3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.

4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.

5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.

6. Areas important as game species habitat or as fisheries.

7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.

8. Special areas (Source: Order No. R4-2012-0175).

~~**Site** means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity (Source: Order No. R4-2012-0175).~~

STORM DRAIN SYSTEM. Any facilities or any part of those facilities, including streets, gutters, conduits, natural or artificial drains, channels, and watercourses that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City of Monrovia.

STORM WATER OR STORMWATER. Water that originates from atmospheric moisture (rain or snow) and that falls onto land, water, or other surfaces. Without any change in its meaning, this term may be spelled or written as one word or two separate words.

SECTON 4. Chapter 12.36 of Title 12 of the Monrovia Municipal Code is hereby amended by adding a new Section 12.36.XXX:

"12.36.XXX. STORMWATER POLLUTION CONTROL MEASURES FOR DEVELOPMENT PLANNING AND CONSTRUCTION ACTIVITIES

(A) Objective. The provisions of this section contain requirements for construction activities and facility operations of Development and Redevelopment projects to comply with the current "Municipal NPDES permit," lessen the water quality impacts of development by using smart growth practices, and integrate LID design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use. LID shall be inclusive of previously adopted SUSMP requirements.

(B) Scope. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment projects and authorizes the City of Monrovia to further define and adopt stormwater pollution control measures, to develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies, and to grant waivers or alternate compliance as allowed by the Municipal NPDES permit and collect fees from projects granted exceptions. . Except as otherwise provided herein, the City of Monrovia shall administer, implement and enforce the provisions of this Section. Guidance documents supporting implementation of requirements in this Ordinance are hereby incorporated by reference, including SUSMP and LID Manuals.

(C) Applicability. The following Development and Redevelopment projects, termed "Planning Priority Projects," shall comply with the requirements of [SECTION NUMBER]:

(1) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.

(2) Industrial parks 10,000 square feet or more of surface area.

(3) Commercial malls 10,000 square feet or more of surface area.

(4) Retail gasoline outlets with 5,000 square feet or more of surface area.

(5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of surface area.

(6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.

(7) Streets and roads construction of 10,000 square feet or more of impervious surface area.

(8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.

(9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will:

a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and

b. Create 2,500 square feet or more of impervious surface area

(10) Single-family hillside homes.

(11) Redevelopment Projects

a. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.

b. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.

c. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

d. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

e. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

(12) Any other project as deemed appropriate by the Director.

(D) Effective Date. The Planning and Land Development requirements contained in this Ordinance shall become effective XX days from the adoption of the Ordinance. This includes Planning Priority Projects that are discretionary permit projects or project phases that have not been deemed complete for processing, or discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals within 90 days of adoption of the Ordinance. Projects that have been deemed complete within 90 days of adoption of the Ordinance are not subject to the requirements of this Chapter.

(E) Stormwater Pollution Control Requirements. The Site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

(1) A new single-family hillside home development shall include mitigation measures to:

a. Conserve natural areas;

b. Protect slopes and channels;

c. Provide storm drain system stenciling and signage;

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and

e. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.

(2) Street and road construction of 10,000 square feet or more of impervious surface shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) to the maximum extent practicable.

(3) The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:

a. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

i. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

ii. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

b. Minimize hydromodification impacts to natural drainage systems as defined in the Municipal NPDES Permit. Hydromodification requirements are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

c. When, as determined by the [APPROVING AGENCY], 100 percent onsite retention of the SWQDv is technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted LID Plan. The technical infeasibility may result from conditions that may include, but are not limited to:

    i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.

    ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;

    iii. Locations within 100 feet of a groundwater well used for drinking water;

    iv. Brownfield development sites or other locations where pollutant mobilization is a documented concern;

    v. Locations with potential geotechnical hazards;

    vi. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

d. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the Municipal NPDES Permit.

    i. Additional alternative compliance options such as offsite infiltration may be available to the project Site. The project Site should contact the [APPROVING AGENCY] to determine eligibility. Alternative compliance options are further specified in [NAME OF POST-CONSTRUCITON BMP HANDBOOK].

e. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per the Municipal NPDES Permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

    i. 0.2 inches per hour, or
    ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

f. A Multi-Phased Project may comply with the standards and requirements of this section for all of its phases by: (a) designing a system acceptable to the [APPROVING AGENCY] to satisfy these standards and requirements for the entire Site during the first phase, and (b) implementing these standards and requirements for each phase of Development or Redevelopment of the Site during the first phase or prior to commencement of construction of a later phase, to the extent necessary to treat the stormwater from such later phase. For purposes of this section, "Multi-Phased Project" shall mean any Planning Priority Project implemented over more than one phase and the Site of a Multi-Phased Project shall include any land and water area designed and used to store, treat or manage stormwater runoff in connection with the Development or Redevelopment, including any tracts, lots, or parcels of real property, whether Developed or not, associated with, functionally connected to, or under common ownership or control with such Development or Redevelopment.

(E) Other Agencies of the City of Monrovia. All City of Monrovia departments, offices, entities and agencies, shall establish administrative procedures necessary to implement the provisions of this Article on their Development and Redevelopment projects and report their activities annually to the [REPSONSIBLE AGENCY].

(F) Validity. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance are declared to be severable.

SECTION X. Severability. If any section, subsection, subdivision, sentence, clause, phrase, or portion of this ordinance or the application thereof to any person or place, is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remainder of this ordinance. The City Council hereby declares that it would have adopted this ordinance, and each and every section, subsection, subdivision, sentence, clause, phrase, or portion thereof, irrespective of the fact that any one or more sections, subsections, subdivisions, sentences, clauses, phrases, or portions thereof be declared invalid or unconstitutional.

SECTION X. The City Clerk shall certify to the passage of this ordinance and shall cause same to be published pursuant to state law within fifteen (15) days after its passage, and this ordinance shall become effective thirty (30) days after its passage.

INTRODUCED this X[st] day of [MONTH] 201X.

PASSED, APPROVED, AND ADOPTED this X[st] day of [MONTH] 201X. by the following vote:

AYES:
NOES:
ABSTAIN:
EXCUSED:

BY:

Mary Ann Lutz, Mayor
City of Monrovia

ATTEST:

Alice D. Atkins, CMC, City Clerk
City of Monrovia

APPROVED AS TO FORM:

Craig A. Steele, City Attorney
City of Monrovia

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES)
CITY OF MONROVIA)

I, ALICE D. ATKINS, CMC, City Clerk of the City of Monrovia, California, do hereby certify that the foregoing Ordinance No. 201X-XX authorizing the City Council to contract for residential solid waste, green waste and recyclable materials collection was duly adopted and passed at a regular meeting of the City Council on the Xth day of [MONTH] 201X by the following vote:

AYES:
NOES:
ABSTAIN:
EXCUSED:

ATTEST:

Alice D. Atkins, CMC, City Clerk
City of Monrovia

CITY OF MONROVIA

INTER-OFFICE MEMORANDUM

DATE: June 24, 2013

TO: MS4 NPDES Permit File

FROM: Heather Maloney, Senior Management Analyst

SUBJECT: **Draft Low Impact Development Ordinance and Draft Green Streets Policy Status**

This memo is to document that the Draft LID Ordinance and Draft Green Streets Policy have been review and discussed with key City staff. On May 7, 2013, I met with the following City Staff:

- Jun Cervantes, City Engineer
- Craig Jiminez, Planning Division Manager
- Brian O'Connor, Planning Management Analyst
- Sharon Gallant, Environemental Services Management Analyst

During the meeting, we reviewed the Template/Draft LID Ordinance and Draft Green Streets Policy language that was developed by Larry Walker and Associates on behlaf of the LA Permit Group. Furthermore, we discussed a rough Final Ordinance and Policy development timeline, potential coforming changes that would need to take place in other Municipal Code/General Plan sections, CEQA review, and technical consulting and legal assistance needed.

In June 2013, the Draft LID Ordinance and Draft Green Streets Policy was also dicussed with the contract engineer utilized by the City for plan reviews. He indicated he understod the drafts and requested clarification on when they would be implemented and applicable to new/redvelopement and streets projects. I told him that I along with several other LA Permit Group members were trying to seek clarification from Regional Board staff on this guideline as the deadline for applicability and final Ordinance/Policy adoption is not clearly called out in the MS4 Permit.

The Draft LID Ordinance and Draft Green Streets Policy have also been discussed with our Director of Public Works, City Manager and City Attorney's Office on several occasions.

City of Sierra Madre

Public Works Department
232 W. Sierra Madre Boulevard, Sierra Madre, CA 91024
phone 626.355.7135 fax 626.355.2251

DRAFT

Draft Green Streets Policy
6/25/2013

Green Street Policy

Purpose

The City of Sierra Madre's Department of Public Works shall implement green street BMPs for transportation corridors associated with new and redevelopment street and roadway projects, including Capital Improvement Projects (CIPs). This policy is enacted to demonstrate compliance with the NPDES MS4 Permit for the Los Angeles Region (Order No. R4-2012-0175).

Green streets are an amenity that provides many benefits including water quality improvement, groundwater replenishment, creation of attractive streetscapes, creation of parks and wildlife habitats, and pedestrian and bicycle accessibility. Green streets are defined as right-of-way areas that incorporate infiltration, biofiltration, and/or storage and use BMPs to collect, retain, or detain stormwater runoff as well as a design element that creates attractive streetscapes.

Policy

A. Application. The Department of Public Works shall require new development and/or redevelopment streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs. Transportation corridors projects are major arterials as defined in the (add year, existing or updated) Sierra Madre General Plan which add at least 10,000 square feet of impervious surface. Routine maintenance or repair and linear utility projects are excluded from these requirements. Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained.

B. Amenities. The Department of Public Works shall consider opportunities to replenish groundwater, create attractive streetscapes, create parks and wildlife habitats, and provide pedestrian and bicycle accessibility through new development and redevelopment of streets and roadway projects and CIPs.

C. Guidance. The Department of Public Works shall use the City of Los Angeles Green Streets guidance, USEPA's *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets*[1], or equivalent guidance developed by the Department of Public Works for use in public and private developments.

D. Retrofit Scope. The Department of Public Works shall use the City's Watershed Management Program or Enhanced Watershed Management Program to identify opportunities for green street BMP retrofits. Final decisions regarding implementation will be determined by the Director of Public Works based on the availability of adequate funding.

E. Training. The Department of Public Works shall incorporate aspects of green streets into internal annual staff trainings.

[1] EPA-833-F-08-009, December 2008.

City of Sierra Madre

Public Works Department
232 W. Sierra Madre Boulevard, Sierra Madre, CA 91024
phone 626.355.7135 fax 626.355.2251

DRAFT

Draft Low Impact Development Ordinance
6/25/2013

ORDINANCE NO. XX-XX

An ordinance amending [MUNICIPAL CODE SECTION REFERENCE(S)] of the City of Sierra Madre Municipal Code to expand the applicability of the existing Sierra Madre Municipal Code sections 15.04.070 “Building Code and Permits - Stormwater retention”and Sierra Madre Municipal Code Chapter 7.04 “Stormwater Pollutant Elimination” requirements by imposing Low Impact Development (LID) strategies on projects that require building permits.

Findings.

(A) The City of Sierra Madre is authorized by Article XI, §5 and §7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity.

(B) The City of Sierra Madre has authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity which might degrade the quality of waters of the State.

(C) The city is a permittee under the “Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4,” issued by the California Regional Water Quality Control Board--Los Angeles Region,” (Order No. R4-2012-0175) which also serves as an NPDES Permit under the Federal Clean Water Act (NPDES No. CAS004001), as well as Waste Discharge Requirements under California law (the “Municipal NPDES permit”). In order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program, the Municipal NPDES permit requires permittees to develop and implement a LID Ordinance.

(D) The City of Sierra Madre is committed to a stormwater management program that protects water quality and water supply by employing watershed-based approaches that balance environmental and economic considerations.

(E) Urbanization has led to increased impervious surface areas resulting in increased water runoff and less percolation to groundwater aquifers causing the transport of pollutants to downstream receiving waters.

(F) The City of Sierra Madre seeks to update its approach to managing rainwater and urban runoff while mitigating the negative impacts of development and urbanization.

(G) LID is widely recognized as a sensible approach to managing the quantity and quality of stormwater runoff by setting standards and practices to maintain or restore the natural hydrologic character of a development site, reduce off-site runoff, improve water quality, and provide groundwater recharge.

(H) It is the intent of the City of Sierra Madre to expand the applicability of the existing Standard Urban Stormwater Mitigation Plan (SUSMP) requirements by providing stormwater and rainwater LID strategies for Development and Redevelopment projects as defined under "Applicability."

[MUNICIPAL CODE SECTION REFERENCE(S)] of the City of Sierra Madre Municipal Code is amended in its entirety to read as follows:

Definitions.

Except as specifically provided herein, any term used in this [SECTION REFERENCE] shall be defined as that term in the current Municipal NPDES permit, or if it is not specifically defined in either the Municipal NPDES permit, then as such term is defined in the Federal Clean Water Act, as amended, and/or the regulations promulgated thereunder. If the definition of any term contained in this chapter conflicts with the definition of the same term in the current Municipal NPDES permit, then the definition contained in the Municipal NPDES permit shall govern. The following words and phrases shall have the following meanings when used in this chapter:

Automotive Service Facility means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5541, 5511, provided that these facilities have no outside activities or materials that may be exposed to stormwater (Source: Order No. R4-2012-0175).

Basin Plan means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments (Source: Order No. R4-2012-0175).

Best Management Practice (BMP) means practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water (Source: Order No. R4-2012-0175).

Best Management Practice (BMP) Manual means a manual identified to assist applicants with meeting the requirements of this chapter. The BMP Manual shall be selected by the City Engineer and may be updated, or replaced from time to time when additional qualified and available specifications are produced. The BMP Manual shall be available at the Development Services and Public Works Departments for public access.

Biofiltration means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales (Modified from: Order No. R4-2012-0175).

Bioretention means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in the Municipal NPDES permit, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by the Municipal NPDES permit as biofiltration (Modified from: Order No. R4-2012-0175).

Bioswale means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes (Source: Order No. R4-2012-0175).

City means the City of Sierra Madre.

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

Commercial Malls means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers (Source: Order No. R4-2012-0175).

Construction Activity means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that result in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See “Routine Maintenance” definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan (Source: Order No. R4-2012-0175).

Control means to minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities (Source: Order No. R4-2012-0175).

Development means construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include -- certain conditions.

Green Roof means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain (Source: Order No. R4-2012-0175).

Hazardous Material(s) means any material(s) defined as hazardous by Division 20, Chapter 6.95 of the California Health and Safety Code.

Hillside means a property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes (Source: Order No. R4-2012-0175).

Impervious Surface means any man-made or modified surface that prevents or significantly reduces the entry of water into the underlying soil, resulting in runoff from the surface in greater quantities and/or at an increased rate, when compared to natural conditions prior to development. Examples of places that commonly exhibit impervious surfaces include parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from paving, compacted gravel, compacted earth, and oiled earth.

Industrial Park means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry (Source: Order No. R4-2012-0175).

Infiltration BMP means a LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement (Source: Order No. R4-2012-0175).

LID means Low Impact Development. LID consists of building and landscape features designed to retain or filter stormwater runoff (Source: Order No. R4-2012-0175).

MS4 means Municipal Separate Storm Sewer System (MS4). The MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a combined sewer; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

(40 CFR § 122.26(b)(8)) (Source: Order No. R4-2012-0175)

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA

§307, 402, 318, and 405. The term includes an “approved program” (Source: Order No. R4-2012-0175).

Natural Drainage System means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system (Source: Order No. R4-2012-0175).

New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision (Source: Order No. R4-2012-0175).

Non-Stormwater Discharge means any discharge to a municipal storm drain system that is not composed entirely of stormwater (Source: Order No. R4-2012-0175).

Parking Lot means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces (Source: Order No. R4-2012-0175).

Person means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, state, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine and the singular shall include the plural where indicated by the context.

Planning Priority Projects means development projects subject to City conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s) (Modified from: Order No. R4-2012-0175).

Pollutant means any “pollutant” defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Sec. 13373. Pollutants may include, but are not limited to the following:

(1) Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash, and sludge).

(2) Metals (such as cadmium, lead, zinc, copper, silver, nickel, chromium, and non-metals such as phosphorus and arsenic).

(3) Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants, and grease).

(4) Excessive eroded soil, sediment, and particulate materials in amounts that may adversely affect the beneficial use of the receiving waters, flora, or fauna of the State.

(5) Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables, and show facilities).

(6) Substances having characteristics such as pH less than 6 or greater than 9, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus.

Project means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code §21065) (Source: Order No. R4-2012-0175).

Rainfall Harvest and Use means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department (Source: Order No. R4-2012-0175).

Receiving Water means "water of the United States" into which waste and/or pollutants are or may be discharged (Source: Order No. R4-2012-0175).

Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

Regional Board means the California Regional Water Quality Control Board, Los Angeles Region.

Restaurant means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812) (Source: Order No. R4-2012-0175).

Retail Gasoline Outlet means any facility engaged in selling gasoline and lubricating oils (Source: Order No. R4-2012-0175).

Routine Maintenance

Routine maintenance projects include, but are not limited to projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.
4. Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
5. Repair leaks

Routine maintenance does not include construction of new** lines or facilities resulting from
compliance with applicable codes, standards and regulations.
* Update existing lines includes replacing existing lines with new materials or pipes.
** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines (Source: Order No. R4-2012-0175).

Significant Ecological Areas (SEAs) means an area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.
2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.
3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.
4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.
5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.
6. Areas important as game species habitat or as fisheries.
7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.
8. Special areas (Source: Order No. R4-2012-0175).

Site means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity (Source: Order No. R4-2012-0175).

Storm Drain System means any facilities or any part of those facilities, including streets, gutters, conduits, natural or artificial drains, channels, and watercourses that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City of Sierra Madre.

Storm Water or Stormwater means water that originates from atmospheric moisture (rain or snow) and that falls onto land, water, or other surfaces. Without any change in its meaning, this term may be spelled or written as one word or two separate words.

Stormwater Runoff means that part of precipitation (rainfall or snowmelt) which travels across a surface to the storm drain system or receiving waters.

SUSMP means the Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP was required as part of the previous Municipal NPDES Permit (Order No. 01-182, NPDES No. CAS004001) and required plans that designate best management practices (BMPs) that must be used in specified categories of development projects.

Urban Runoff means surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial, or industrial activities involving the use of potable and non-potable water.

Sierra Madre Municipal Code Section 15.04.070 is amended to read as follows:

STORMWATER POLLUTION CONTROL MEASURES FOR DEVELOPMENT PLANNING AND CONSTRUCTION ACTIVITIES

(A) Objective. The provisions of this section contain requirements for construction activities and facility operations of Development and Redevelopment projects to comply with the current “Municipal NPDES permit,” lessen the water quality impacts of development, and integrate LID design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use. LID shall be inclusive of SUSMP requirements.

(B) Scope. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment projects and authorizes the City of Sierra Madre to further define and adopt stormwater pollution control measures, develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies, grant waivers from the requirements of the Standard Urban Stormwater Mitigation Plan, and collect funds for projects that are granted waivers. Except as otherwise provided herein, the City of Sierra Madre shall administer, implement and enforce the provisions of this Section.

(C) Applicability. The following Development and Redevelopment projects, termed “Planning Priority Projects,” shall comply with the requirements of 15.04.070.

(1) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.

(2) Industrial parks 10,000 square feet or more of surface area.

(3) Commercial malls 10,000 square feet or more of surface area.

(4) Retail gasoline outlets with 5,000 square feet or more of surface area.

(5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of surface area.

(6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.

(7) Streets and roads construction of 10,000 square feet or more of impervious surface area.

(8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.

(9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will:

   a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and

   b. Create 2,500 square feet or more of impervious surface area

(10) Single-family hillside homes.

(11) Redevelopment Projects

   a. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.

   b. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.

   c. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

d. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

e. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

(D) Effective Date. The Planning and Land Development requirements contained in Section 7 of Order No. R4-2012-0175 shall become effective 90 days from the adoption of the Order (February 6, 2013). This includes Planning Priority Projects that are discretionary permit projects or project phases that have not been deemed complete for processing, or discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals within 90 days of adoption of the Order. Projects that have been deemed complete within 90 days of adoption of the Order are not subject to the requirements Section 7.

(E) Stormwater Pollution Control Requirements. The Site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

(1) A new single-family hillside home development shall include mitigation measures to:

a. Conserve natural areas;

b. Protect slopes and channels;

c. Provide storm drain system stenciling and signage;

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and

e. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.

(2) Street and road construction of 10,000 square feet or more of impervious surface shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) to the maximum extent practicable.

(3) The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:

a. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

i. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

ii. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

b. When, as determined by the City Engineer, 100 percent onsite retention of the SWQDv is technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted LID Plan. The technical infeasibility may result from conditions that may include, but are not limited to:

i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.

ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;

iii. Locations within 100 feet of a groundwater well used for drinking water;

iv. Brownfield development sites or other locations where pollutant mobilization is a documented concern;

v. Locations with potential geotechnical hazards;

c. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the Municipal NPDES Permit.

i. Additional alternative compliance options such as offsite infiltration may be available to the project Site. The project Site should contact the City Engineer to determine eligibility.

d. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per the Municipal NPDES Permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

i. 0.2 inches per hour, or

ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

e. A Multi-Phased Project may comply with the standards and requirements of this section for all of its phases by: (a) designing a system acceptable to the City Engineer to satisfy these standards and requirements for the entire Site during the first phase, and (b) implementing these standards and requirements for each phase of Development or Redevelopment of the Site during the first phase or prior to commencement of construction of a later phase, to the extent necessary to treat the stormwater from such later phase. For purposes of this section, “Multi-Phased Project” shall mean any Planning Priority Project implemented over more than one phase and the Site of a Multi-Phased Project shall include any land and water area designed and used to store, treat or manage stormwater runoff in connection with the Development or Redevelopment, including any tracts, lots, or parcels of real property, whether Developed or not, associated with, functionally connected to, or under common ownership or control with such Development or Redevelopment.

(E) Other Agencies of the City of Sierra Madre. All City of Sierra Madre departments, offices, entities and agencies, shall establish administrative procedures necessary to implement the provisions of this Article on their Development and Redevelopment projects and report their activities annually to the Department of Public Works.

(F) Validity. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance are declared to be severable.

(G) Certification. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy.

I hereby certify that this ordinance was passed by the Council of the City of Sierra Madre at its meeting of ________________________.

Nancy Shollenberger, City Clerk

By

____

Deputy

Approved ___________________________

______

____

Mayor

Approved as to Form and Legality
[NAME], City Attorney

By ____
[NAME]
Deputy City Attorney

Date _______________________________

File No. _____________________________

City of Sierra Madre

Memo

To: 2012/2013 NPDES New Permit File

From: James Carlson, Management Analyst

Date: June 25, 2013

Re: Development of Low Impact Development (LID) Ordinance and Green Streets Policy

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This memo is to document the progress of the City of Sierra Madre's efforts to produce both a Low Impact Development (LID) Ordinance and Green Streets Policy. The origin of these efforts can be identified by the necessities that are required by the new MS4 permit. The importance of developing (and now updating) these items is further warranted by our current water source emergency.

On December 11, 2012 the Sierra Madre City Council adopted resolution 12-92 which included the immediate adoption of the City of Los Angeles LID Ordinance and the City of Los Angeles Green Streets Policy. This also included the associated BMP Manuals. Resolution 12-92 was adopted to ensure that the City of Sierra Madre had an LID Ordinance and Green Street's Policy in place as an interim measure while staff worked to update both the ordinance and policy to more closely fit with Sierra Madre's conditions. The ordinance has been in effect and used during all qualifying plan checks.

The City of Sierra Madre also contributed funds to the San Gabriel Valley Council of Governments to work with Larry Walker and Associates to create templates of an LID Ordinance and Green Street Policy. I have been working with Public Works Director Bruce Inman, City Engineer Kev Tcharkhoutian, and City Attorney Theresa Highsmith in this development. The update to our interim LID Ordinance and Green Streets policy is tentatively scheduled to go back to the City Council for approval on July 23, 2013.

Thank you!

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Attachment C

MS4 Permit TMDL WQOs

This attachment includes tables summarizing the existing Total Maximum Daily Load (TMDL) requirements relevant to the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG), corresponding with **Section 1.3.2** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP). The following TMDL water quality objectives are outlined in this attachment, based on the Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit:

- Los Angeles River (LAR) Watershed Trash TMDL;
- LAR Nitrogen Compounds and Related Effects TMDL;
- LAR and Tributaries Metals TMDL;
- LAR Watershed Bacteria TMDL;
- Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (DC and LA Harbor Toxic Pollutants TMDL);
- San Gabriel River Metals and Impaired Tributaries Metals and Selenium TMDL (USEPA TMDL); and
- Los Angeles Area Lakes TMDLs (USEPA TMDL) for Peck Road Park Lake.

Attachment C List of Tables

Table C-1 demonstrates which RH/SGRWQG members are affected by each of the TMDLs per Attachment K, Table K-5, K-6, K-9, and K-10 of the Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit.

Table C-1 RH/SGRWQG TMDLs and Applicability

RH/SGRWQG Member	LAR Watershed Trash TMDL	LAR Nitrogen Compounds and Related Effects TMDL	LAR and Tributaries Metals TMDL	LAR Watershed Bacteria TMDL	Los Angeles Area Lakes TMDLs for Peck Road Park Lake	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxics TMDL	SGR and Impaired Tributaries Metals and Selenium TMDL
Arcadia	X	X	X	X	X		X
Azusa					X		X
Bradbury	X	X	X	X	X		X
Duarte	X	X	X	X	X		X
Monrovia	X	X	X	X	X		X
Sierra Madre	X	X	X	X	X		
County of Los Angeles	X	X	X	X	X	X	X
LACFCD		X	X	X	X	X	X

LAR Watershed Trash TMDL

The litigation and implementation history of the LAR Watershed Trash TMDL is complex, however the current TMDL was adopted by the Los Angeles Regional Water Quality Control Board (LARWQCB) as Resolution 2007-012, which became effective on September 23, 2008. Simplistically, TMDL compliance is assessed based on Daily Generation Rate (DGR) studies, the remainder of the catchment not protected by Full Capture Certified Devices (FCCDs), or a combination of both metrics. **Table C-2** and **Table C-3** list (in gallons and pounds) interim and final DGR estimated residual Water Quality-Based Effluent Limitations (WQBELs) from Attachment O Part A.3 of the MS4 Permit, while the allowable remainder of the catchment unprotected by FCCDs is identified in parentheses within the table header rows.

Table C-2 LAR Watershed Trash TMDL Effluent Limitations per Storm Year (gal of uncompressed trash)						
Permittees	**Baseline**	**2012 (30%)**	**2013 (20%)**	**2014 (10%)**	**2015 (3.3%)**	**2016 (0%)**
Arcadia	50108	15032	10022	5011	1654	0
Bradbury	4277	1283	855	428	141	0
Duarte	12210	3663	2442	1221	403	0
Monrovia	46687	14006	9337	4669	1541	0
Sierra Madre	11611	3483	2322	1161	383	0
County of Los Angeles	310223	93067	62045	31022	10237	0

Table C-3 LAR Watershed Trash TMDL Effluent Limitations per Storm Year (lbs of drip dry trash)						
Permittees	**Baseline**	**2012 (30%)**	**2013 (20%)**	**2014 (10%)**	**2015 (3.3%)**	**2016 (0%)**
Arcadia	93036	27911	18607	6876	2269	0
Bradbury	12160	3648	2432	1216	401	0
Duarte	23687	7106	4737	2369	782	0
Monrovia	100988	30296	20198	10099	3333	0
Sierra Madre	25192	7558	5038	2519	831	0
County of Los Angeles	651806	195542	130361	65181	21510	0

The final WQBEL of zero trash discharged, or catchment area unprotected, is to be achieved for the 2016 storm year that begins on October 1, 2015 and ends on September 30, 2016. During the current period from October 1, 2013 to September 30, 2014, 90% of the baseline study trash volume or weight must be captured based on DGR study analysis and only 10% estimated to have been discharged. Alternatively, 90% of a Permittee catchment may be protected by FCCDs, leaving 10% unprotected.

LAR Nitrogen Compounds and Related Effects TMDL

The LAR Nitrogen TMDL was adopted by the LARWQCB as Resolution 2003-009 and became effective on March 23, 2004. Site Specific Objectives (SSOs) for ammonia were approved by the State Water Resources Control (SWRCB) Board on June 4, 2013. This TMDL has been primarily addressed by Publically Owned Treatment Works (POTWs), or Water Recovery Plants (WRPs), and MS4 Permittee discharges do not appear to cause or contribute to the exceedance of the applicable Receiving Water Limitations (RWLs). **Table C-4** lists the currently effective TMDL WQBELs, as identified in Attachment O, Part B.2 of the MS4 Permit, which the RH/SGRWQG Permittee discharges would be expected to comply with as assessed through the Coordinated Integrated Monitoring Program (CIMP).

Table C-4 LAR Nitrogen Compounds and Related Effects TMDL Final WQBELs					
Water Body	**NH_3-N (mg/L)**		**NO_3-N (mg/L)**	**NO_2-N (mg/L)**	**NO_3-N+NO_2-N (mg/L)**
	One-hour Average	**Thirty-day Average**	**Thirty-day Average**	**Thirty-day Average**	**Thirty-day Average**
LAR below LAG	8.7	2.4	8.0	1.0	8.0
Rio Hondo Reach 1 and 2	10.1	2.3	8.0	1.0	8.0

LAG = Los Angeles-Glendale WRP

LAR and Tributaries Metals TMDL

The litigation and implementation history of the LAR and Tributaries Metals TMDL is complex, however the current TMDL was adopted by the LARWQCB as Resolution 2007-014 and became effective on October 29, 2008. The TMDL assesses compliance based on the load or concentration of several metals in comparison to the California Toxic Rule (CTR) values, during dry- and wet-weather conditions. Dry-weather is defined as days when the maximum daily flow in the Los Angeles River is less than 500 cubic feet per second (cfs) as measured at the Wardlow Street gauge station in Long Beach. Since metal toxicity is correlated to bioavailability, which is higher for dissolved metals, and decreases in the presence of competing cations, as assessed by water hardness, the permit and TMDL WQBEL values were determined using total to dissolved "translator" values, prepared by the USEPA, weather, and water body specific hardness data, which results in relatively significant variability in WQBELs among the various water body and weather combinations. Furthermore, local water characteristics, such as organic content, may result in Water Effect Ratios (WERs) and SSOs that alter the preliminary toxicity assessment used in developing a TMDL and may change the final numeric WQBELs.

Table C-5 through **Table C-8** list the "final" WQBELs that may be of importance to the RH/SGRWQG, subject to any future basin plan amendments, established by the LAR and Tributaries Metals TMDL and identified in Attachment O Parts C.2 and C.3 of the MS4 Permit. **Table C-5** lists the grouped (shared) dry-weather final WQBELs, expressed as total recoverable metals daily loads. Dry-weather flows in Rio Hondo Reach 1, have normally been much lower than the TMDL estimate of 0.5 cfs, however TMDL watershed compliance has generally been first assessed based on concentration, rather than load.

Table C-5 LAR Metals TMDL Dry-Weather Final WQBELs Expressed as Total Recoverable Metals

Water Body	Effluent Limitations Daily Maximum (kg/day)		
	Copper	Lead	Zinc
LAR Reach 2	WER[1] x 0.13	WER[1] x 0.07	--
LAR Reach 1	WER[1] x 0.14	WER[1] x 0.07	--
Rio Hondo Reach 1	WER[1] x 0.01	WER[1] x 0.006	WER[1] x 0.16

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process

Concentration based dry-weather WQBEL that may be of importance to the RH/SGRWQG are summarized in **Table C-6**.

Table C-6 LAR Metals TMDL Concentration Based Dry-Weather Final WQBELs Expressed as Total Recoverable Metals

Water Body	Effluent Limitations Daily Maximum (µg)		
	Copper	Lead	Zinc
LAR Reach 2	WER[1] x 22	WER[1] x 11	--
LAR Reach 1	WER[1] x 23	WER[1] x 12	--
Rio Hondo Reach 1	WER[1] x 13	WER[1] x 5.0	WER[1] x 131

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process

Load and approximate concentration based wet-weather WQBELs that are applicable to the RH/SGRWQG are summarized in **Table C-7**. Since the TMDL includes both Waste Loads (WLs) and WLAs, and multiple discharge groups, the WQBEL concentration for MS4 Permittees varies with the volume of runoff measured at Wardlow Street, but the rightmost column is a serviceable first order estimate.

Table C-7 LAR Metals TMDL Wet-Weather Final WQBEL Expressed as Total Recoverable Metals

Constituent	Effluent Limitations Daily Maximum (kg/day)	Approximate Effluent Limitation (µg/L)
Cadmium	$WER^1 \times 2.8 \times 10^{-9} \times$ daily volume (L) - 1.8	$WER^1 \times 2.8$
Copper	$WER^1 \times 1.5 \times 10^{-8} \times$ daily volume (L) - 9.5	$WER^1 \times 15$
Lead	$WER^1 \times 5.6 \times 10^{-8} \times$ daily volume (L) - 3.85	$WER^1 \times 56$
Zinc	$WER^1 \times 1.4 \times 10^{-7} \times$ daily volume (L) - 83	$WER^1 \times 140$

1 WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process

Table C-8 outlines the interim and final Metals TMDL WQBELs schedule which Permittees are expected to comply with through the EWMP and RAA development process. Since the RH/SGRWQG affected by this TMDL is located within Jurisdictional Group 2, it should be noted that the June 29, 2012 Implementation Study, funded by the Permittees, identified Watershed Control Measures to achieve the interim and final WQBELs. Among the more important measures was State Senate Bill 346, chaptered in September 2010, which called for phased elimination of copper from automotive friction (brake) pads. A similar effort to reduce the zinc content in automotive tires has also been initiated, but is many years from being chaptered.

Table C-8 LAR Metals TMDL Schedule of Interim and Final WQBELs

Deadline	Total Drainage Area Served by the MS4 required to meet the water quality-based effluent limitations (%)	
	Dry Weather	Wet Weather
January 11, 2012	50	25
January 11, 2020	75	-
January 11, 2024	100	50
January 11, 2028	100	100

Along with most other LAR Watershed municipalities, the RH/SGRWQG Permittees supported a study to develop Copper WER and Lead Recalculation SSOs that will become effective after approved by the LARWQCB as Basin Plan Amendments. The draft study reports suggest that for copper, in both dry- and wet-weather, a final WER of 3.971 for LAR Reaches 1 and 2 and 9.691 for the Rio Hondo should be adopted. The lead recalculation study suggest that during dry-weather the WQBELs for LAR Reach 1 should increase from 12 to 102 µg/L for LAR Reach 1, increase from 11 to 94 µg/L for LAR Reach 2, and rise from 5 to 37 µg/L for the Rio Hondo. In wet-weather, the lead WQBEL should increase from 62 to 94 µg/L in all of these water bodies. Favorable translators between total and dissolved metal concentrations were also determined by these studies, but are not explicitly referenced in the MS4 Permit so their eventual impact is unclear at this time. As a result of these studies and legislative efforts, the LAR Metals TMDL has probably moved from a regional to specific outfall priority.

LAR Watershed Bacteria TMDL

The LAR Watershed Bacteria TMDL was adopted by the LARWQCB as Resolution 2010-007 and became effective on March 23, 2012. As expressed in Attachment O Part D4 of the MS4 Permit, this TMDL is very complex with multiple implementation phases, river segments that do not coincide with reaches, wet and dry compliance schedules, WLAs expressed as both WQBELs and RWLs, complex analytical methods, and requires the development with submission of Segment Specific Load Reduction Strategies (LRS). In addition, studies indicate that there are significant natural sources including endogenous replication of the "pollutant." **Table C-9** through **Table C-12** summarize the final WQBELs and RWLs that may be of importance to the RH/SGRWG.

Table C-9 LAR Bacteria TMDL WQBEL		
Constituent	**Effluent Limitation (MPN or cfu)**	
	Daily Maximum	**Geometric Mean**
E. coli	235/100 Ml	126/100 mL

Table C-10 summaries the "grouped interim dry-weather single sample bacteria WQBEL for the specific river segment and tributaries," that may be of importance to the RH/SGRWQG. While the Rio Hondo watershed area is approximately half of the total Segment B catchment area and would be expected to generate comparable discharge volumes during dry- and wet-weather, the WQBEL differs by over 250 fold. This is a result of the latter being based on the flow of water, mostly discharged from wastewater treatment plants, into the reach, while the Rio Hondo is primarily a headwater catchment. The interim dry-weather WQBELs are group-based and shared among the Permittees within a drainage area; however, alternatively they may be distributed based on proportion of drainage area, upon approval of the Regional Board Executive Officer. It is currently unclear how compliance with the LAR Bacteria TMDL will be assessed.

Table C-10 LAR Bacteria TMDL Grouped Interim Dry-Weather Single Sample Bacteria WQBEL			
River Segment of Tributary	**Daily Maximum *E. coli* Load (10^9 MPN/day)**	**First Phase Compliance Date**	**Second Phase Compliance Date**
LAR Segment A (Willow to Rosecrans)	301	March 23, 2024	September 23, 2031
LAR Segment B (Rosecrans to Figueroa)	518	March 23, 2022	September 23 2028
Rio Hondo	2	September 23, 2023	March 23, 2030

In addition to WQBELs for MS4 discharges, the LAR Bacteria TMDL includes a RWL that is attributable to all MS4 Permittees, including the City of Long Beach and Caltrans. This RWL is assessed as a limit on the number of days, or weeks, per year, where the RWLs are not achieved. The final compliance dates, for the annually assessed grouped single sample bacteria RWLs, are March 23, 2022 for dry-weather and March 23, 2037 for wet-weather. These requirements can be found in **Table C-11**, while the numeric water quality objective is shown on **Table C-12**.

Table C-11 LAR Bacteria TMDL Grouped Final Single Sample Bacteria RWLs		
Time Period	**Annual Allowable Exceedance Days of the Single Sample Objective (days)**	
	Daily Sampling	**Weekly Sampling**
Dry-Weather	5	1
Non-HFS[1] Waterbodies Wet-Weather	15	2
HFS[1] Waterbodies Wet-Weather	10 (not including HFS days)	2 (not including HFS days)

[1] HFS stands for high flow suspension as defined in Chapter 2 of the Basin Plan

Table C-12 LAR Bacteria TMDL Geometric Mean RWL	
Constituent	**Geometric Mean (MPN or cfu)**
E. coli	126/100 mL

The distinction that these water quality objectives are expressed annually may be important, as MS4 Permit Part VI.A.13.g states that for some WQBELs that are expressed as annual effluent limitations, such as those for trash, violations may only be assessed annually; however Part VI.C.1.d.(i) states that EWMPs must "achieve applicable WQBELs in Part VI.E and Attachments L through R pursuant to the corresponding compliance schedules." It is unclear why an annually assessed WQBEL is substantially and inherently different than an annually assessed RWL, although this question is likely to be resolved long before the dry-weather final compliance schedule is reached.

DC and LA Harbor Waters Toxic Pollutants TMDL

The DC and LA Harbor Waters Toxic Pollutants TMDL (also known as the Los Angeles and Long Beach Harbor Toxic and Metals TMDL) became effective on March 23, 2012 as Resolution No. R11-008.

Per Attachment N Part E.2 of the MS4 Permit, the Permittees subject to this TMDL must comply with sediment interim WQBELs for discharges to the Dominguez Channel Estuary and Greater Los Angeles and Long Beach Harbor Waters, Permittees should comply with interim concentration-based WQBELs presented in **Table C-13**.

Table C-13 DC and LA Harbor Waters Toxic Pollutants TMDL Sediment Interim WQBELs						
Water Body	**Interim Effluent Limitations Daily Maximum (mg/kg sediment)**					
	Copper	**Lead**	**Zinc**	**DDT**	**PAHs**	**PCBs**
Long Beach Inner Harbor	142.3	50.4	240.6	0.070	4.58	0.060
Long Beach Outer Harbor (inside breakwater)	67.3	46.7	150	0.075	4.022	0.248
Los Angeles River Estuary	53.0	46.7	183.5	0.254	4.36	0.683

Per Attachment N Part E.3.c of the MS4 Permit, the Dominguez Channel Estuary and Greater Los Angeles (and Long Beach) Harbor Waters must comply with final mass-based WQBELs, expressed as an annual loading of pollutants in the sediment deposited to the Dominguez Channel Estuary and the Greater Los Angeles and Long Beach Harbor Waters and final concentration-based WQBELs for sediments as shown in **Table C-14**. Compliance with these limitations should be met by March 23, 2032 and every year thereafter.

Table C-14 DC and LA Harbor Waters Toxic Pollutants TMDL Final Sediment Metals WQBELs for DC Estuary and Los Angeles Harbor				
Water Body	**Final Effluent Limitations Annual (kg/yr)**			
	Total Cu	**Total Pb**	**Total Zn**	**Total PAHs**
Inner Harbor	1.7	34.0	115.9	0.088
Outer Harbor	0.91	26.1	81.5	0.105
LAR Estuary	35.3	65.7	242.0	2.31

Per Attachment N Part E.3.d of the MS4 Permit, Permittees must comply with final mass-based WQBELs, listed in **Table C-15**, expressed as an annual loading of total DDT and total PCBs in the sediment deposited to the Dominguez Channel Estuary and Greater Los Angeles (and Long Beach) Harbor Waters by March 23, 2032 and every year thereafter.

Table C-15 DC and LA Harbor Waters Toxic Pollutants TMDL Final Sediment Metals WQBELs for DC Estuary and Los Angeles Harbor

Water Body	Final Effluent Limitations Annual (g/yr)	
	Total DDTs	Total PCBs
Inner Harbor	0.051	0.059
Outer Harbor	0.005	0.020
LAR Estuary	0.100	0.324

Per Attachment N Part E.4, compliance with the limitations specified in Attachment N Part E.3.a-d, listed in **Table C-13** to **Table C-15**, can be determined according to **Table C-16**. The table includes the MS4 Permit Part, which specifies the WQBELs associated with the DC and LA Harbor Waters Toxic Pollutants TMDL, the Table Reference for which the limitations are specified within this document and the various compliance determination methods.

Table C-16 DC and LA Harbor Waters Toxic Pollutants TMDL Compliance Determination

MS4 Permit Section[1]	Table Reference	Compliance Determination
Part E.2.b	**Table C-13**	i. Demonstrate that the sediment quality condition of *Unimpacted* or *Likely Unimpacted* via the interpretation and integration of multiple lines of evidence as defined in the Sediment Quality Objectives (SQO) Part 1 is met. ii. Meet the interim WQBELs in bed sediment over a three-year averaging period. iii. Meet the interim WQBELs in the discharge over a three-year averaging period.
		ii. California Toxics Rule (CTR) total metals criteria are met instream.
Parts E.3.c.i and E.3.c.ii	**Table C-14**	i. Final WQBELs for pollutants in the sediment are met ii. The qualitative sediment conditions of *Unimpacted* or *Likely Unimpacted* via the interpretation and integration of multiples lines of evidence as defined in the SQO Part 1, is met, with the exception of chromium, which is not included in the SQO Part 1. iii. Sediment numeric targets are met in the bed sediments over a three-year averaging period.
Part E.3.d	**Table C-15**	i. Fish tissue targets are met in species resident to the specified waterbodies[2].
		ii. Final WQBELs for pollutants in the sediment are met.

1 Attachment N of the MS4 Permit
2 A site-specific study to determine resident species should be submitted to the Regional Board Executive Officer for approval

San Gabriel River Metals and Impaired Tributaries Metals and Selenium TMDL

The San Gabriel River (SGR) Metals and Impaired Tributaries Metals and Selenium TMDL (SGR Metals TMDL) was established by the USEPA, approved on March 26, 2007. On June 6, 2013, the SWRCB amended the Basin Plan with Resolution No. R13-004 to "Incorporate Implementation Plans for the TMDLs for Metals in the Los Cerritos Channel and for Metals and Selenium in the San Gabriel River and Impaired Tributaries." The USEPA-established TMDL includes Problem Statements, Numeric Targets, Source Analysis, Loading Capacities, Load Allocations, Waste Load Allocations, and Margins of Safety. However, an implementation plan or schedules to achieve WLAs is not considered a required element of USEPA established TMDLs, therefore the SWRCB approved this resolution.

Pursuant to Part VI.E.3 of the MS4 Permit, Permittees are encouraged to incorporate WLAs established in USEPA TMDLs in the EWMP development process in order to establish a schedule for implementation, which in this case, the EWMP itself will fulfill the implementation plan requirements. Per Attachment P Part A.2 of the MS4 Permit, the grouped wet-weather WLAs relevant to the RH/SGRWQG, expressed as total recoverable metals, are summarized in **Table C-17**. In SGR Reach 2, wet-weather TMDLs apply when the maximum daily flow of the river is equal to or greater than 260 cfs as measured at the United States Geological Survey (USGS) station 11085000, located at the bottom of Reach 3 just above Whittier Narrows Dam. Per Attachment P Part A.3 of the MS4 Permit, the grouped dry-weather WLAs relevant to the RH/SGRWQG, expressed as total recoverable metals, are summarized in **Table C-18**. The wet- and dry-weather WLAs are group-based and shared among all MS4 Permittees, which includes Los Angeles MS4 Permittees, the City of Long Beach, Orange County MS4 Permittees, and Caltrans located within the drainage area.

Table C-17 SGR Metals TMDL Grouped Wet-Weather WLAs as Total Recoverable Metals

Water Body	WLA Daily Maximum (kg/day)		
	Copper	Lead	Zinc
SGR Reach 2	---	8.34 µg/L x daily storm volume (L)	---

Table C-18 SGR Metals TMDL Grouped Dry-Weather WLAs as Total Recoverable Metals

Water Body	WLA Daily Maximum	
	Copper	Selenium
SGR Reach 1	18 µg/L	---
SGR Estuary	3.7 µg/L	---

Los Angeles Area Lakes TMDLs

The Los Angeles Area Lakes TMDL was established by the USEPA, approved March 26, 2012. This TMDL is essentially a compilation of various Lake TMDLs in Los Angeles County. Within the USEPA TMDL, WLAs are established for both Peck Road Park Lake and Santa Fe Dam Park Lake, however only load allocations for Peck Road Park Lake are included in the MS4 Permit and are summarized herein. Pursuant to Part VI.E.3 of the MS4 Permit, Permittees are encouraged to incorporate WLAs established in USEPA TMDLs in the EWMP development process in order to establish a schedule for implementation, which in this case, the EWMP itself will fulfill the implementation plan requirements.

Peck Road Park Lake Nutrient TMDL

Per Attachment O Part G.8, Peck Road Park Lake is subject to nutrient WLAs and the RH/SGRWQG members must comply with the annual mass-based allocations dependent on current flow conditions summarized in **Table C-19**.

Table C-19 Peck Road Park Lake - Nutrient Load Allocations

Permittee	Total Phosphorus (lb-P/yr)	Total Nitrogen (lb-N/yr)
Eastern Subwatershed		
Arcadia	383	2,320
Bradbury	497	3,223
Duarte	1,540	9,616
Monrovia	6,243	38,736
County of Los Angeles	129	773
Near Lake Subwatershed		
Arcadia	158	1,115
Monrovia	60.4	415
County of Los Angeles	129	773
Western Subwatershed		
Arcadia	2,840	16,334
Monrovia	425	2,678
Sierra Madre	695	4,254
County of Los Angeles	467	2,818

Measured at the point of discharge using a three-year average. Mass-based allocations are equivalent to existing concentrations of 0.076 mg/L total phosphorus as a summer average (May-September) and annual average, and 0.76 mg/L total nitrogen as a summer average (May-September) and annual average based on approved flow conditions.

Per Attachment O. Part G.8.d of the MS4 Permit, if the applicable water quality objectives for ammonia, dissolved oxygen, and pH are achieved, and the chlorophyll a target of 20 μg/L as a summer average (May-September) and as an annual average is met, in the lake then the total phosphorus and total nitrogen concentration-based WLAs shall be considered attained.

Peck Road Park Lake PCBs TMDL

Per Attachment O Part G.9, Peck Road Park Lake is subject to WLAs associated with PCBs. Part G.9.c specifies applicable WLAs and Part G.9.d specifies Permittees may comply with alternative WLAs upon approval by the Regional Board based upon documentation that the fish target of 3.6 parts per billion wet weight has been met for the preceding three or more years. A demonstration that the fish tissue target has been met in any given year must at a minimum include a composite sample of skin of fillets from at least five largemouth bass each measuring at least 350 millimeters in length. Documentation must be submitted to the Regional Board and USEPA. Compliance may be demonstrated based on the alternative WLAs upon approval by the Regional Board so long as the USEPA does not object within 60 days. **Table C-20** summarizes the current and alternative WLAs.

Table C-20 Peck Road Park Lake - PCB Load Allocations				
Permittee	**WLAs[1]**		**Alternative WLAs[2]**	
	Total PCBs (Suspended Sediment) (µg/kg dry weight)	**Total PCBs in Water Column (ng/L)**	**Total PCBs (Suspended Sediment) (µg/kg dry weight)**	**Total PCBs in Water Column (ng/L)[4]**
Eastern Subwatershed				
Arcadia	1.29	0.17	59.8	0.17
Bradbury	1.29	0.17	59.8	0.17
Duarte	1.29	0.17	59.8	0.17
Monrovia	1.29	0.17	59.8	0.17
County of Los Angeles	1.29	0.17	59.8	0.17
Near Lake Subwatershed				
Arcadia	1.29	0.17	59.8	0.17
Monrovia	1.29	0.17	59.8	0.17
County of Los Angeles	1.29	0.17	59.8	0.17
Western Subwatershed				
Arcadia	1.29	0.17	59.8	0.17
Monrovia	1.29	0.17	59.8	0.17
Sierra Madre	1.29	0.17	59.8	0.17
County of Los Angeles	1.29	0.17	59.8	0.17

1 Measured at the point of discharge. Applied as an annual average.
2 Measured at the point of discharge.
3 Applied as a three-year average.
4 Applied as an annual average.

Peck Road Park Lake Chlordane TMDL
Per Attachment O Part G.10, Peck Road Park Lake is subject to WLAs associated with chlordane. Part G.10.c specifies applicable WLAs and Part G.10.d specifies Permittees may comply with alternative WLAs upon approval by the Regional Board based upon documentation that the fish target of 5.6 parts per billion wet weight has been met for the preceding three or more years. A demonstration that the fish tissue target has been met in any given year must at a minimum include a composite sample of skin of fillets from at least five largemouth bass each measuring at least 350 millimeters in length. Documentation must be submitted to the Regional Board and USEPA. Compliance may be demonstrated based on the alternative WLAs upon approval by the Regional Board so long as the USEPA does not object within 60 days. **Table C-21** summarizes the current and alternative WLAs.

Table C-21 Peck Road Park Lake - Chlordane Load Allocations

Permittee	WLAs[1]		Alternative WLAs[2]	
	Total Chlordane (Suspended Sediment) (µg/kg dry weight)	Total Chlordane in Water Column (ng/L)	Total Chlordane (Suspended Sediment) (µg/kg dry weight)	Total Chlordane in Water Column (ng/L)
Eastern Subwatershed				
Arcadia	1.73	0.59	3.24	0.59
Bradbury	1.73	0.59	3.24	0.59
Duarte	1.73	0.59	3.24	0.59
Monrovia	1.73	0.59	3.24	0.59
County of Los Angeles	1.73	0.59	3.24	0.59
Near Lake Subwatershed				
Arcadia	1.73	0.59	3.24	0.59
Monrovia	1.73	0.59	3.24	0.59
County of Los Angeles	1.73	0.59	3.24	0.59
Western Subwatershed				
Arcadia	1.73	0.59	3.24	0.59
Monrovia	1.73	0.59	3.24	0.59
Sierra Madre	1.73	0.59	3.24	0.59
County of Los Angeles	1.73	0.59	3.24	0.59

1 Measured at the point of discharge. Applied as an annual average.
2 Measured at the point of discharge.
3 Applied as a three-year average.
4 Applied as an annual average.

Peck Road Park Lake DDT TMDL

Per Attachment O Part G.11, Peck Road Park Lake is subject to DDT WLAs and the allocations applicable to the RH/SGRWQG members are summarized in **Table C-22**.

Table C-22 Peck Road Park Lake - DDT Load Allocations

Permittee	Total DDT (Suspended Sediment) (µg/kg dry weight)	4-4' DDT in Water Column (ng/L)
Eastern Subwatershed		
Arcadia	5.28	0.59
Bradbury	5.28	0.59
Duarte	5.28	0.59
Monrovia	5.28	0.59
County of Los Angeles	5.28	0.59
Near Lake Subwatershed		
Arcadia	5.28	0.59
Monrovia	5.28	0.59
County of Los Angeles	5.28	0.59
Western Subwatershed		
Arcadia	5.28	0.59
Monrovia	5.28	0.59
Sierra Madre	5.28	0.59
County of Los Angeles	5.28	0.59

Measured at the point of discharge using a three-year average. Mass-based allocations are equivalent to existing concentrations of 0.076 mg/L total phosphorus as a summer average (May-September) and annual average, and 0.76 mg/L total nitrogen as a summer average (May-September) and annual average based on approved flow conditions.

Peck Road Park Lake Dieldrin TMDL

Per Attachment O Part G.12, Peck Road Park Lake is subject to WLAs associated with dieldrin. Part G.12.c specifies applicable WLAs and Part G.12.d specifies Permittees may comply with alternative WLAs upon approval by the Regional Board based upon documentation that the fish target of 0.46 parts per billion wet weight has been met for the preceding three or more years. A demonstration that the fish tissue target has been met in any given year must at a minimum include a composite sample of skin of fillets from at least five largemouth bass each measuring at least 350 millimeters in length. Documentation must be submitted to the Regional Board and USEPA. Compliance may be demonstrated based on the alternative WLAs upon approval by the Regional Board so long as the USEPA does not object within 60 days. **Table C-23** summarizes the current and alternative WLAs.

Table C-23 Peck Road Park Lake - Dieldrin Load Allocations

Permittee	WLAs[1]		Alternative WLAs[2]	
	Dieldrin (Suspended Sediment) (µg/kg dry weight)	Dieldrin in Water Column (ng/L)	Dieldrin (Suspended Sediment) (µg/kg dry weight)	Dieldrin in Water Column (ng/L)
Eastern Subwatershed				
Arcadia	0.43	0.14	1.90	0.14
Bradbury	0.43	0.14	1.90	0.14
Duarte	0.43	0.14	1.90	0.14
Monrovia	0.43	0.14	1.90	0.14
County of Los Angeles	0.43	0.14	1.90	0.14
Near Lake Subwatershed				
Arcadia	0.43	0.14	1.90	0.14
Monrovia	0.43	0.14	1.90	0.14
County of Los Angeles	0.43	0.14	1.90	0.14
Western Subwatershed				
Arcadia	0.43	0.14	1.90	0.14
Monrovia	0.43	0.14	1.90	0.14
Sierra Madre	0.43	0.14	1.90	0.14
County of Los Angeles	0.43	0.14	1.90	0.14

1 Measured at the point of discharge. Applied as an annual average.
2 Measured at the point of discharge.
3 Applied as a three-year average.
4 Applied as an annual average.

Peck Road Park Lake Trash TMDL

Per Attachment O Part G.13, Peck Road Park Lake is subject to Trash WLAs and the allocations. The Cities of Arcadia, Bradbury, Duarte, Monrovia, and Sierra Madre and the County of Los Angeles must comply with a zero trash WLA.

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Attachment D

Supporting Information for Receiving Water Analysis

This attachment summarizes the key findings from the receiving water data analysis relevant to the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) in determining applicable water quality priorities, corresponding with **Section 2.1.1** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP).

Summary of Key Findings of Receiving Water Data Analysis

The following provides a summary of key findings from the receiving water data analysis. It is not intended to be a detailed discussion of all the results of the data analysis, instead, the summary highlights outcomes of the data analysis that may affect the constituents addressed by the EWMP and/or the way the EWMP will approach addressing the constituent. For example, some constituents addressed by the Los Angeles River Metals TMDL appear to exceed less frequently than in the past and as such, are discussed in this subsection. Conversely, indicator bacteria continue to exceed on a frequent basis and nothing "new" was learned from the data analysis. As such, indicator bacteria are not discussed in this subsection. The key findings are organized as follows:

- Summary of findings related to the Los Angeles River Metals TMDL.
- Summary of findings related to the Los Angeles River Nitrogen TMDL.
- Summary of findings related to the Los Angeles River Bacteria TMDL.
- Summary of findings related to the San Gabriel River Metals and impaired Tributaries Metals and Selenium TMDL.
- Identification of constituents that are not currently on the 303(d) list.

Key findings related to the Los Angeles River Metals TMDL

Over the past five years, copper, lead and zinc exceedances of TMDL targets are infrequent in Rio Hondo Reach 3. Cadmium did not exceed in any of the data reviewed. The following provides a generalized summary of the key findings from comparing the data collected over the past five years to the Metals TMDL targets (note that percentages are rounded) (please see **Table D-1** below for detailed summary):

- Copper: Rarely exceeds in Rio Hondo Reach 3 (6-9%).
- Lead: Rarely exceeds in Rio Hondo Reach 3 (0-3%).
- Zinc: Rarely exceeds in Rio Hondo Reach 3 (0-1%).

Key findings related to the Los Angeles River Nitrogen TMDL

Over the past five years ammonia, nitrate and nitrite have not exceeded the Los Angeles River Nitrogen TMDL targets in Rio Hondo Reach 3. This is likely due to the fact that the primary sources of these constituents (DC Tillman, LA/Glendale, and Burbank WRPs) are not up gradient. The data analysis suggests that ammonia, nitrate and nitrite are not a water quality issue in the watershed. The following provides a generalized summary of the key findings from comparing the data collected over the past five years to the Nitrogen TMDL targets:

- Ammonia as N: Of the 198 samples collected only one exceeded (Rio Hondo Reach 3).
- Nitrate as N: Of the 203 samples collected zero samples exceeded.
- Nitrite as N: Of the 203 samples collected zero samples exceeded.
- Nitrogen (NO_3-N+NO_2-N): Of the 2,465 samples only one exceeded (Rio Hondo Reach 3).

Key findings related to the San Gabriel River Metals and impaired Tributaries Metals and Selenium TMDL

Over the past 5 years copper, lead, and zinc exceedances of TMDL targets are infrequent in the San Gabriel River, with no exceedances occurring in San Gabriel River Reach 5, which is applicable to the RH/SGRWQG. Selenium did not exceed in any of the data reviewed.

Constituents not on the 303(d) List

All water quality data obtained was reviewed for potential exceedances of the water quality objectives. The only constituents identified through the data analysis that had not already been identified through the review of TMDLs, 303(d) listings, and annual monitoring were polycyclic aromatic hydrocarbons (PAHs). Six PAHs were observed at levels exceeding the relevant water quality objectives benzo(a)Pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene). **Table D-1** identifies the constituents by water body and presents the frequency of exceedances over the past five and ten year periods.

Table D-1 Summary of Exceedances

Constituent	All Data (2002-2012)		Past 5 Years (2007 - 2012)		Source of Water Quality Objective
	N	% Exceed	N	% Exceed	
Rio Hondo Reach 3					
Aluminum	0	0%			Basin Plan
Ammonia	1	1%	0	0%	LA River Nutrients TMDL
2,3,7,8-TCDD	0	0%	0	0%	CTR HH Organism
Benzo(a)Pyrene	1	2%	1	9%	CTR HH Organism
Benzo(b)Fluoranthene	2	7%	1	9%	CTR HH Organism
Benzo(k)Fluoranthene	3	6%	2	18%	CTR HH Organism
Bis(2-Ethylhexyl)Phthalate	5	45%			CTR HH Organism
Chloride	3	2%	1	2%	Basin Plan
Chrysene	1	2%	1	9%	CTR HH Organism
Diazinon	6	8%	2	11%	CTR
Dibenzo(a,h)Anthracene	3	6%	2	18%	CTR HH Organism
Copper	11	9%	3	6%	LA River Metals TMDL
Total Dissolved Solids	0	0%	0	0%	Basin Plan
Dissolved Oxygen	82	37%	23	39%	Basin Plan
pH	47	21%	5	10%	Basin Plan
E. coli	43	73%	36	69%	Los Angeles River Bacteria TMDL
Fecal Coliform	158	72%	35	67%	Los Angeles River Bacteria TMDL
Total Coliform	220	100%	52	100%	Basin Plan
Indeno(1,2,3-cd)Pyrene	3	6%	3	33%	CTR HH Organism
Mercury	2	3%	1	2%	CTR HH Organism
N-Nitrosodimethylamine	4	8%	0	0%	CTR

Table D-1 Summary of Exceedances					
Constituent	All Data (2002-2012)		Past 5 Years (2007 - 2012)		Source of Water Quality Objective
	N	% Exceed	N	% Exceed	
Lead	4	3%	0	0%	LA River Metals TMDL
Nitrate	0	0%	0	0%	LA River Nutrients TMDL
Nitrite	0	0%	0	0%	LA River Nutrients TMDL
Total Nitrogen	1	0%	0	0%	LA River Nutrients TMDL
Cyanide	6	7%	0	0%	CTR
Zinc	1	1%	0	0%	LA River Metals TMDL
San Gabriel River Reach 5					
Ammonia	0	0%			Basin Plan
Chloride	0	0%	0	0%	Basin Plan
Copper	1	25%	0	0%	Basin Plan
Total Dissolved Solids	0	0%	0	0%	Basin Plan
pH	0	0%			Basin Plan
Lead	0	0%	0	0%	Basin Plan
Nitrate	0	0%	0	0%	Basin Plan
Nitrite	0	0%			Basin Plan
Selenium	0	0%			Basin Plan
Zinc	0	0%			Basin Plan
San Dimas Wash					
Ammonia	0	0%			Basin Plan
Chloride	0	0%			Basin Plan
Dissolved Oxygen	0	0%			Basin Plan
pH	0	0%			Basin Plan
Nitrate	0	0%			Basin Plan
Nitrite	0	0%			Basin Plan
Big Dalton Wash					
Aluminum	0	0%			Basin Plan
Ammonia	0	0%			Basin Plan
Chloride	0	0%			Basin Plan
Dissolved Oxygen	0	0%			Basin Plan
pH	0	0%			Basin Plan

Attachment E

Regional and Distributed BMP Fact Sheets

This attachment includes Best Management Practice (BMP) Fact Sheets for regional and distributed BMPs that may be implemented by the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) through the Enhanced Watershed Management Program (EWMP) development process, corresponding with **Section 3.1.1** of the RH/SGRWQG EWMP.

Regional BMPs are constructed structural practices intended to treat runoff from a contributing area of multiple parcels (normally on the order of 10s or 100s of acres or larger). Fact Sheets are included for the following regional BMPs:

- Infiltration facilities
- Detention facilities
- Constructed wetlands
- Treatment facilities

Distributed BMPs are constructed structural practices intended to treat runoff relatively close to the source and typically implemented at a single- or few-parcel level (normally less than one acre). Fact Sheets are included for the following distributed BMPs:

- Site-scale detention facilities
- Green infrastructure
- Flow-through treatment BMPs
- Source control structural BMPs

Attachment E Table of Contents

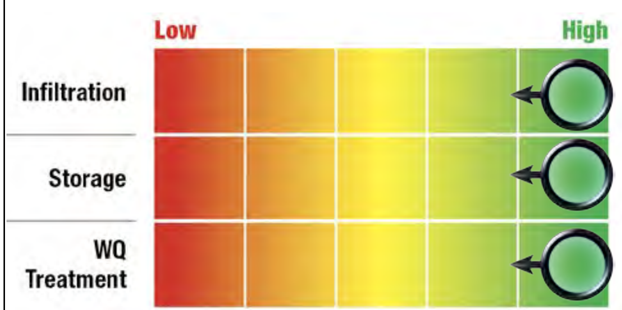
Fact Sheet 1 Infiltration Facilities (Regional BMP)

Infiltration facilities are designed to decrease runoff volume through groundwater recharge and improve water quality through filtration and sorption. Facilities can incorporate engineered medias to improve percolation into native soils. Infiltration facilities can be open-surface basins or subsurface galleries.

Surface Infiltration Basin

Subsurface Infiltration Gallery

BMP Performance Functions



Design Variations

Several design variations include:

- **Surface Infiltration Basins:** depressions designed to infiltrate stormwater into the subgrade soils. Facilities can be vegetated to encourage evapotranspiration and aesthetics.
- **Subsurface Infiltration Galleries:** underground storage systems designed to infiltrate stormwater into subgrade soils. Subsurface systems are used when limited area is available for BMP implementation

Typical Design Components

Figure E-1 presents a typical design and highlights potential design variations:

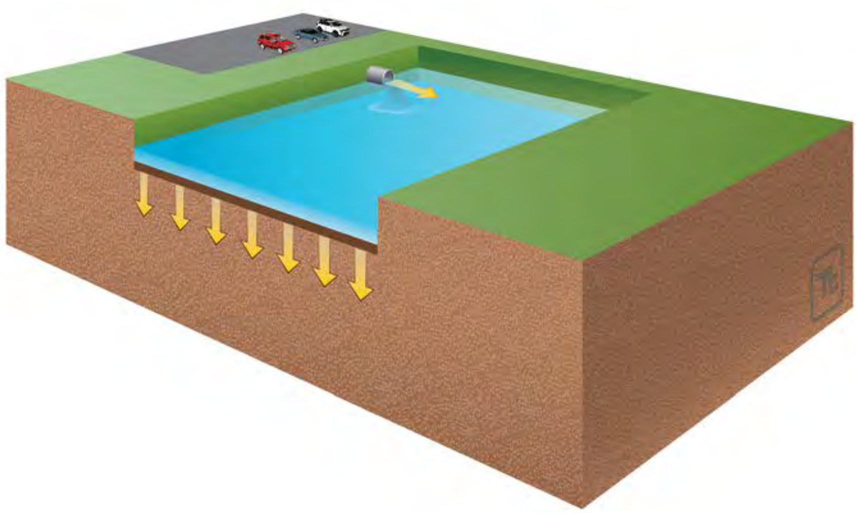


Figure E-1 Typical Regional Infiltration Facility Schematic (arrows indicate water pathways)

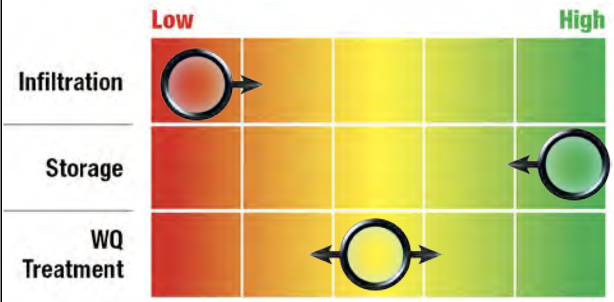
Fact Sheet 2 Detention Facilities (Regional BMP)

Detention facilities are designed to detain runoff and improve water quality through pollutant settling. Facilities encourage settling by decreasing runoff flow rates and allowing ponding to occur. Detention facilities can be open-surface practices or subsurface galleries and can be dry during non-rainy seasons or wet year-round.

Surface Detention Basin

Subsurface Detention Gallery

BMP Performance Functions



Design Variations

Several design variations include:

- **Surface Detention Basins:** basins designed to detain stormwater runoff for a specified time to allow sedimentation of particle-bound pollutants. Surface systems can have permanent pools or fully drain between storms.
- **Subsurface Detention Galleries:** underground storage systems designed to detain stormwater. Subsurface systems are used when limited area is available for BMP implementation.

Typical Design Components

Figure E-2 presents a typical design and highlights potential design variations:

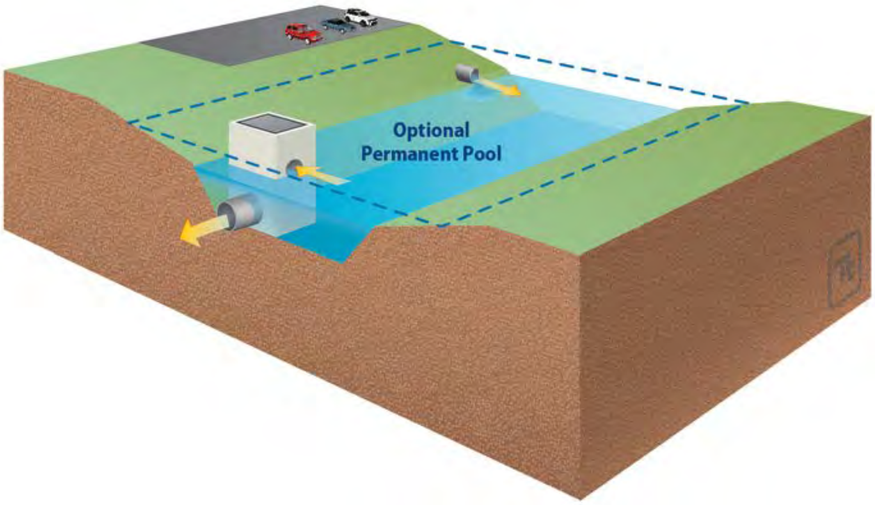


Figure E-2 Typical Regional Detention Facility Schematic (arrows indicate water pathways)

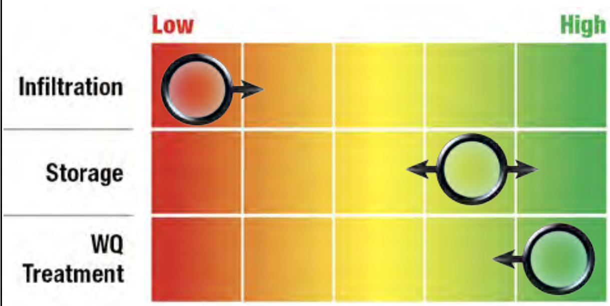
Fact Sheet 3 Constructed Wetlands (Regional BMP)

Constructed wetlands are engineered, shallow-marsh systems designed to control and treat stormwater runoff. Particle-bound pollutants are removed through settling, and other pollutants are removed through biogeochemical activity. Constructed wetlands must always maintain a baseflow into the system, which can come from an intersected groundwater or an associated low-flow diversion utilizing dry-weather flows.

Wetland Basin

Flow-Through/Linear Wetland

BMP Performance Functions



Design Variations

Several design variations include:

- **Wetland Basins:** basins with shallow permanent pools and a temporary shallow ponding zone. An outlet control structure typically regulates dewatering of the temporary storage volume.
- **Flow-through/Linear Wetlands:** wetlands that provide treatment as water passes through a long flow path. These wetlands are typically constructed parallel to existing channels such that water can be easily diverted.

Typical Design Components

Figure E-3 presents a typical design and highlights potential design variations:

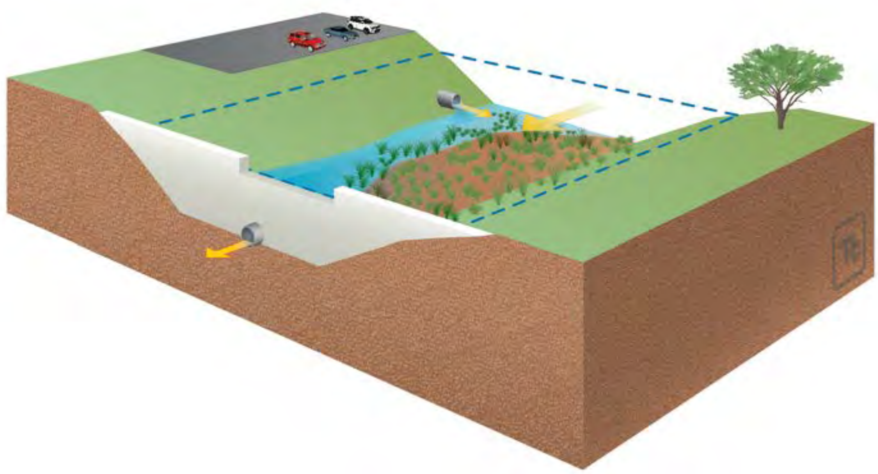
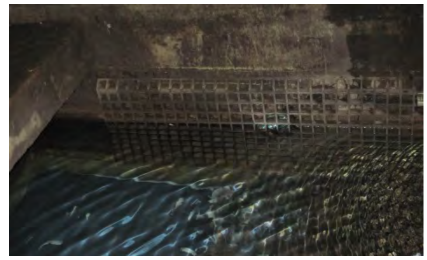


Figure E-3 Typical Regional Constructed Wetland Schematic (arrows indicate water pathways)

Fact Sheet 4 Treatment Facilities and Low Flow Diversions (Regional BMP)

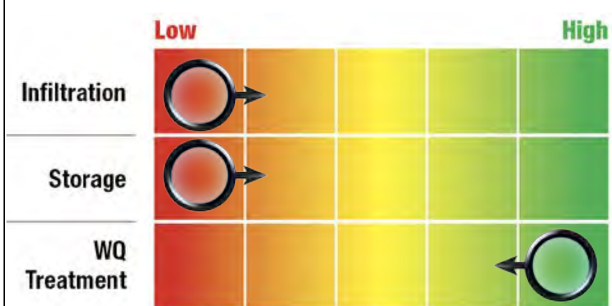
Other regional water quality technology falls into the treatment facilities and low flow diversions subcategories. These systems typically divert flow from engineered channels to a treatment facility. Water is treated using physical, chemical, or radiological processes and is then returned to the original channel or discharged to the treatment plant outfall.

Treatment Facility



Low-Flow Diversion Dam and Inlet in a Storm Drain

BMP Performance Functions



Design Variations

Several design variations include:

- **Low Flow Diversion:** a design flow rate (typically dry-weather flow) is diverted from the storm drain to a sanitary sewer for treatment.
- **Treatment and Return:** water is pumped or conveyed by gravity from a channel to a small-scale wastewater treatment facility where it is treated and discharged back into the original channel. Sometimes a portion of treated water can be diverted for reuse.

Typical Design Components

Figure E-4 presents a typical design and highlights potential design variations:

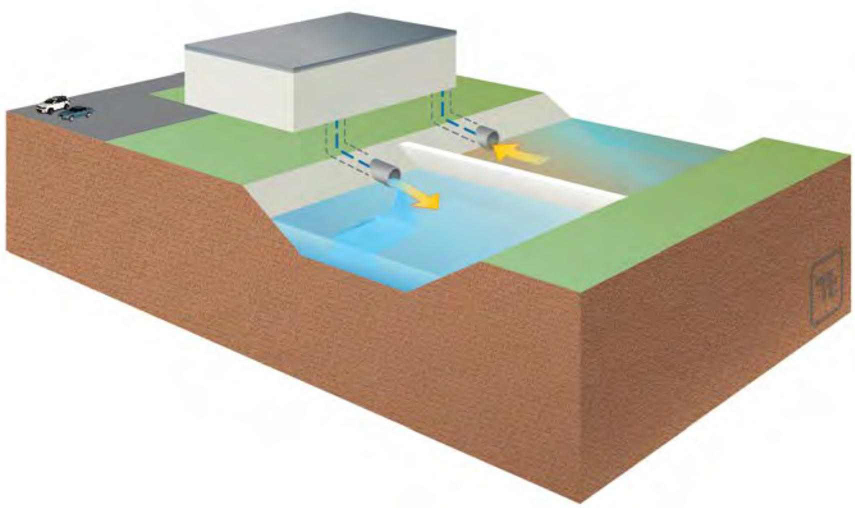


Figure E-4 Typical Regional Treatment Facility Schematic (arrows indicate water pathways)

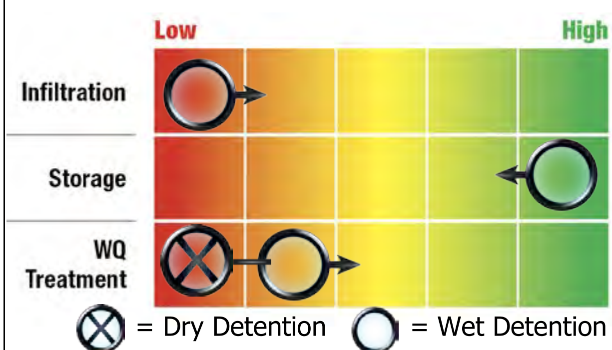
Fact Sheet 5 Site Scale Detention (Distributed BMP)

Site-scale detention facilities are designed to detain runoff from an individual parcel and improve water quality through pollutant settling. Site-scale detention facilities can reduce peak flows and improve water quality by storing water in a basin before slowly draining the water through an orifice to the downstream waterway. Settling of sediment and sediment-bound pollutants is the primary pollutant removal mechanism.

Dry Detention Basin

Wet Detention Pond

BMP Performance Functions



Design Variations

Several design variations include:

- **Dry Detention Basins:** runoff ponds on the basin surface and fully drains between storm events. The drawdown orifice is located at the bottom of the basin.
- **Wet Detention Pond:** runoff is captured in a temporary storage zone above a permanent pool. The drawdown orifice sets the depth of the permanent pool.
- **Detention Chambers:** subsurface chambers or vaults designed to detain captured runoff.

Typical Design Components

Figure E-5 presents a typical design and highlights potential design variations:

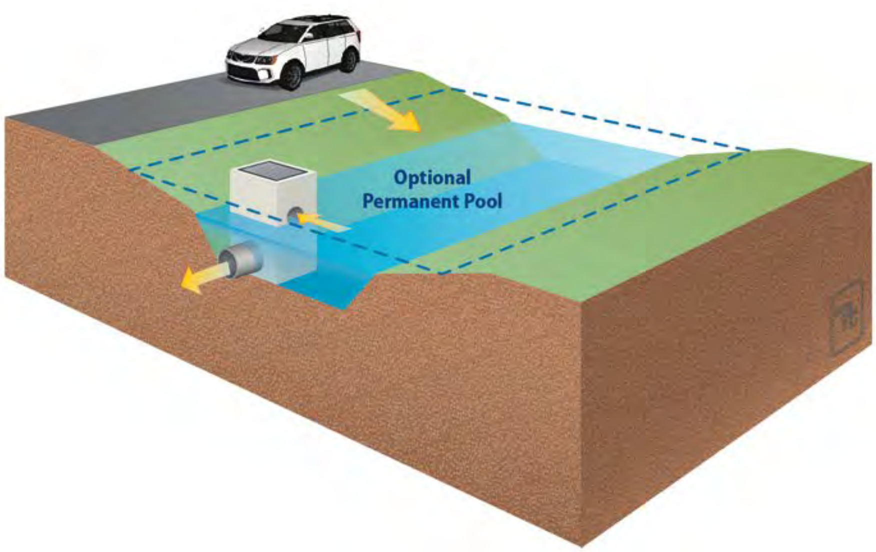


Figure E-5 Typical Distributed Detention Schematic (arrows indicate water pathways)

Fact Sheet 6 Bioretention and Biofiltration (Green Infrastructure BMP)

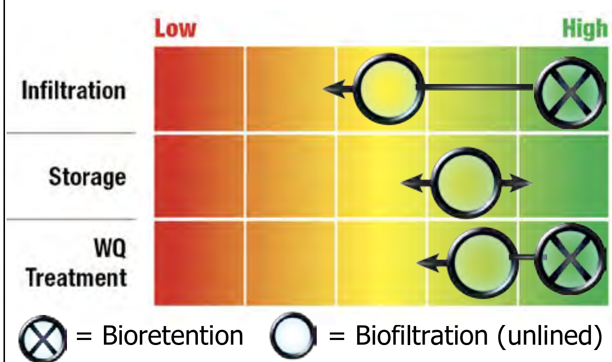
Bioretention and biofiltration are vegetated BMPs designed to capture and filter stormwater runoff through a soil layer. Following filtration, treated runoff infiltrates underlying soils (bioretention), or, if the subgrade has poor permeability, exits through an underdrain to the downstream conveyance network (biofiltration). Vegetation can enhance biological treatment processes.

Residential Bioretention

Bioretention in an Alley

Parking Lot Biofiltration

BMP Performance Functions



Design Variations

Several design variations include:

- **Bioretention:** shallow, depressed, vegetated basins with permeable soil media. Runoff temporarily ponds on the surface before filtering through the soil. Bioretention does not include underdrains.
- **Biofiltration:** bioretention areas with underdrains. Infiltration is considered incidental, although substantial infiltration can occur in some unlined systems.

Typical Design Components

Figure E-6 presents a typical design and highlights potential design variations:

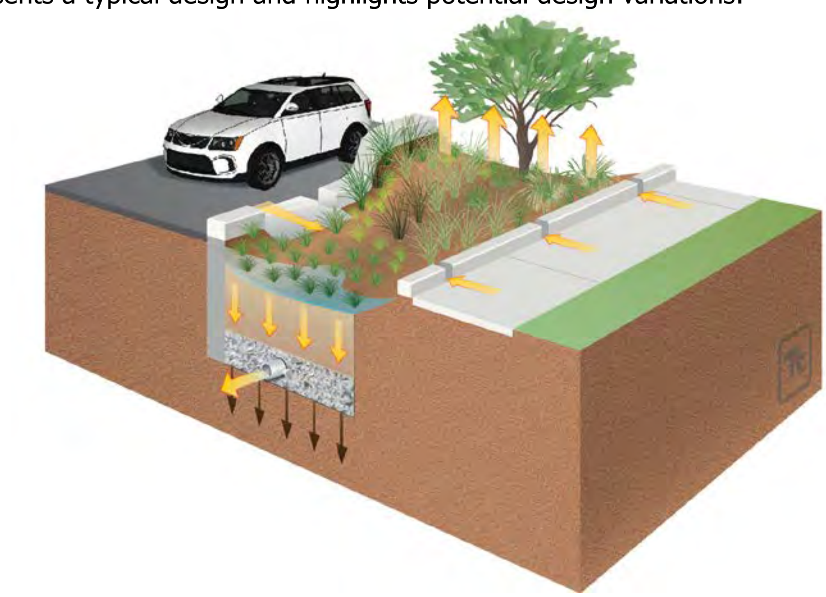


Figure E-6 Typical Distributed Bioretention and Biofiltration Schematic Showing Underdrain Option (arrows indicate water pathways)

Fact Sheet 7 Permeable Pavement (Green Infrastructure BMP)

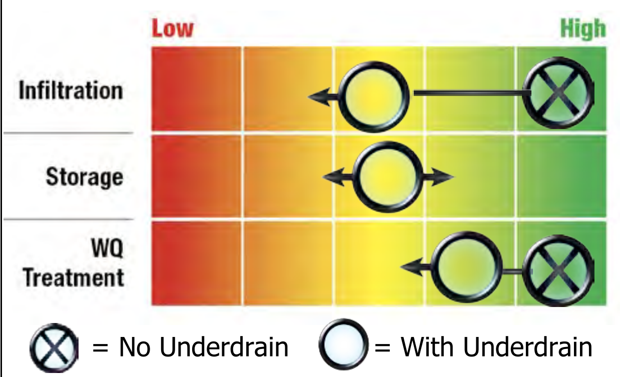
Permeable pavement is a stable load-bearing surface that allows for stormwater infiltration. Beneath the permeable surface is a crushed-rock reservoir that provides structural support while allowing runoff to percolate to the underlying soils. Permeable pavement can be fully infiltrating or can have an underdrain like bioretention and biofiltration practices.

Pervious Concrete

Permeable Interlocking

Porous Asphalt

BMP Performance Functions



Design Variations

Several design variations include:

- **Pervious Concrete:** fines are excluded from typical concrete aggregate to create permeable void space within the section.
- **Porous Asphalt:** fines are excluded from typical hot-mix asphalt to create pores within the section.
- **Permeable Interlocking Concrete Pavers:** pavers that allow infiltration of rainwater through joints between the blocks

Typical Design Components

Figure E-7 presents a typical design and highlights potential design variations:

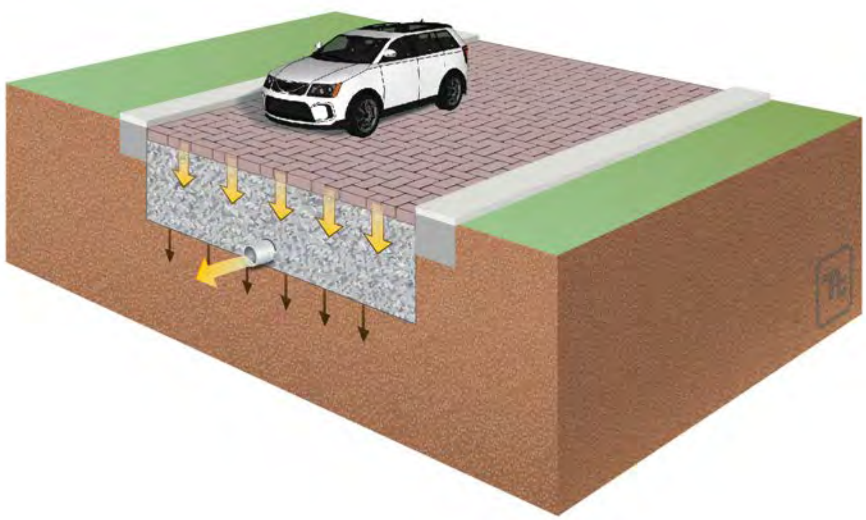


Figure E-7 Typical Distributed Permeable Pavement Schematic Showing Underdrain Option (arrows indicate water pathways)

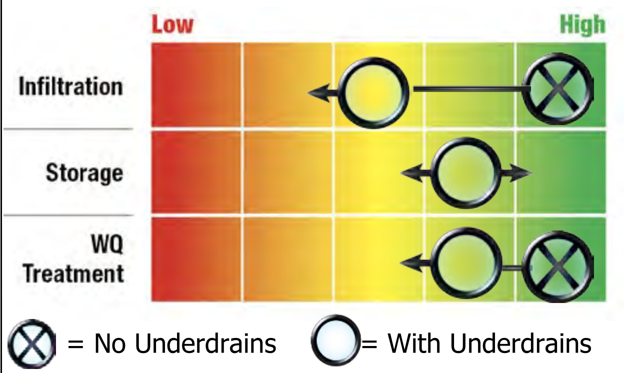
Fact Sheet 8 Green Streets (Green Infrastructure BMP)

Green streets are systems of multiple BMPs arranged in a linear fashion within the street right-of-way (as opposed to a parcel-based implementation). Green streets are designed to reduce runoff and improve water quality for the runoff from the roadway and adjacent parcels. Bioretention, biofiltration, and permeable pavement BMPs are commonly used in conjunction and can be hydraulically connected using subsurface stone reservoirs.

Green Street

Green Street

BMP Performance Functions



Design Variations

Green streets can feature several design variations. Some common features include:

- **Linear Bioretention/Biofiltration:** BMPs can be incorporated as linear systems between the road and parcel to intercept runoff from both roadways and properties.
- **Curb Extensions:** bioretention/ biofiltration BMP "bumpouts" can intercept gutter flow.
- **Permeable Parking Lanes:** street parking can be designed with permeable pavement to intercept roadway runoff.

Typical Design Components

Figure E-8 presents a typical design and highlights potential design variations:

Figure E-8 Typical Distributed Green Street Schematic (arrows indicate water pathways)

Fact Sheet 9 Infiltration BMPs (Green Infrastructure BMP)

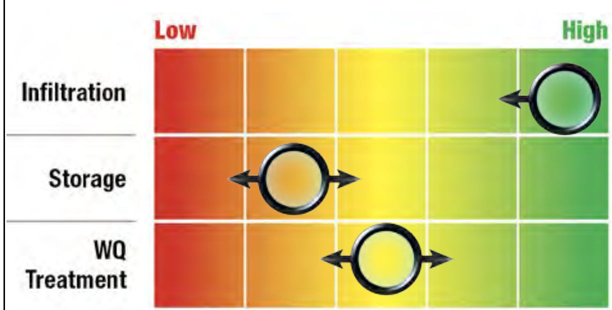
Infiltration BMPs capture and infiltrate runoff into underlying soils. Runoff is typically stored in subsurface trenches or pits filled with engineered soil media, gravel, or concrete chambers. Some infiltration BMPs that inject water into subsurface reservoirs are considered Class V injection wells and must be registered as such. Infiltration BMPs are unvegetated (see Bioretention for vegetated practices).

Various Dry-Well Sizes(Source: www.peerlessconcrete.com)

Infiltration Trench

Infiltration Trench

BMP Performance Functions



Design Variations

Several design variations include:

- **Infiltration Trench:** a media-filled trench that captures runoff in the pore space of gravel or soil prior to infiltration.
- **Dry/Wet Well:** a gravel-surrounded vault with perforated walls that receives runoff from a pipe and allows direct infiltration into the ground.
- **Rock Well:** a gravel-filled pit that receives runoff from a pipe. This BMP is essentially a dry well without a concrete vault.

Typical Design Components

Figure E-9 presents a typical design and highlights potential design variations:

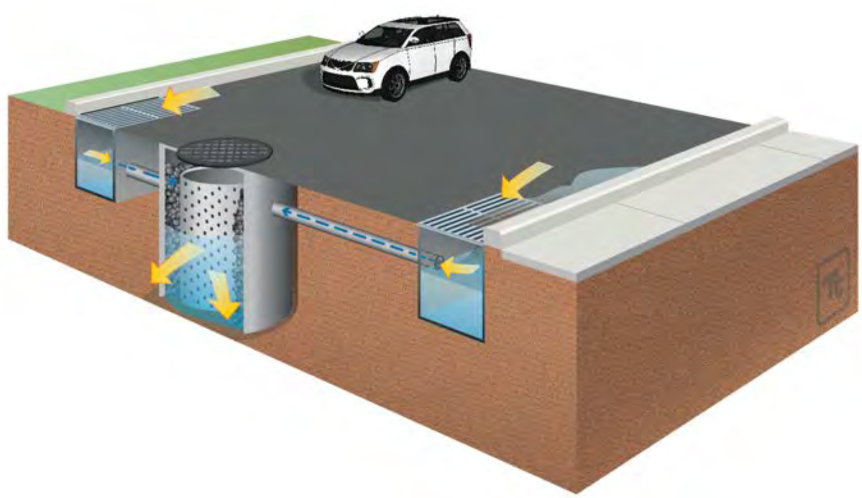


Figure E-9 Typical Distributed Infiltration BMP Schematic Showing Perforated Concrete Dry Well Variation (arrows indicate water pathways; for infiltration trenches, see Figure B-2 and omit vegetation)

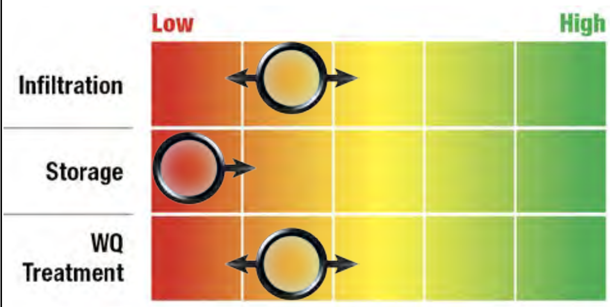
Fact Sheet 10 Bioswales (Green Infrastructure BMP)

Bioswales are practices that convey uniform sheet flow through vegetated, shallow depressions to remove sediment-associated pollutants by settling and straining. Infiltration and filtration through soil media are not key components of bioswales; rather, bioswales are typically implemented to act as pretreatment and used to transport runoff to an associated structural BMP.

Vegetated Swale

Vegetative Filter Strip

BMP Performance Functions



Design Variations

Several design variations include:

- **Vegetated Swale:** linear, vegetated channels used to convey concentrated flow from the contributing area to a structural BMP. Check dams can be added in areas of steep slopes or to further decrease the flow rates and spread the runoff over a larger area.
- **Vegetative Filter Strip:** broad-sloped, vegetated areas used to convey sheet flow from the contributing area to a structural BMP or other conveyance channel.

Typical Design Components

Figure E-10 presents a typical design and highlights potential design variations:

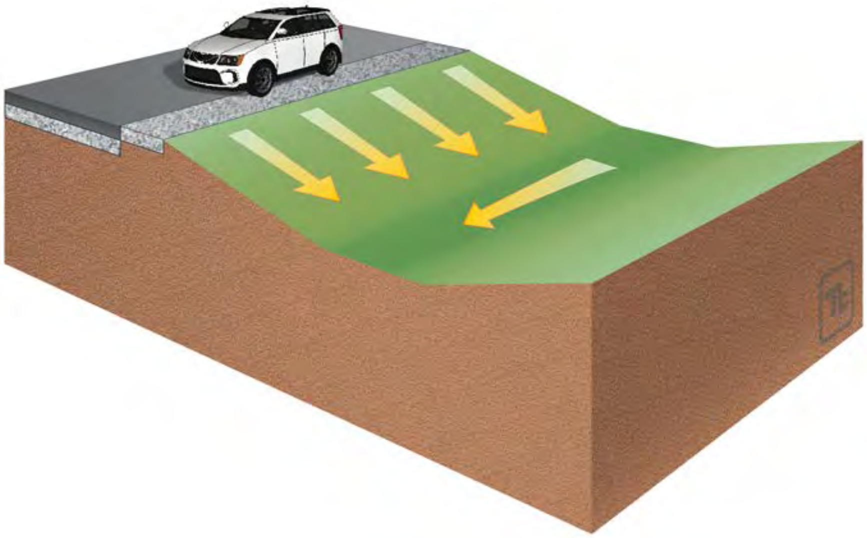


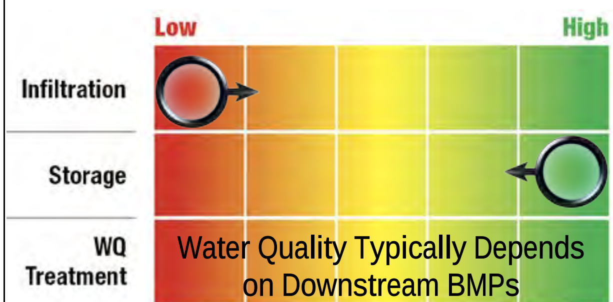
Figure E-10 Typical Distributed Bioswale Schematic (arrows indicate water pathways)

Fact Sheet 11 Rainfall Harvest (Green Infrastructure BMP)

The primary goal for rainfall harvest is improving water quality by intercepting rooftop runoff and lowering the overall impervious impact of a developed site. Runoff can be reduced through interception and evapotranspiration on green roofs or used for alternative uses with a cistern or rain barrel.

Green Roof

Cistern

BMP Performance Functions	Design Variations
	Several design variations include: ➢ **Green Roof:** engineered, vegetated roof structures intended to intercept rainfall in a growing medium. Rooftop detention can be incorporated if structures allow. ➢ **Cisterns and Rain Barrels:** storage tanks used to intercept and store rooftop runoff. Captured runoff can be reused to offset non-potable water uses such as irrigation and toilet flushing. Alternatively, stored water can be slowly released to a pervious surface.

Typical Design Components

Figure E-11 presents a typical design and highlights potential design variations:

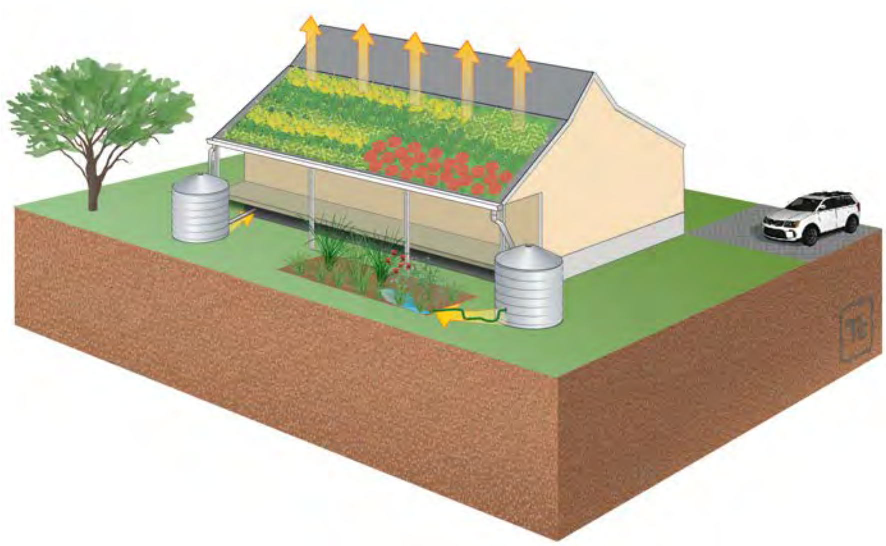


Figure E-11 Typical Distributed Rainfall Harvest Schematic (arrows indicate water pathways)

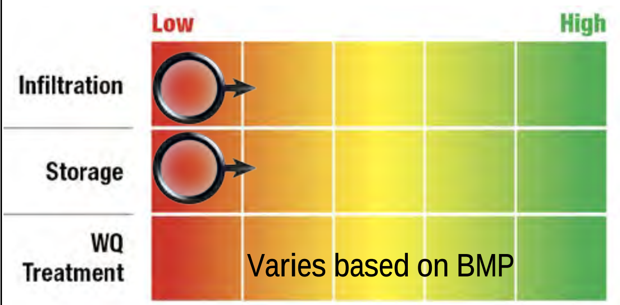
Fact Sheet 12 Flow-Through Treatment BMP (Distributed BMP)

Manufactured flow-through devices are commercial products that aim to provide stormwater treatment using patented, innovative technologies. Typical types of manufactured devices for stormwater management include cartridge filters, media filters, and high-flow biotreatment devices.

Media/Cartridge Filter

High-Flow Biotreatment(Photo Source: Jonathan Page, NCSU-BAE)

BMP Performance Functions



Design Variations

Several design variations include:

- **Media/Cartridge Filters:** proprietary filtration devices used to remove pollutants.
- **High-Flow Biotreatment Device:** modular, vault-type practices containing high-flow media. Typically incorporate vegetation.

Typical Design Components

Figure E-12 presents a typical design and highlights potential design variations:

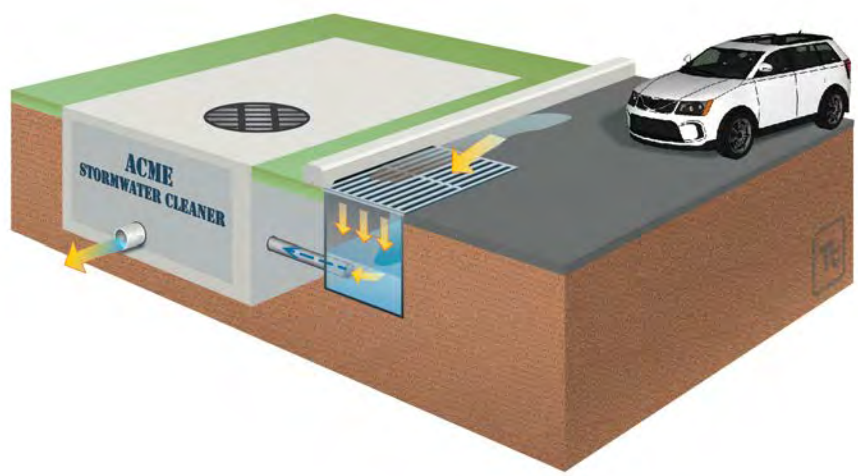


Figure E-12 Typical Distributed Flow-Through Treatment BMP Schematic (arrows indicate water pathways)

Fact Sheet 13 Source Control Structural BMP (Distributed BMP)

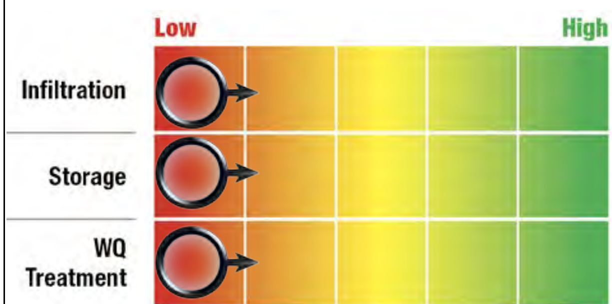
Source control structural BMPs are commercial products designed to treat runoff in highly urbanized environments. Mechanical separation, or more complex physicochemical processes, provides separation of gross solids and other pollutants. Many models feature media or materials designed to sequester hydrocarbons and other pollutants.

Catch Basin Insert

Hydrodynamic Separator

Connector Pipe Screen

BMP Performance Functions



Design Variations

Several design variations include:

- **Hydrodynamic Separators:** mechanical devices that use screens, baffles, and/or vortical flow to separate sediment and gross solids.
- **Catch Basin Inserts:** inserts that use nets, screens, fabric, and/or filtration media to gross solids, fine sediments, oils, and/or grease from runoff entering a catch basin.

Typical Design Components

Figure E-13 presents a typical design and highlights potential design variations:

Figure E-13 Typical Distributed Source Control Structural BMP Schematic (arrows indicate water pathways)

Attachment F

Detailed List of Existing Regional BMPs

This attachment includes a table summarizing the regional Best Management Practice (BMP) projects identified in planning documents within the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG), corresponding with **Section 3.2.2** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP). The BMPs listed in the table are illustrated in **Figure 3-7** of the EWMP.

Table F-1 Existing Regional Projects

ID	Project Name	Jurisdiction	Location	Description	Sources[1]	Notes
Within RH/SGRWQG EWMP Area						
R1	Rio Hondo Trail Enhancements	Arcadia	Rio Hondo Trail	Greening and installation of new gates and signage along 2.1 miles of trail located on the east bank of the Rio Hondo River from Lower Azusa Road to Peck Water Conservation Park. Planting native plants and shrubs, permeable paving and bioswales to be installed.	1	Completed 2013
R2	Rosemead Boulevard Improvement Project	County Unincorporated Area	Rosemead Boulevard from Foothill Boulevard to the City of Temple City limits	Complete a major road upgrade and revitalization for 2.5 miles of Rosemead Boulevard. Project to include pavement reconstruction and resurfacing, new curb ramps and sidewalks, and sustainable parkways.	2	Project discussed at 12/12/13 meeting. Completed February 2012
R3	San Gabriel Canyon Forest Gateway	Azusa	Sierra Madre Avenue and San Gabriel Canyon Road	The San Gabriel Canyon Forest Gateway is a 2.5 acre pocket park and interpretive center in Azusa that provides a unique interface between urban and Angeles National Forest environments marking the entrance to the National Forest.	1	Completed 2008

[1] Sources: 1: (Amigos de los Rios) and 2: (Green Street, 2013)

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Attachment G

Detailed List of Existing Distributed BMPs

This attachment includes tables summarizing the existing distributed Best Management Practices (BMPs) implemented by the Rio Hondo/San Gabriel River Water Quality Management Group (RH/SGRWQG), corresponding with **Section 3.2.2** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP). Most of these projects correspond to distributed BMPs implemented in response to Standard Urban Stormwater Mitigation Plan (SUSMP) and Low Impact Development (LID) requirements. The projects listed in the table are illustrated in **Figure 3-8** in the Work Plan.

Table G-1 Detailed List of Existing Distributed BMPs in RH/SGRWQG EWMP Area

ID	Jurisdiction	Data Source	BMP Subcategory	BMP	Latitude	Longitude	Purpose	Install Date	Approval Date (SUSMP)	Maintenance	Comments
D1	Arcadia	DR	Unk	Other (see comments)	34.1314	-118.04628		8/13/2012			APN5775024913
D2	Arcadia	LA Layer	RH	Rain Barrel	34.12317	-118.06461					Temple City Blvd
D3	Arcadia	LA Layer	RH	Rain Barrel	34.12074	-118.06337					Camino Real Ave
D4	Arcadia	LA Layer	SC	Landscaping and Irrigation	34.1081	-118.01552					Santa Anita Ave
D5	Azusa	LA Layer	RH	Rain Garden	34.11925	-117.88199					8th Ave
D6	Azusa	SUSMP	SC	3 Filter Inserts	34.15278	-118.03244	SUSMP		12/16/2005		Vision Development
D7	Azusa	SUSMP	SC	16 Filter Inserts	34.1317	-118.0286	SUSMP		1/24/2006		Villa Firenze
D8	Azusa	SUSMP	SC	5 Filter Inserts	34.14191	-118.02866	SUSMP		7/5/2006		Arcadia Fitness Center
D9	Azusa	SUSMP	SC	1 Filter Insert	34.10399	-118.00667	SUSMP		7/18/2006		Foothill Transit
D10	Azusa	SUSMP	SC	2 Filter Inserts	34.10787	-118.05179	SUSMP		7/25/2006		Arco AM/PM
D11	Azusa	SUSMP	SC	2 Drywells and 1 CDS	34.13449	-118.04212	SUSMP		7/25/2006		Methodist Hospital SoCal Parking Structure
D12	Azusa	SUSMP	SC	5 Filter Inserts and 1 CDS	34.13449	-118.04212	SUSMP		7/28/2006		Methodist Hospital SoCal Education Center
D13	Azusa	SUSMP	SC	1 Filter Insert	34.10673	-118.03197	SUSMP		8/1/2006		Automotive Center
D14	Azusa	SUSMP	Inf	10 Infiltration Trenches and 3 Filter Inserts	34.1333	-118.02451	SUSMP		8/22/2006		12 Unit Condominium
D15	Azusa	SUSMP	Inf	2 Filter Inserts, 2 CDS, 2 Infiltration Basins	34.13488	-118.04865	SUSMP		10/6/2006		Cheesecake Factory
D16	Azusa	SUSMP	Inf	5 Infiltration systems and 5 Filter Inserts	34.1314	-118.06492	SUSMP		10/10/2006		Arcadia Bank

Table G-1 Detailed List of Existing Distributed BMPs in RH/SGRWQG EWMP Area

ID	Jurisdiction	Data Source	BMP Subcategory	BMP	Latitude	Longitude	Purpose	Install Date	Approval Date (SUSMP)	Maintenance	Comments
D17	Azusa	SUSMP	PP	Permeable Pavement and 2 Filter Inserts	34.15155	-118.02343	SUSMP		11/30/2006		Walgreens
D18	Azusa	SUSMP	Inf	1 Infiltration System and 3 Filter Inserts	34.10768	-118.02573	SUSMP		1/23/2007		Walgreens
D19	Azusa	SUSMP	Inf	1 Infiltration System and 1 Filter Insert	34.10607	-118.03323	SUSMP		3/6/2007		Arcadia Warehouse
D20	Azusa	SUSMP	Bio	Swale and Filter Insert	34.12998	-118.03097	SUSMP		6/5/2007		EZ Lube
D21	Azusa	SUSMP	SC	43 Filter Inserts, 1 Infiltration Basin and 1 Swale	34.13591	-118.03922	SUSMP		11/29/2007		Santa Anita Racetrack
D22	Azusa	SUSMP	Unk		34.13449	-118.04212	SUSMP		3/18/2008		Methodist Hospital - North Tower Addition
D23	Azusa	SUSMP	Inf	3 Filter Inserts, 1 Swale, 2 Infiltration Systems	34.13522	-118.02846	SUSMP		4/1/2008		409 S. First Street
D24	Azusa	SUSMP	Unk		34.13603	-118.05056	SUSMP		4/15/2008		Westfield Mall Santa Anita
D25	Azusa	SUSMP	Bio	5 Filter Inserts and 1 Swale	34.132	-118.05056	SUSMP		5/27/2008		Firestation 105
D26	Azusa	SUSMP	Inf	1 Infiltration System and 1 Filter Insert	34.10819	-118.02457	SUSMP		3/10/2009		Live Oak Plaza
D27	Azusa	SUSMP	Inf	1 Infiltration System	34.12426	-118.0155	SUSMP		10/20/2009		Tract 69958

Table G-1 Detailed List of Existing Distributed BMPs in RH/SGRWQG EWMP Area

ID	Jurisdiction	Data Source	BMP Subcategory	BMP	Latitude	Longitude	Purpose	Install Date	Approval Date (SUSMP)	Maintenance	Comments
D28	Azusa	SUSMP	Inf	4 Infiltration Trenches and 1 Filter Insert	34.1558	-118.0638	SUSMP		12/7/2009		Tran Residence
D29	Azusa	SUSMP	Inf	1 Infiltration System and 1 Filter Insert	34.10148	-118.00568	SUSMP		12/30/2009		PSM Properties
D30	Azusa	SUSMP	Inf	7 Filter Inserts and 2 Infiltration Trenches	34.14197	-118.0218	SUSMP		3/25/2010		468 E. Santa Clara Street
D31	Azusa	DR	SC	KRISTAR-SWALEGARD	34.12858	-117.92751					
D32	Duarte	LA Layer	SC	Disconnect Impervious Surfaces	34.12095	-117.99309			7/1/2010		Calmia Rd
D33	Duarte	LA Layer	SC	Disconnect Impervious Surfaces	34.12646	-117.98906			2/22/2010		Mountain Ave
D34	Duarte	LA Layer	Unk	Percolation Basin	34.13793	-117.96627					Highland Ave
D35	Duarte	LA Layer	RH	Rain Garden	34.12602	-117.99098			8/30/2012		Beckville Street
D36	Monrovia	LA Layer	Unk	Other	34.11955	-118.00362			3/18/2013		Brisbane Street
D37	Monrovia	LA Layer	SC	Disconnect Impervious Surfaces	34.11955	-118.00159			6/1/2011		Brisbane Street
D38	Monrovia	SUSMP	Inf	So. Calif Gas – Fueling Station	34.13628	-117.99391	SUSMP	9/28/2010		Yes	Infiltration system
D39	Monrovia	SUSMP	Inf		34.13663	-117.98697	SUSMP	6/3/2010		Yes	Infiltration onsite
D40	Monrovia	SUSMP	Inf	Bowden	34.13897	-118.00599	SUSMP				Infiltration
D41	Monrovia	SUSMP	Inf	Car Wash	34.13965	-117.98463	SUSMP	5/3/2013		Yes	Infiltration onsite
D42	Monrovia	SUSMP	Unk	Chase Bank	34.14028	-118.00689	SUSMP				
D43	Monrovia	SUSMP	Unk		34.14181	-118.00278	SUSMP	7/30/2010		Yes	

Table G-1 Detailed List of Existing Distributed BMPs in RH/SGRWQG EWMP Area

ID	Jurisdiction	Data Source	BMP Subcategory	BMP	Latitude	Longitude	Purpose	Install Date	Approval Date (SUSMP)	Maintenance	Comments
D44	Monrovia	SUSMP	Inf		34.14321	-117.97941	SUSMP	10/21/2010		Yes	Infiltration onsite
D45	Monrovia	SUSMP	Unk	Multi Use Res/Com	34.14389	-117.99985	SUSMP				
D46	Monrovia	SUSMP	Inf		34.1443	-118.01266	SUSMP				Infiltration
D47	Monrovia	SUSMP	Inf		34.14485	-118.01815	SUSMP	4/12/2013		Yes	Infiltration onsite
D48	Monrovia	SUSMP	Inf		34.1451	-118.00222	SUSMP	1/20/2011		Yes	Infiltration system/underground
D49	Monrovia	SUSMP	Unk		34.14558	-118.00229	SUSMP	10/18/2012		Yes	
D50	Monrovia	SUSMP	Unk	Big Shrimps – Restaurant	34.14603	-118.00209	SUSMP	8/4/2011		Yes	Daylights to steet, filter fabric at downspouts
D51	Monrovia	SUSMP	Unk	Library	34.14881	-118.00112	SUSMP				
D52	Monrovia	SUSMP	Unk	Bowden	34.15112	-118.00416	SUSMP	10/21/2010		Yes	
D53	Monrovia	SUSMP	Unk		Unknown	Unknown	SUSMP				
D54	Monrovia	SUSMP	Unk		Unknown	Unknown	SUSMP				
D55	Monrovia	SUSMP	SC	Storm drain insert retrofits	Unknown	Unknown	TRASH				catch basin inserts
D56	Unincorporated County	DR	Unk	Other (see comments)	34.1196	-118.00362		3/18/2013			APN8510018011
D57	Unincorporated County	DR	Bio	Rain Garden	34.126	-117.99098		8/30/2012			APN8521009040
D58	Unincorporated County	DR	Bio	Rain Garden	34.1342	-118.07255		11/2/2011			APN5378012022
D59	Unincorporated County	DR	RH	Rain Barrel	34.1412	-118.06902		3/6/2013			APN5755016065
D60	Unincorporated County	DR	RH	Rain Barrel	34.1412	-118.06878		3/6/2013			APN5755016064
D61	Unincorporated County	DR	RH	Rain Barrel	34.1415	-118.06785		10/31/2011			APN5755016002
D62	Unincorporated County	LA Layer	RH	Rain Barrel	34.10196	-117.91427					TUDOR ST

Table G-1 Detailed List of Existing Distributed BMPs in RH/SGRWQG EWMP Area

ID	Jurisdiction	Data Source	BMP Subcategory	BMP	Latitude	Longitude	Purpose	Install Date	Approval Date (SUSMP)	Maintenance	Comments
D63	Unincorporated County	LA Layer	SC	Landscaping and Irrigation	34.1106	-117.88237					TRAYMORE AVE
D64	Unincorporated County	LA Layer	SC	Landscaping and Irrigation	34.14109	-118.07216					WALNUT DR
D65	Unincorporated County	LA Layer	Bio	Planter Box	34.1202	-118.07061					ARDENDALE AVE
D66	Unincorporated County	LA Layer	RH	Rain Barrel	34.14152	-118.06785		10/31/2011			MICHILLINDA AVE
D67	Unincorporated County	LA Layer	SC	Disconnect Impervious Surfaces	34.14155	-118.07063					MOUNTAIN VIEW AVE
D68	Unincorporated County	LA Layer	Unk	Other (see comments)	34.13143	-118.04628		8/13/2012			SANTA ANITA AVE
D69	Unincorporated County	LA Layer	SC	Disconnect Impervious Surfaces	34.12899	-118.0708					SOUTHVIEW RD
D70	Unincorporated County	LA Layer	Unk	Other (see comments)	34.12127	-118.06855					ARDENDALE AVE
D71	Unincorporated County	LA Layer	Bio	Planter Box	34.1351	-118.07135					MICHIGAN BLVD
D72	Unincorporated County	LA Layer	SC	Disconnect Impervious Surfaces	34.10226	-117.91471					TUDOR ST
D73	Unincorporated County	LA Layer	RH	Rain Garden	34.1342	-118.07255		11/2/2011			ROSEMEAD BLVD
D74	Unincorporated County	LA Layer	SC	Disconnect Impervious Surfaces	34.1418	-117.88327					OAK DR

Notes Bio = Bioretention/Biofiltration, DR = Data Request, Inf = Infiltration, PP = Permeable Pavement, RH = Rainfall Harvest, SC = Source Control Structural BMP, Unk = Unknown

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Attachment H

BMPs Reported in 2011-2012 Unified Annual Stormwater Report

This attachment includes a table summarizing the existing Best Management Practices (BMPs) implemented by the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) based on the 2011-2012 Unified Annual Stormwater Report, corresponding with **Section 3.1.2** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP).

Table H-1 Existing BMPs According to Review of 2011-2012 MS4 Annual Report

EWMP Subcategory	BMP Name	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County (San Gabriel River)	LACFCD (San Gabriel River)	LA County (LA River)	LACFCD (LA River)	TOTAL
Green Infrastructure: Biofiltration	Biofiltration	0	0	0	0	8	0	0	0	0	0	8
	Rain Gardens	0	0	0	0	0	0	0	0	2	0	2
Green Infrastructure: Bioswale	Landscape Swale	0	0	0	0	16	0	0	0	0	0	16
Green Infrastructure: Infiltration	Infiltration Trenches	15[3]	6	0	3[3]	4	0	0	0	8	0	36
	Cultec Recharger	1	0	0	0	0	0	0	0	0	0	1
	Cultec Storm Filter	2[3]	0	0	0	0	0	0	0	0	0	2
	Infiltration Basin/Facility	5[3]	0	0	0	0	0	0	0	0	0	5
	Infiltration Drywell	2[3]	0	0	0	0	0	0	0	0	0	2
	Kristar FloGard Inserts	0	0	0	0	0	0	1[3]	0	10[3]	0	11
	Perforated Drain	0	0	0	1[3]	0	0	0	0	0	0	1
	French Drain	0	0	0	0	6	0	0	0	0	0	6
Green Infrastructure: Permeable Pavement	Geo Block Porous Pavement	0	0	0	0	14	0	0	0	1	0	15
	Grass Block Porous Pavement	0	0	0	0	0	0	1	0	0	0	1
	Grass Pavers Porous Pavement	0	0	0	0	0	0	1	0	0	0	1
	Gravel Pave Porous Pavement	0	0	0	0	0	0	0	0	7	0	7
Green Infrastructure: Rainfall Harvest	Downspout Filters	0	0	0	0	0	0	0	0	2	0	2
	Potable Water/Irrigation	0	0	0	0	0	0	0	0	3[3]	0	3
Detention	Clarifier	0	0	0	0	4	0	0	0	0	3	7
Treatment Facility	Floating Trash Booms	0	0	0	0	0	0	4	1[3]	0	7	12
	Low Flow Diversion (City of Long Beach)	0	0	0	0	0	0	0	3[3]	0	0	3
Flow-Through Treatment BMP	HydroCartridge In-Line Filters	0	0	0	0	0	0	0	0	1	0	1
Source Control Structural BMP	CDS Gross Pollutant Separators	6	2	0	0	2	0	0	2	0	6	18
	Clean Screen Catch Basin Inserts	0	0	6	0	0	2	5	0	26	0	39
	Drain Pac Catch Basin Inserts	1	0	0	0	10	0	0	0	4	0	15
	Fossil Filter Catch Basin Inserts	0	10	0	0	27	0	1	0	31	0	69

Table H-1 Existing BMPs According to Review of 2011-2012 MS4 Annual Report

EWMP Subcategory	BMP Name	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County (San Gabriel River)	LACFCD (San Gabriel River)	LA County (LA River)	LACFCD (LA River)	TOTAL
Source Control Structural BMPs	Automated Catch Basin Inlet Screens (ARS)	13[3]	0	0	0	0	0	0	0	2,688[3]	3,444[3]	6,145
	Catch Basin Insert (various)	0	0	0	1[3]	0	0	0	0	16	0	17
	Catch Basin Connector Pipe Full Capture (CPS)	13	0	0	0	0	0	0	0	3,081	1011	4,105
	Connector Pipe Screens (CPS)	13	0	0	0	0	0	0	2[3]	851	20	886
	Filter Insert	35	0	0	0	0	0	0	0	0	0	35
	Filter Bag with Debris Trap	0	0	0	0	2	0	0	0	0	0	2
	Filters	35	0	0	0	0	0	0	0	0	0	35
	Filter Basket Catch Basin Inserts	0	0	0	0	0	0	0	0	100	0	100
	Flume Filter	0	0	0	0	1	0	0	0	0	0	1
	Manually Retractable Catch Basin Screen (MRS)	0	0	0	0	0	0	0	0	100	0	100
	Modification to Existing Catch Basin Insert	17[3]	0	0	0	0	0	0	0	0	0	17
	Poured Concrete Catch Basin	0	0	0	0	0	0	0	0	3	0	3
	Storm Drain Inlet Protection	0	0	0	0	0	0	1	0	9[3]	0	10
Institutional	Covered Material Bunkers	0	0	0	0	1	0	31	0	25	14	71
	Covered Trash Bins	12	10	0	0	0	0	9	0	53[3]	0	84
	Dog Parks	1	0	0	0	0	2	0	0	1	0	4
	Enhanced Street Sweeping	1[3]	0	1	0	0	1	0	0	19[3]	0	22
	Extra Trash Cans	0	0	0	0	50	0	242	0	959[3]	0	1,251
	Concrete Waste Management	0	0	0	0	0	0	0	0	6	0	6
	Concrete Wash Containers	0	0	0	0	0	0	3[3]	0	12[3]	0	15
	Construction Road Entrance Wash Rack	0	0	0	0	0	0	0	0	5	0	5
	Containment Berms	0	0	0	0	1	0	0	0	0	0	1
	Covered Waste Fuel Tank	0	0	0	0	0	0	2	0	0	0	2
	Hazardous Waste Management	0	0	0	0	0	0	0	0	7[3]	0	7
	Pig Oil Skimmer for Wash Rack Clarifier	0	0	0	0	0	0	0	0	3	0	3

Table H-1 Existing BMPs According to Review of 2011-2012 MS4 Annual Report

EWMP Subcategory	BMP Name	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County (San Gabriel River)	LACFCD (San Gabriel River)	LA County (LA River)	LACFCD (LA River)	TOTAL
Institutional	Secondary Containment for Waste Oil Tanks	0	0	0	0	0	0	2	0	1	0	3
	Signage & Stenciling	134[3]	0	0	0	0	0	0	0	0	0	134
	Street Sweeping & Vacuuming	0	0	0	0	0	0	0	0	1[3]	0	1
	Vehicle & Equipment Cleaning	0	0	0	0	0	0	0	0	2	0	2
	Vehicle & Equipment Maintenance	0	0	0	0	0	0	0	0	4[3]	0	4
	Wash Rack Clarifier	0	0	0	0	0	0	0	0	1	0	1
	Waste Oil Recycling Center	0	0	0	0	0	0	0	0	1	0	1
	Water Conservation Practices	0	0	0	0	0	0	0	0	3[3]	0	3
	Wind Erosion Control	0	0	0	0	0	0	0	0	11[3]	0	11
	Wind Screen	0	0	0	0	0	0	1	0	0	0	1
	Liquid Waste Management	0	0	0	0	0	0	0	0	3[3]	0	3
	Material Delivery & Storage	0	0	0	0	0	0	0	0	4[3]	0	4
	Material Use	0	0	0	0	0	0	0	0	1[3]	0	1
	Sanitary/Septic Waste Management	0	0	0	0	0	0	0	0	4[3]	0	4
	Scheduling	0	0	0	0	0	0	0	0	4[3]	0	4
	Solid Waste Management	0	0	0	0	0	0	0	0	9[3]	0	9
	Spill Containment - Temp. Hazardous Material	0	0	0	0	0	0	0	0	17[3]	0	17
	Spill Prevention & Control	0	0	0	0	0	0	0	0	3[3]	0	3
	Stockpile Management	0	0	0	0	0	0	0	0	6[3]	0	6
	Vehicle & Equipment Fueling	0	0	0	0	0	0	0	0	3[3]	0	3
	Dust Control	0	0	0	0	0	0	0	0	9[3]	0	9
	Erosion Control	0	0	0	0	0	0	0	0	4[3]	0	4
	Fiber Rolls	0	0	0	0	0	0	0	0	330[3]	0	330
Other	Concrete Curing	0	0	0	0	0	0	0	0	9[3]	0	9
	Concrete Finishing	0	0	0	0	0	0	0	0	9[3]	0	9
	Restaurant Vent Traps	0	0	0	0	17	0	0	0	1	0	18
	Check Dam	0	0	0	0	0	0	0	0	1	0	1
	Dewatering Operations	0	0	0	0	0	0	0	0	2[3]	0	2

Table H-1 Existing BMPs According to Review of 2011-2012 MS4 Annual Report

EWMP Subcategory	BMP Name	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County (San Gabriel River)	LACFCD (San Gabriel River)	LA County (LA River)	LACFCD (LA River)	TOTAL
Other	Earth Dikes/Drainage Swales	0	0	0	0	0	0	0	0	4[3]	0	4
	Geotextiles Materials/Plastic Covers Blankets	0	0	0	0	0	0	0	0	1	0	1
	Gravel Bag Berm	0	0	0	0	0	0	0	0	2[3]	0	2
	Outlet Protection/ Velocity Dissipation	0	0	0	0	0	0	0	0	1[3]	0	1
	Paving & Grinding Operations	0	0	0	0	0	0	0	0	6[3]	0	6
	Preserved Existing Vegetation	0	0	0	0	0	0	0	0	8[3]	0	8
	Sandbag	0	0	0	0	0	0	2,123[3]	0	17,162[3]	0	19,285
	Sewer Lift Station	0	0	0	0	0	0	0	0	2	0	2
	Shakers	0	0	0	0	0	0	0	0	13	0	13
	Silt Fence	0	0	0	0	0	0	102[3]	0	20[3]	0	122
	Silt Screens	0	0	0	0	0	0	0	0	2	0	2
	Slope Stabilization	0	0	0	0	0	0	2	0	0	0	2
	Slope Vegetation	0	0	0	0	0	0	0	0	5	0	5
	Soil Stabilizer/ Irrigation	0	0	0	0	0	0	0	0	1	0	1
	Soil Stabilizer Tracking Control	0	0	0	0	0	0	0	0	1	0	1
	Stabilized Construction Entrance/Exit	0	0	0	0	0	0	4	0	32[3]	0	36
	Stabilized Construction Roadway	0	0	0	0	0	0	0	0	2[3]	0	2
	Steel Plate	0	0	0	0	0	0	0	0	20	0	20
	Upgraded Fuel System with Canopy	0	0	0	0	0	0	2	0	1	0	3
	Water Trucks	0	0	0	0	0	0	0	0	8	0	8
	Sediment Trap	0	0	0	0	0	0	0	0	950[3]	0	950
Total		306[3]	28	7	5[3]	163	5	2,537[3]	10[3]	26,717[3]	4,505	34,283[3]

1 The numbers of BMPs herein were estimated based on adding the BMPs reported to be both installed and maintained in 2011-2012.

2 BMPs reported by LA County and LACFCD in the Annual Report are not specific to the EWMP area, instead they are reported for their entire jurisdiction and thus the numbers herein are a gross overestimate of the BMPs in the EWMP area.

3 These BMPs are highlighted as potentially double-counted because they may have been both installed and maintained in 2011-2012.

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Attachment I

Detailed List of Regional BMP Projects Identified in Planning Documents

This attachment includes a table summarizing the regional Best Management Practice (BMP) projects identified in planning documents within the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG), corresponding with **Section 3.1.3** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP). The BMPs listed in the table correspond to **Figure 3-9** of the EWMP.

Table I-1 Potential Regional Projects

ID	Project Name	Jurisdiction	Location	Description	Sources[1]	Notes
Within RH/SGRWQG EWMP Area						
R4	Azusa Bike Trail Network	Azusa	See project description	Develop a system of street-side bicycle paths to help bicyclists enter Azusa Canyon from Sierra Madre Avenue or Azusa Canyon Road and connect to the San Gabriel River Bike Trail.	1	May be complete - trail exists
R5	Azusa Rock Quarry Restoration	Azusa	Off of Encanta Parkway near San Gabriel River	Rehabilitate and restore the area within the Azusa Rock Quarry once mining is complete.	1	
R6	Buena Vista Wetlands	LACFCD	Near Duarte Road and Buena Vista Road	Create bio-engineered wetlands for habitat restoration in spreading basin west of Santa Fe Dam.	1	
R7	Duarte Bike Trail Extension	Duarte	See project description	Extend an existing trail for an additional mile from Royal Oaks Park (Duarte) to historic Puente Largo Rail Bridge to the San Gabriel River Bike Trail (Azusa).	1	
R8	Forest Gateway Interpretive Center	Azusa	Entrance to Azusa Canyon	Create a new U.S. Department of Agriculture (USDA) Forest Service Station and Interpretive Center at the entrance to Azusa Canyon. "Green" building practices and watershed sensitive design principles will be incorporated into the site.	1	
R9	Hugo Reid Park - Infiltration Basin	Arcadia and Unincorporated County	Michillinda Avenue and Oakdale Avenue	Provide stormwater treatment and recreational facilities with aboveground treatment at the athletic fields and underground treatment at the tennis courts and parking lot. Provide additional storage and enhanced infiltration capacity at the park.	4	
R10	Improvements to San Gabriel River Diversion and San Gabriel River Water Committee Canal and Appurtenances	Azusa	San Gabriel Canyon Road and Mountain Laurel Way	Install liftgates to allow remote operation of the canal system and upgrade parts of the canal.	5	Canal lining improvements bid in 2013
R11	Pacific Electric Rails-To-Trails Project	Azusa/Duarte	See project description	Create an east-west bike trail on an abandoned rail line running parallel to Foothill Boulevard between Monrovia and Claremont.	1	May be complete - trail exists
R12	Peck Water Conservation Improvement Project	LACFCD	Flood Control Basin near Rio Hondo Parkway and Peck Road	Construction of a pump station at Peck Road Park that will divert water that would normally flow into the San Gabriel River into facilities for groundwater recharge. Sediment will be removed from the middle of Peck Road Spreading Basin, and water will flow freely between two drainage outlets at Santa Anita Wash.	2, 3, 5	Active in planning stages.
R13	Robert's Creek Restoration	Azusa	Robert's Creek	This will be a habitat restoration and park expansion in the canyon area behind Mountain Cove.	1	
R14	Route 66/Foothill Boulevard Gateway	Azusa/Duarte	Route 66 Highway	The future City of Duarte gateway project, in partnership with the City of Azusa, is located on the historic Route 66 Highway.	1	
R15	San Gabriel Canyon Spreading Grounds	LACFCD	Near San Gabriel Canyon Road and Sierra Madre Avenue	Provide landscaping, native habitat restoration, trails, and other park amenities for public enjoyment at two deep spreading basins near San Gabriel River.	1	
R16	San Gabriel River Bike Trail Extension	Azusa	See project description	This project will extend the 38-mile regional bike trail from its current terminus near the southern edge of San Gabriel Canyon to the proposed Azusa Canyon Park and eventually all the way to the Angeles National Forest. A one-mile extension is being built to the Mountain Cove development, near the mouth of the San Gabriel Canyon.	5	
R17	Santa Anita Dam Seismic Rehabilitation	Monrovia	Santa Anita Dam; Santa Anita Canyon Road	Rehabilitate dam by adding a partial buttress to meet current seismic standards and allow for increased long term storage of captured stormwater for groundwater recharge.	5	
R18	Sawpit Debris Dam Seismic Strengthening Project	Monrovia	Monrovia Canyon Trail and Canyon Boulevard	Remove and replace existing outlet tower of the debris basin with a more updated design. Rebuild spillway on bedrock for the Division of Safety of Dams (DSOD) approval of long term water impoundment in the basin for stormwater capture and diversion to spreading grounds.	5	

Table I-1 Potential Regional Projects

ID	Project Name	Jurisdiction	Location	Description	Sources[1]	Notes
R19	Station Square	Monrovia	Myrtle Avenue and Duarte Road	Variety of on-site improvements at the new Metro Gold Line Station including the creation of a trail network, create shade by adding vegetation, promote environmental education through exposed stormwater management facilities and vegetation.	7	Anticipated completion in 2015
R20	Todd Avenue Bike Trail Network	Azusa	See project description	Connect an existing City of Azusa bike path at the south end of the San Gabriel Canyon Spreading Grounds with the San Gabriel River Bike Trail.	1	
R21	West Riverbank Tree Planting Project at the San Gabriel Valley Gun Club	Azusa	Off of Encanta Parkway near San Gabriel River	Planting 200+ trees on the west levee of the San Gabriel River to provide shade, as well as to dampen the sounds that echo up the canyon from the Gun Club activities.	1	
R22	Wright-Romvary Properties	Duarte	North Duarte	Acquire a total of 3,365 acres of land for open space protection, trails, and habitat restoration. The property is adjacent to the Van Tassel Creek, a tributary of the San Gabriel River.	1	
Outside the RH/SGRWQG EWMP Area						
R23	Baldwin Park	Baldwin Park	Patritti Avenue and Bess Avenue	Upgrade an existing 2-acre right-of-way with landscaping and trails to connect Barnes Park, the San Gabriel River Bike Trail, and neighborhood schools.	1	Downstream of project area.
R24	Indirect Reuse Replenishment Project	Irwindale	Arrow Highway and Rivergrade Road	Provide additional treatment of tertiary treated recycled water prior to reuse for groundwater replenishment.	5	Downstream of project area.
R25	Miller Pit Spreading Basins	Irwindale	Santa Fe Dam near Interstate 710 and Interstate 605	Existing deep pits will be converted to spreading basins and an intake structure and pipeline will be constructed to divert stormwater from the San Gabriel River. The pits will recharge water and serve as a sediment placement site until enough material is imported.	5	Downstream of project area.
R26	Olive Pit Water Conservation Park	Irwindale	Azusa Canyon Road and Olive Street	Divide Olive Pit into sediment placement, water conservation, and future areas. Construct an inlet from Big Dalton Wash into Olive Pit to divert water. Construct a drain from the Santa Fe Dam headworks to Olive Pit.	5	Downstream of project area.
R27	San Gabriel River Discovery Center	South El Monte	Durfee Avenue and Santa Anita Avenue	Present the story of the San Gabriel River Watershed, emphasize the importance of water resources, and provide educational and outdoor experiences to people of all ages.	2	Downstream of project area. In planning phase - looking for funding
R28	Whittier Narrows Park	South El Monte	Durfee Avenue and Santa Anita Avenue	Divert stormwater flows into a constructed infiltration basin at a County Park facility	2	Downstream of project area.

[1] Sources: 1: (San Gabriel River Corridor Master Plan, 2006), 2: (Clean Water, Clean Beaches), 3: (Amigos de los Rios), 4: (Multi-Pollutant TMDL Implementation Plan, 2010), 5: (Opti.com/IRWMP, 2013), 6: (Green Street, 2013), and 7: (City of Monrovia)

Attachment J

Detailed List of Distributed BMP Projects Identified in Planning Documents

This attachment includes tables summarizing the distributed Best Management Practices (BMPs) identified in planning documents in the Rio Hondo/San Gabriel River Water Quality Management Group (RH/SGRWQG) area, corresponding with **Section 3.1.3** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP). The projects listed in the table are illustrated in **Figure 3-10** in the EWMP.

Table J-1 Detailed List of Planned Distributed BMPs in RH/SGRWQG EWMP Area

ID	Jurisdiction	Data Source	BMP Subcategory	BMP	Latitude	Longitude	Install Date	Comments
D75	Arcadia	IRWMP	Unk	Santa Anita Park and Shopping Mall Parking Lot BMP	34.138431	-118.04611		Large privately owned shopping mall to be retrofit with BMPs.
D76	Monrovia	NOI	Unk	Monrovia Station Square/Transit Village Multi-Benefit Park and Greenway Project	34.133716	-118.00361	4/1/2015	Design and develop a 2.5 acre multi-benefit green space along the future Metro Gold Line multi-use trail, native trees and shrubs, runoff storage and infiltration systems prior to discharging into Sawpit Wash and Peck Road Water Conservation Park to the south.
D77	Monrovia	City	GS	Duarte Avenue Green Street	34.132191	-118.00366	4/1/2015	Green streets will be designed and incorporated adjacent to the Monrovia Square/Transit Village.
D78	Monrovia	City	GS	Myrtle Avenue Green Street	34.133583	-118.00366	4/1/2015	Green streets will be designed and incorporated adjacent to the Monrovia Square/Transit Village.
D79	Monrovia	City	Unk	Gold Line Maintenance Yard	34.133625	-17.99286		On Duarte Avenue between California and Shamrock. BMPs will be implemented based on SUSMP requirements.
D80	Azusa	DR, WCA	Bio	Azusa River Wilderness Park	34.161121	-117.89261		Develop LID stormwater BMPs for new parking lot and developments
D81	Azusa	DR, WCA	PP	Azusa River Wilderness Park	34.161121	-117.89261		Develop LID stormwater BMPs for new parking lot and developments
D82	Azusa	NOI	Inf	Metro Gold Line Infiltration Project	Unknown		4/1/2015	The City of Azusa in coordination with the Foothill Construction Authority for the Gold Line Project has constructed infiltration systems at some of the major crossings in town. Infiltration will occur at the catch basins which are soft bottom. Anticipated tributary areas are approximately 17 acres and will include the rail corridor. The 10 year storm event is to be infiltrated.
D83	Monrovia	DR	SC	CPS Installation	City-wide			In response to trash TMDL requirements set forth by the MS4 Permit.

Notes Bio = Bioretention/Biofiltration, DR = Data Request, GS = Green Streets, Inf = Infiltration, PP = Permeable Pavement, RH = Rainfall Harvest, SC = Source Control Structural BMP, Unk = Unknown, WCA = Watershed Conservation Authority Website

Attachment K

Potential Regional BMP Projects Worksheet

This attachment includes a worksheet used to evaluate potential regional project sites as identified within the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG), corresponding with **Section 3.1.4** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP). The potential sites listed in the worksheet correspond to **Table 3-3** and **Figure 3-12** of the EWMP.

Table K-1 Potential Regional BMP Projects Worksheet in LAR Watershed

Ranking Criteria		Proximity to Receiving Waters		Ownership		Size of Catchment Area		Size of Opportunity Site			Jurisdictions		Catchment Area Land Use and Likely Pollutants[1]											Funding Opportunities		Local Knowledge	
Assigned Weight		1		3		1		3			1		2											1		2	
Project Sites	**Type**	**Distance (ft)**	**Score**	**Owner**	**Score**	**Size (ac)**	**Score**	**Parcel (ac)**	**% Parcel**	**Score**	**No. Jurisd**	**Score**	**A**	**C**	**E**	**I**	**M**	**S**	**T**	**V**	**RW**	**%**	**Score**	**Sources**	**Score**	**Notes**	**Score**
Parks																											
Aloysia Moore Park	EWMP	500	5	Public	10	60.7		0.81	59%	4	1	4	0%	24%	0%	22%	0%	41%	5%	8%	LAR	51%	8	Potential funds	5	Diversion pipe against natural slope - down	3
Bailey Canyon Park	Regional	< 100	10	Public	10	79.83		3.01	18%	8	1	4	0%	11%	0%	0%	0%	6%	0%	83%	LAR	11%	2	Potential funds	5	Too far upstream - down	0
Duarte Park	Regional	< 100	10	Public	10	612.7		2.95	144%	1	1	4	12%	8%	1%	2%	5%	49%	0%	23%	LAR	9%	2	Potential funds	5	Benefits various jurisdictions	6
Eisenhower Park	Regional	< 100	10	Public	10	1424.8		4.64	136%	1	3	10	0%	3%	0%	1%	1%	51%	2%	42%	LAR	5%	2	Potential funds	5	Close proximity to receiving water	8
Hugo Reid Park	EWMP	< 100	10	Public	10	164.7		4.76	19%	8	2	7	0%	22%	1%	1%	0%	64%	12%	1%	LAR	35%	5	Potential funds	5	Proposed groundwater well onsite	0
L. Garcia Park	EWMP	< 100	10	Public	10	264.9		1.66	109%	1	1	4	0%	7%	3%	0%	7%	79%	0%	4%	LAR	7%	2	Already looking into it	10	Large catchment area along receiving water	10
Library Park	Regional	< 100	10	Public	10	316.47		4.38	45%	6	1	4	0%	8%	0%	0%	2%	47%	0%	44%	LAR	8%	2	Potential funds	5	Park was recently upgraded	0
Memorial Park (Sierra Madre)	Regional	700	5	Public	10	444.62		2.17	115%	1	1	4	0%	5%	3%	1%	6%	54%	0%	32%	LAR	5%	2	Potential funds	5	High within the watershed	2
Michillinda Park	Regional	1300	3	Public	10	317.3		2.18	89%	2	2	7	0%	19%	0%	0%	2%	67%	8%	2%	LAR	28%	5	Potential funds	5		5
Peck Road Park	Regional	< 100	10	Public	10	10544		169.97	42%	6	4	10	1%	8%	2%	5%	5%	48%	2%	29%	Peck	45%	5	Potential funds	5	Not a lot of space upstream of receiving water	2
Recreation Park	EWMP	< 100	10	Public	10	106.20		18.85	4%	10	1	4	0%	0%	0%	0%	0%	88%	0%	11%	LAR	0%	2	Already looking into it	10		5
Sierra Vista Park	EWMP	< 100	10	Public	10	120		35.30	2%	10	1	4	0%	4%	8%	7%	18%	63%	0%	0%	LAR	12%	2	Potential funds	5	Entire parcel not available for project site	3
Golf Courses																											
Arcadia Golf Course	EWMP	1000	0	Public	10	62.4		25.87	1%	10	1	4	0%	0%	36%	0%	0%	46%	0%	18%	Peck	54%	8	Potential funds	5	Diversion pipe extremely costly	-4
Arcadia Golf Course - Regional	Regional	< 100	10	Public	10	3505.7		25.87	95%	2	4	10	0%	4%	1%	2%	4%	59%	1%	29%	Peck	36%	5	Potential funds	5		5
Santa Anita Golf Course	Regional	4000′	10	Public	10	445.9		181.71	2%	10	1	4	0%	15%	12%	0%	24%	9%	0%	40%	LAR	15%	2	Potential funds	5	Diversion pipe extremely costly	-4
Santa Anita Golf Course Alternative 2	Regional	1500′	10	Public	10	315.2		181.71	1%	10	1	4	0%	44%	1%	4%	2%	39%	2%	7%	LAR	50%	8	Potential partners and funds	8	Diversion pipe extremely costly	-4
Educational Facilities																											
Camino Grove Park/School	-	750	5	School	0	247.33		8.25	15%	8	2	7	0%	1%	2%	0%	1%	95%	0%	1%	LAR	1%	2	Potential funds	5	Difficulty working with schools	0
Duarte Park/School	-	< 100	10	School	0	189.37		33.18	4%	10	1	4	12%	8%	1%	2%	5%	49%	0%	23%	LAR	9%	2	Potential funds	5	Difficulty working with schools	0
Foothills Middle School	-	650	5	School	0	25.56		16.39	1%	10	1	4	0%	0%	61%	0%	0%	28%	0%	11%	LAR	0%	2	Potential funds	5	Difficulty working with schools	0
Highland Oaks Elementary	-	< 100	10	School	0	68.60		7.41	7%	9	1	4	0%	0%	7%	0%	0%	89%	0%	3%	LAR	0%	2	Potential funds	5	Difficulty working with schools	0
Longley Way Elementary	-	< 100	10	School	0	264.34		5.30	32%	6	1	4	0%	2%	6%	0%	0%	92%	0%	1%	LAR	2%	2	Potential funds	5	Difficulty working with schools	0
Other																											
Arboretum of LAC – Regional	Regional	< 100	10	Public	10	1658.38		110.07	11%	8	2	7	7%	5%	2%	0%	3%	67%	2%	14%	LAR	7%	2	Potential partners and funds	8	Drainage area too large	0
Arboretum of LAC	EWMP	< 100	10	Public	10	206.7		110.07	1%	10	1	4	20%	2%	0%	0%	0%	75%	3%	0%	LAR	5%	2	Potential partners and funds	8	Positive perception if restoring historical area	9
Buena Vista Spreading Grounds	Regional	< 100	10	Public	10	1307.4		9.69	85%	2	3	10	7%	17%	3%	4%	8%	40%	4%	17%	Peck	48%	5	Potential funds	5		5
Royal Oaks Trail (LAR)	EWMP	< 100	10	Public	10	660.7		14.29	28%	8	2	7	14%	0%	1%	0%	0%	56%	0%	29%	LAR	0%	2	Potential funds	5	May not be able to utilize entire trail due to slope or else system would be deep	2

[1] A = Agricultural, C = Commercial, E = Educational, I = Industrial, M = Multi-Family Residential, S = Single Family Residential, T = Transportation, V = Vacant, RW = Receiving Waters

Table K-1 Potential Regional BMP Projects Worksheet in LAR Watershed CONTINUED

Ranking Criteria		Seasonal High Groundwater Table Depth						Proximity to GW[2] Production Well		Pollutants in Soil or Groundwater			Geotechnical Hazards		Soil Type		Total:	Rank
Assigned Weight		1						1		1			1		1			
Project Sites	**Type**	**Well**	**Min D**	**Date**	**Depth**	**Date**	**Score**	**Dist (ft)**	**Score**	**Superfund**	**Geotracker**	**Score**	**Hazard**	**Score**	**C_u**	**Score**		
Parks																		
Aloysia Moore Park	EWMP	4227A	100.5	2/13/90	255	7/30/13	10	> 200	10		1	8		10	0.52	8	124	10
Bailey Canyon Park	Regional	4122A	47.9	4/16/93	58.5	10/18/07	10	> 200	10		0	10		10	0.74	6	123	11
Duarte Park	Regional	4246	128.2	9/21/06	312	7/30/13	10	> 200	10		1	8		10	0.52	8	114	17
Eisenhower Park	Regional	4175	214.8	1/21/70	286	11/26/13	10	> 200	10		0	10		10	0.3	10	128	6
Hugo Reid Park	EWMP	4136A	3.6	12/22/24	151	9/30/10	10	< 200	5		0	10	Fault	5	0.3	10	126	8
L. Garcia Park	EWMP	4175	214.8	1/21/70	286	11/26/13	10	> 200	10		0	10		10	0.52	8	129	5
Library Park	Regional	4216	203.2	5/30/80	274.8	10/7/91	10	> 200	10		1	8		10	0.52	8	117	15
Memorial Park (Sierra Madre)	Regional	4145G	0.4	1/7/31	118.6	10/18/07	10	> 200	10		1	8		10	0.52	8	101	20
Michillinda Park	Regional	4136I	29.2	4/9/54	127	11/26/13	10	> 200	10		0	10	Fault	5	0.52	8	114	17
Peck Road Park	Regional	4199E	0	10/16/09	0	10/14/10	5	> 200	10		0	10	Liquefaction	5	0.52	8	125	9
Recreation Park	EWMP	4216	203.2	5/30/80	274.8	10/7/91	10	> 200	10		1	8		10	0.52	8	144	1
Sierra Vista Park	EWMP	4164J	34.8	7/5/67	267	11/26/13	10	> 200	10		1	8		10	0.52	8	135	3
Golf Courses																		
Arcadia Golf Course	EWMP	4189G	39.8	4/30/96	137.6	10/16/09	10	> 200	10		0	10	Liquefaction	5	0.3	10	122	12
Arcadia Golf Course - Regional	Regional	4189G	39.8	4/30/96	137.6	10/16/09	10	> 200	10		0	10	Liquefaction	5	0.74	6	122	12
Santa Anita Golf Course	Regional	4167A	63.9	2/23/96	188	8/22/13	10	> 200	10		1	8		10	0.74	6	112	19
Santa Anita Golf Course Alternative 2	Regional	4167A	63.9	2/23/96	188	8/22/13	10	> 200	10		1	8		10	0.74	6	127	7
Educational Facilities																		
Camino Grove Park/School	-	4198L	63.5	8/15/68	174	5/14/04	10	> 200	10		0	10		10	0.3	10	95	22
Duarte Park/School	-	4246	128.2	9/21/06	312	7/30/13	10	> 200	10		1	8		10	0.52	8	99	21
Foothills Middle School	-	4175	214.8	1/21/70	286	11/26/13	10	> 200	10		0	10	Liquefaction, Fault	2	0.82	4	84	25
Highland Oaks Elementary	-	4164D	25.1	7/5/67	257	11/26/13	10	> 200	10		0	10		10	0.82	4	94	23
Longley Way Elementary	-	4149C	95.7	8/22/62	212	11/26/13	10	> 200	10		0	10		10	0.74	6	87	24
Other																		
Arboretum of LAC – Regional	Regional	4145G	0.4	1/7/31	118.6	10/18/07	10	> 200	10		1	8	Liquefaction, Fault	2	0.82	4	117	15
Arboretum of LAC	EWMP	4145G	0.4	1/7/31	118.6	10/18/07	10	> 200	10		1	8	Liquefaction, Fault	2	0.3	10	142	2
Buena Vista Spreading Grounds	Regional	4217	12.3	8/8/83	0	4/18/07	5	> 200	10		1	8	Liquefaction	5	0.3	10	119	14
Royal Oaks Trail (LAR)	EWMP	4255E	29.8	4/28/95	108	7/30/13	10	> 200	10		0	10		10	0.52	8	132	4

[2] GW = Groundwater

Table K-2 Potential Regional BMP Projects Worksheet in SGR Watershed

Ranking Criteria		Proximity to Receiving Waters		Ownership		Size of Catchment Area		Size of Opportunity Site			Jurisdictions		Catchment Area Land Use and Likely Pollutants[1]											Funding Opportunities		Local Knowledge	
Assigned Weight		1		3		1		3			1		2											1		2	
Project Sites	**Type**	**Distance (ft)**	**Score**	**Owner**	**Score**	**Size (ac)**	**Score**	**Parcel (ac)**	**% Parcel**	**Score**	**No. Jurisd**	**Score**	**A**	**C**	**E**	**I**	**M**	**S**	**T**	**V**	**RW**	**%**	**Score**	**Sources**	**Score**	**Notes**	**Score**
Parks																											
Encanto Park	EWMP	< 100	10	Public	10	189.5		11.14	10%	8	2	7	0%	0%	0%	0%	0%	58%	0%	41%	SGR	0%	2	Potential funds	5	In close proximity to receiving water	8
Gladstone Park	EWMP	Surface or 1500'	3	Public	10	54		4.90	7%	9	0	0	0%	1%	0%	0%	0%	87%	2%	10%	SGR	3%	2	Potential funds	5		5
Memorial Park (Azusa)	EWMP	< 100	10	Public	10	386.81		11.71	26%	8	1	4	0%	4%	3%	47%	7%	26%	3%	9%	SGR	54%	8	Potential funds	5		5
Northside Park	EWMP	< 100	10	Public	10	48.03		15.96	2%	10	1	4	0%	0%	23%	0%	47%	1%	0%	29%	SGR	0%	2	Potential funds	5		5
Pioneer Park	EWMP	< 100	10	Public	10	60.21		4.10	7%	9	2	7	38%	0%	0%	0%	0%	30%	0%	33%	SGR	0%	2	Potential funds	5	Upper portion of watershed	2
Royal Oaks Park	Regional	< 100	10	Public	10	305.40		5.38	38%	6	1	4	3%	0%	2%	0%	0%	53%	0%	41%	SGR	0%	2	Potential funds	5		5
Slauson Park	Regional	< 100	10	Public	10	477.64		4.05	68%	4	1	4	16%	10%	3%	1%	11%	53%	0%	5%	SGR	11%	2	Potential funds	5		5
Golf Course																											
Azusa Greens Country Club	Regional	< 100	10	Public	10	487.90		87.22	4%	10	2	7	7%	2%	0%	1%	19%	25%	0%	45%	SGR	3%	2	Potential funds	5		5
Educational Facilities																											
Gordon Sports Park/School	Regional	< 100	10	School	0	1781.5		12.97	86%	2	2	7	3%	1%	2%	1%	4%	36%	0%	53%	SGR	2%	2	Potential funds	5	Difficulty working with schools	0
Royal Oaks Elementary	Regional	< 100	10	School	0	357.80		12.83	19%	8	2	7	2%	0%	5%	0%	0%	57%	0%	36%	SGR	0%	2	Potential funds	5	Difficulty working with schools	0
Other																											
Royal Oaks Trail (SGR)	EWMP	< 100	10	Public	10	721.6		14.29	47%	6	3	10	4%	0%	0%	0%	2%	21%	0%	73%	SGR	0%	2	Potential funds	5		5
LADWP Easement	Regional	< 100	10	Public	10	240.1		8.71	16%	8	2	7	0%	2%	2%	41%	3%	41%	2%	8%	SGR	45%	5	Potential partners and funds	8		5

[1] A = Agricultural, C = Commercial, E = Educational, I = Industrial, M = Multi-Family Residential, S = Single Family Residential, T = Transportation, V = Vacant, RW = Receiving Waters

Table K-2 Potential Regional BMP Projects Worksheet in SGR Watershed CONTINUED

Ranking Criteria		Seasonal High Groundwater Table Depth						Proximity to GW[2] Production Well		Pollutants in Soil or Groundwater			Geotechnical Hazards		Soil Type		Total:	Rank
Assigned Weight		1						1		1			1		1			
Project Sites	Type	Well	Min D	Date	Depth	Date	Score	Dist (ft)	Score	Superfund	Geotracker	Score	Hazard	Score	C_u	Score		
Parks																		
Encanto Park	EWMP	4265A	62	3/29/70	135.2	8/18/13	10	> 200	10		0	10	Liquefaction	5	0.52	8	139	2
Gladstone Park	EWMP	4288A	36	2/1/98	294.4	8/1/13	10	> 200	10		0	10		10	0.74	6	125	8
Memorial Park (Azusa)	EWMP	4306Q	2.4	8/7/75	12.7	5/6/12	5	> 200	10		0	10	Liquefaction	5	0.9	2	131	3
Northside Park	EWMP	4285C	19.2	3/20/35	127.3	8/1/13	10	> 200	10		0	10	Liquefaction	5	0.9	2	130	5
Pioneer Park	EWMP	4295A	19	5/18/58	105	8/1/13	10	> 200	10		0	10	Liquefaction	5	0.52	8	130	5
Royal Oaks Park	Regional	4255E	29.8	4/28/95	108	7/30/13	10	> 200	10		0	10		10	0.52	8	129	7
Slauson Park	Regional	4306Q	2.4	8/7/75	12.7	5/6/12	5	> 200	10		0	10	Liquefaction	5	0.52	8	113	10
Golf Courses																		
Azusa Greens Country Club	Regional	4285B	16.4	3/20/35	144.8	8/1/13	10	175	5		2	5	Liquefaction	5	0.9	2	123	9
Educational Facilities																		
Gordon Sports Park/School	Regional	4256	198.3	2/9/71	372	7/30/13	10	> 200	10		0	10		10	0.52	8	80	12
Royal Oaks Elementary	Regional	4256	198.3	2/9/71	372	7/30/13	10	> 200	10		0	10		10	0.52	8	98	11
Other																		
Royal Oaks Trail (SGR)	EWMP	4255E	29.8	4/28/95	108	7/30/13	10	> 200	10		0	10		10	0.82	4	131	3
LADWP Easement	Regional	4228A	36	2/1/98	294.4	8/1/13	10	> 200	10		1	8		10	0.52	8	145	1

[2] GW = Groundwater

Attachment L

Potential Regional BMP Project Figures

This attachment includes figures associated with all of the regional Best Management Practices (BMPs) evaluated for inclusion in the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) Enhanced Watershed Management Program (EWMP), as discussed in **Section 3.2.4**. Figures are included for all of the sites evaluated within the Los Angeles River (LAR) and San Gabriel River (SGR) Watersheds along with the sites that were eliminated due to fatal flaws. For the LAR and SGR Watershed figures, the order the figures are presented is consistent with the ranking established using the methodology described in the EWMP. **Table L-1** summarizes the projects that were evaluated along with the score and ranking. **Table L-2** identifies the sites that were eliminated, the watershed they are in, and the reason they were eliminated.

Table L-1 Ranked Potential Regional Project Sites in the LAR Watershed

Potential Project Site	Score	Rank
LAR Watershed		
Recreation Park	144	1
Arboretum of Los Angeles County (LAC)	142	2
Sierra Vista Park	135	3
Royal Oaks Trail (LAR)	132	4
L. Garcia Park	129	5
Eisenhower Park	128	6
Santa Anita Golf Course Alternative 2	127	7
Hugo Reid Park	126	8
Peck Road Park	125	9
Aloysia Moore Park	124	10
Bailey Canyon Park	123	11
Arcadia Golf Course	122	12
Arcadia Golf Course - Regional	122	12
Buena Vista Spreading Grounds	119	14
Library Park	117	15
Arboretum of LAC – Regional	117	15
Duarte Park	114	17
Michillinda Park	114	17
Santa Anita Golf Course	112	19
Memorial Park (Sierra Madre)	101	20
Duarte Park/School	99	21
Camino Grove Park/School	95	22
Highland Oaks Elementary	94	23
Longley Way Elementary	87	24
Foothills Middle School	84	25
SGR Watershed		
LADWP Easement	145	1
Encanto Park	139	2
Memorial Park (Azusa)	131	3
Royal Oaks Trail (SGR)	131	3
Northside Park	130	5

Table L-1 Ranked Potential Regional Project Sites in the LAR Watershed		
Potential Project Site	**Score**	**Rank**
Pioneer Park	130	5
Royal Oaks Park	129	7
Gladstone Park	125	8
Azusa Greens Country Club	123	9
Slauson Park	113	10
Royal Oaks Elementary	98	11
Gordon Sports Park/School	80	12

Table L-2 Eliminated Regional EWMP Project Sites		
Potential Project Site	**Watershed**	**Reason for Elimination**
Parks		
Bonita Park	LAR	Upstream in subwatershed, no significant catchment
Dalton Park	SGR	Catchment area outside RH/SGRWQG
Grand Park	LAR	Upstream in subwatershed, no significant catchment
Pamela Park	LAR	Superfund site
Valleydale Park	SGR	Superfund site
Zacatecas Park	SGR	Superfund site
Golf Course		
Rancho Duarte Golf Course	SGR	Existing contamination issues
Educational Facilities		
Citrus Community College	SGR	Catchment area outside RH/SGRWQG

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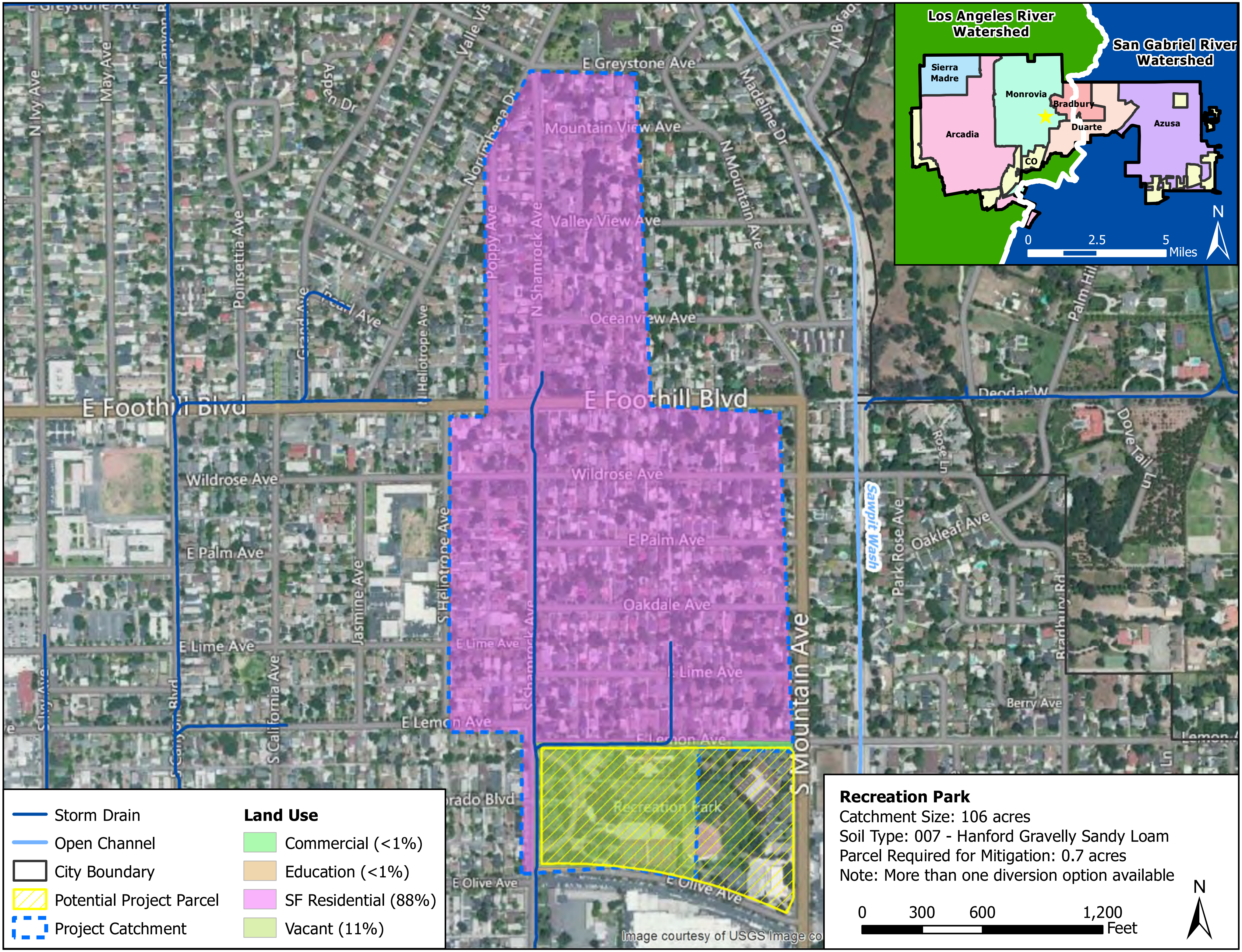
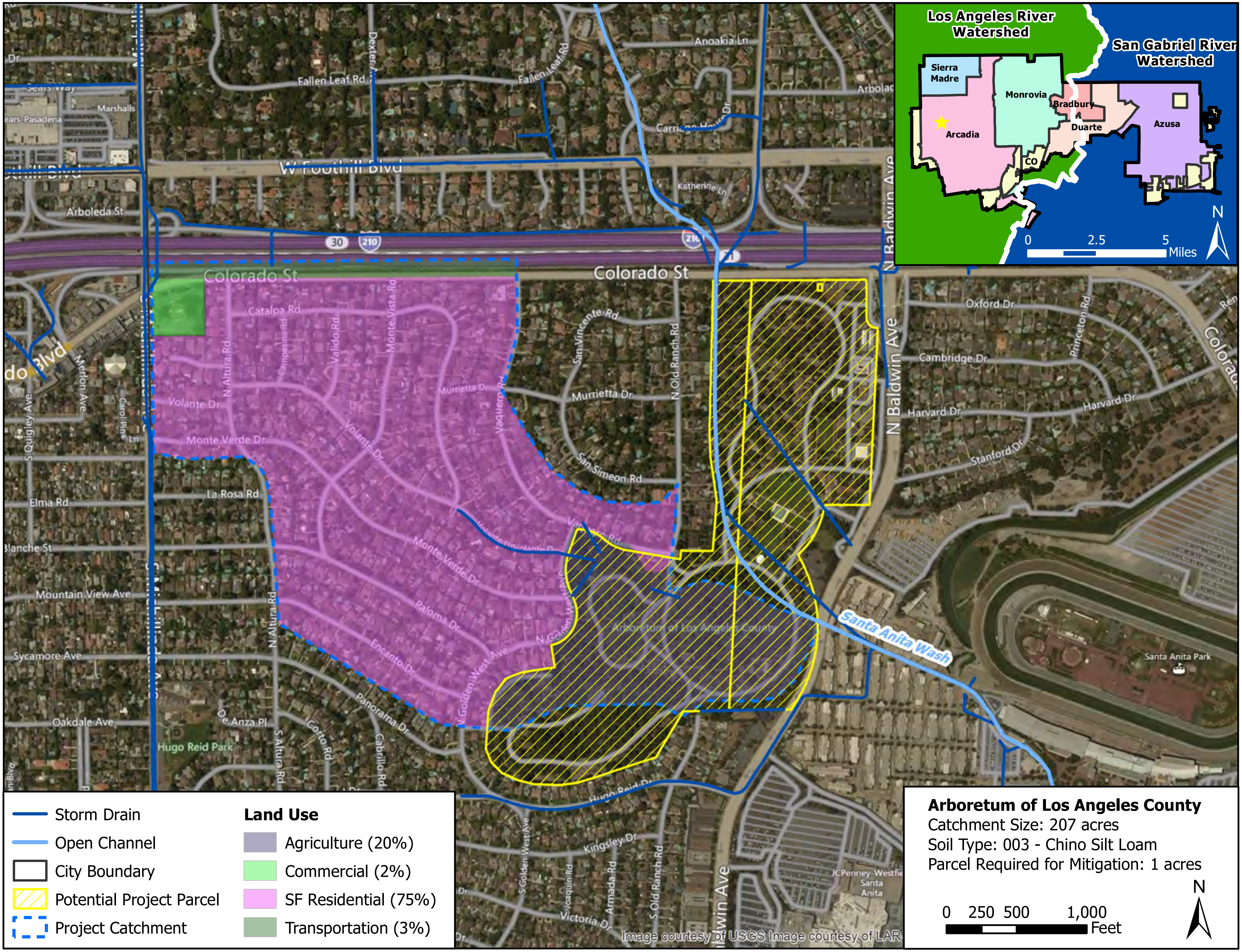
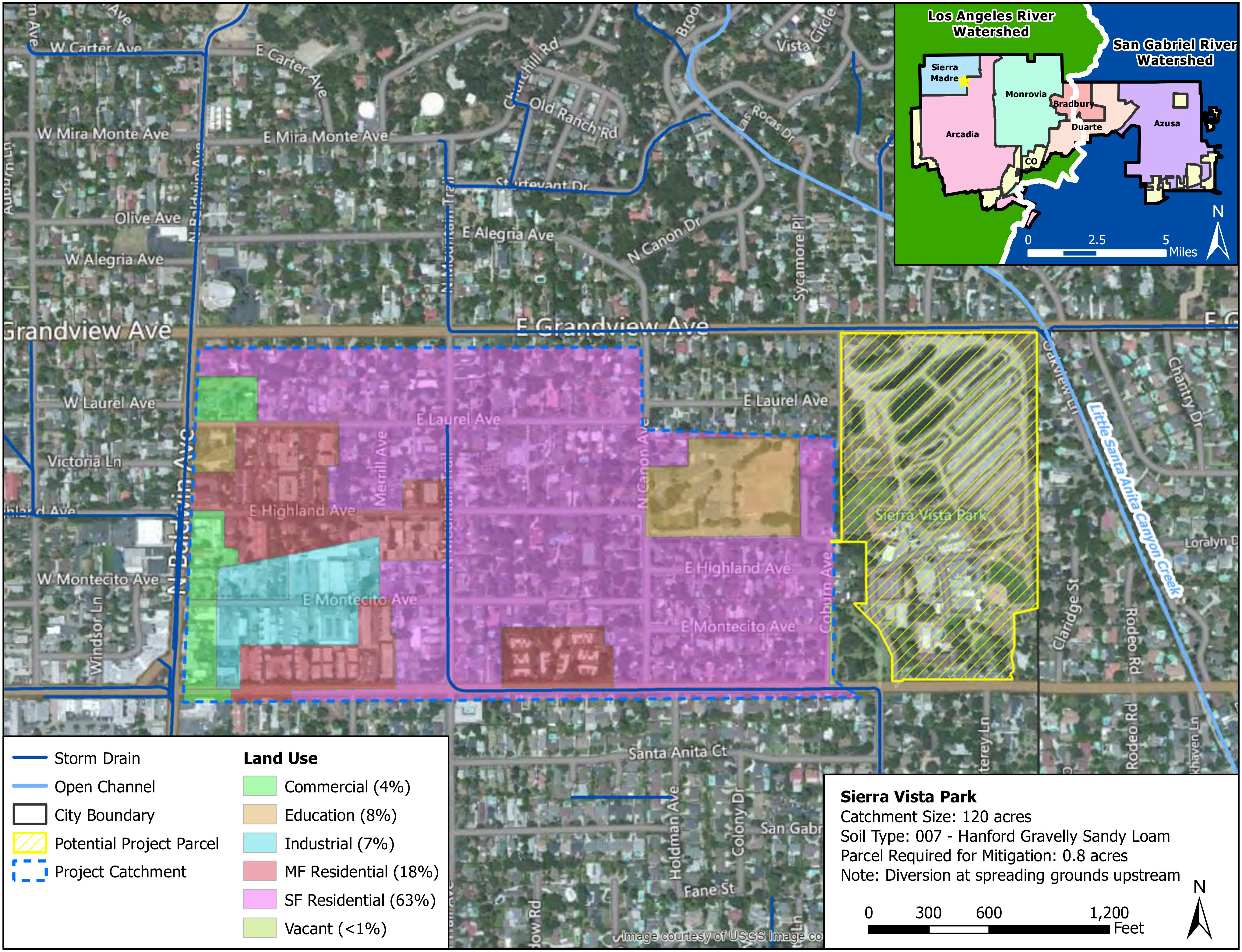
LAR Watershed



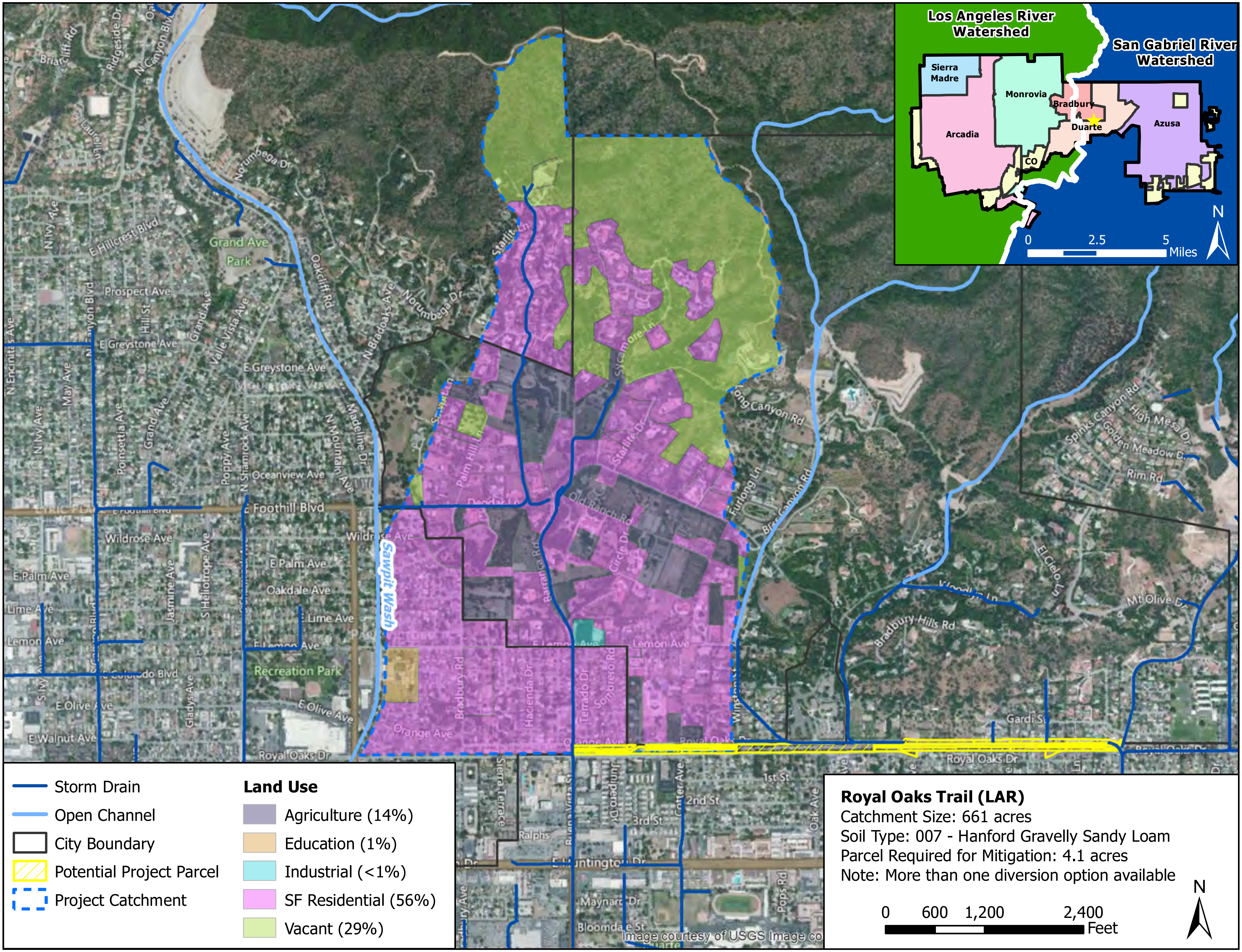
Recreation Park
Catchment Size: 106 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 0.7 acres
Note: More than one diversion option available
0 300 600 1,200 Feet
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (<1%)
Education (<1%)
SF Residential (88%)
Vacant (11%)
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
E Greystone Ave
Mountain View Ave
Valley View Ave
Oceanview Ave
E Foothill Blvd
Wildrose Ave
E Palm Ave
Oakdale Ave
E Lime Ave
E Lemon Ave
E Olive Ave
Recreation Park
S Mountain Ave
N Mountain Ave
N Shamrock Ave
Poppy Ave
Norumbega Dr
Madeline Dr
S Heliotrope Ave
N Heliotrope Ave
Jasmine Ave
S California Ave
Poinsettia Ave
Grand Ave
Pearl Ave
Aspen Dr
May Ave
N Ivy Ave
Sawpit Wash
Park Rose Ave
Oakleaf Ave
Rose Ln
Dove Tail Ln
Palm Hill
Deodar W
Berry Ave
Bradbury Rd
Image courtesy of USGS Image co



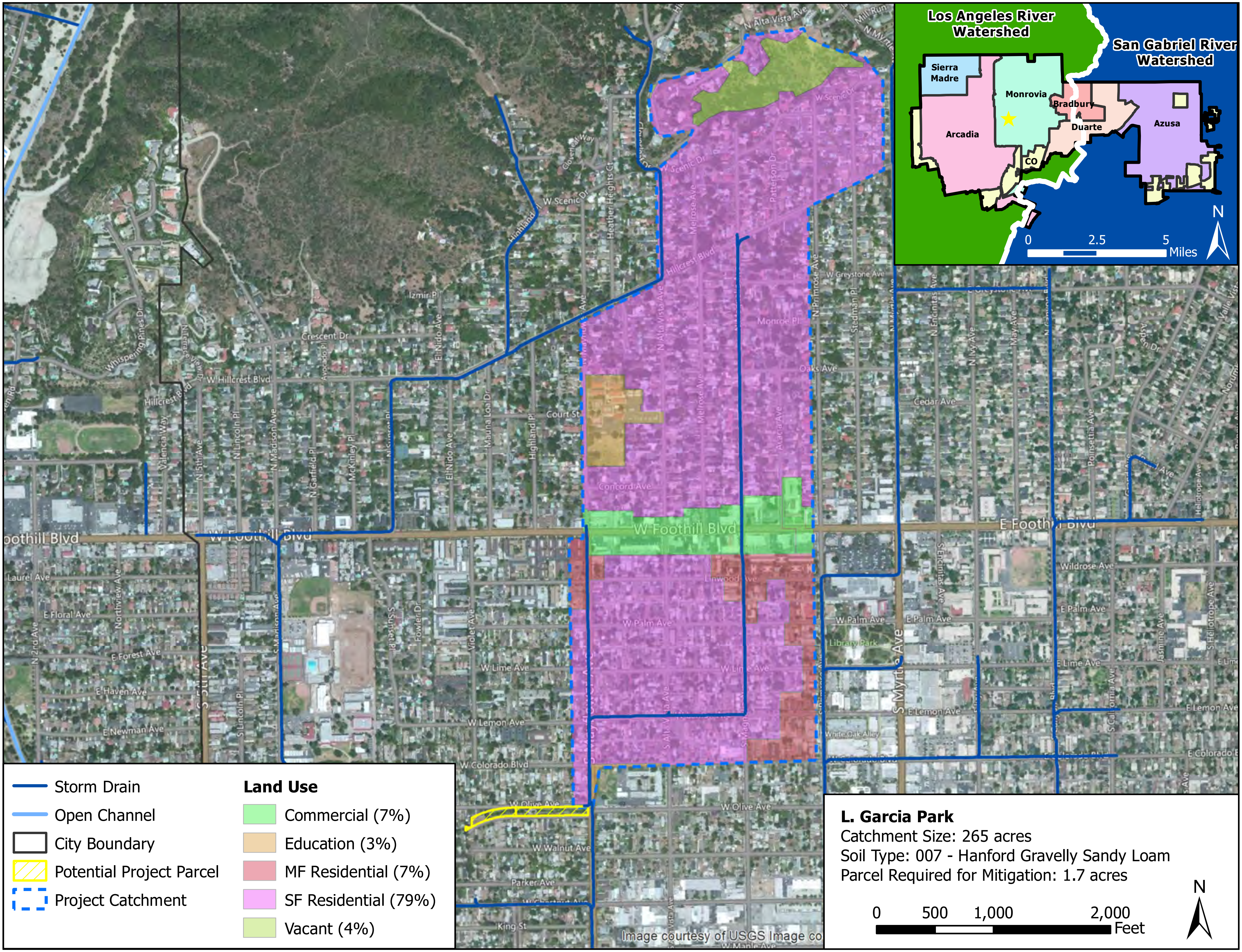
Arboretum of Los Angeles County
Catchment Size: 207 acres
Soil Type: 003 - Chino Silt Loam
Parcel Required for Mitigation: 1 acres
0 250 500 1,000 Feet
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (20%)
Commercial (2%)
SF Residential (75%)
Transportation (3%)
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
Santa Anita Wash
Arboretum of Los Angeles County
Colorado St
W Foothill Blvd
N Baldwin Ave
Santa Anita Park
Hugo Reid Park
Image courtesy of USGS Image courtesy of LAR

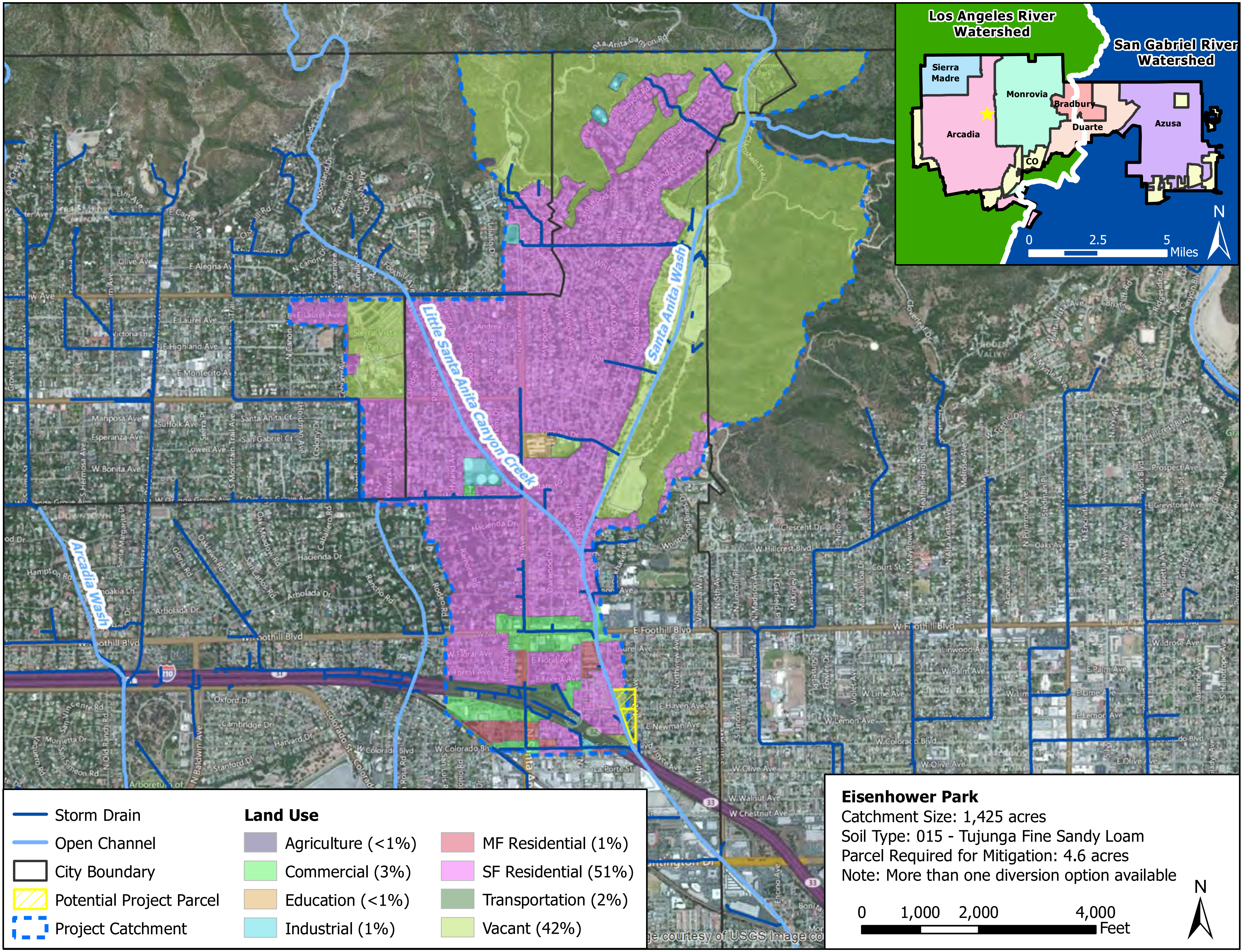


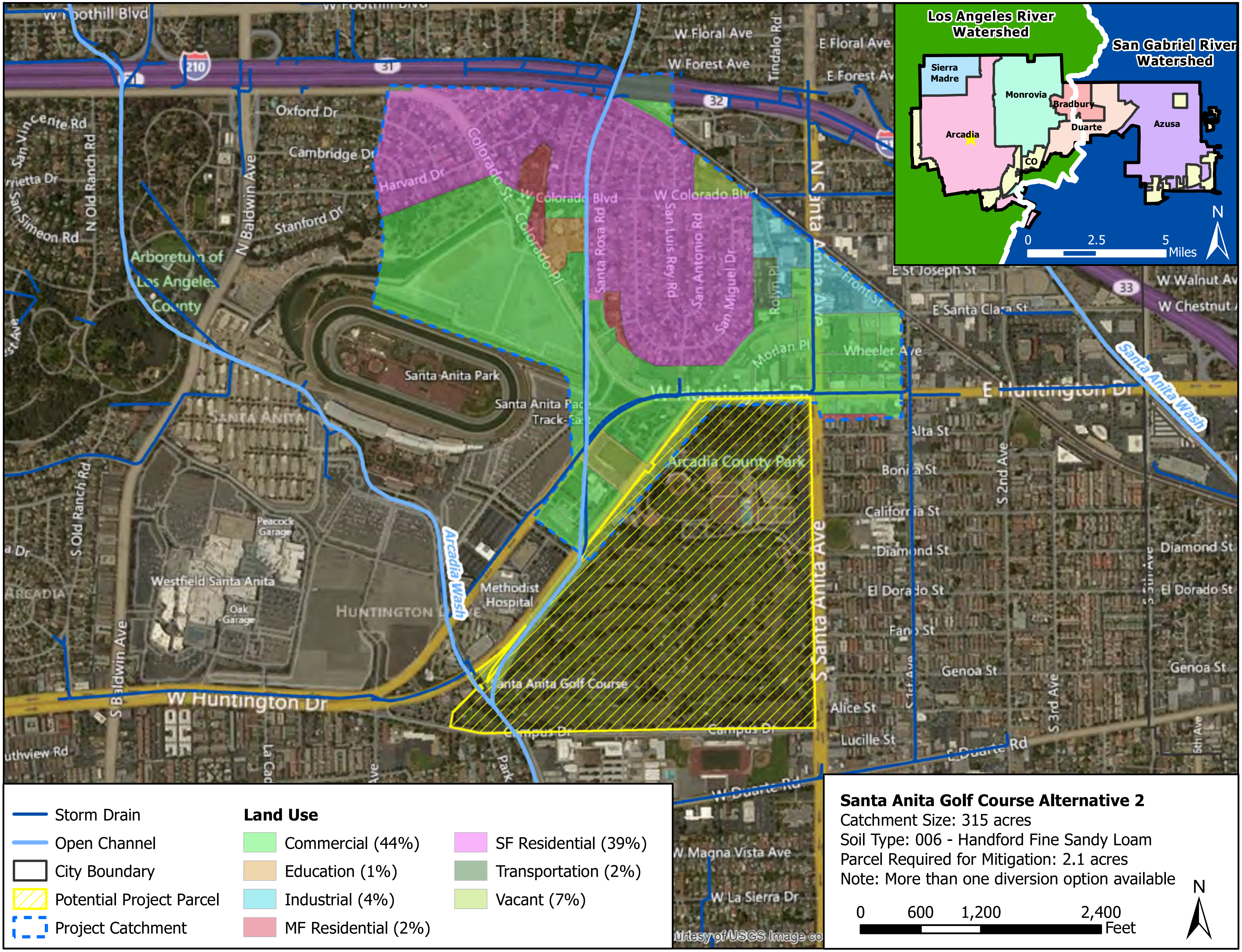
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
W Carter Ave
E Carter Ave
W Mira Monte Ave
E Mira Monte Ave
Old Ranch Rd
Sturtevant Dr
Olive Ave
W Alegria Ave
E Alegria Ave
N Canon Dr
Las Rocas Dr
Sycamore Pl
Grandview Ave
E Grandview Ave
W Laurel Ave
E Laurel Ave
Victoria Ln
N Baldwin Ave
Merrill Ave
E Highland Ave
N Canon Ave
Coburn Ave
W Montecito Ave
E Montecito Ave
Windsor Ln
Sierra Vista Park
Little Santa Anita Canyon Creek
Claridge St
Rodeo Rd
Chantry Dr
Loralyn Dr
Santa Anita Ct
Holdman Ave
Colony Dr
Fane St
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (4%)
Education (8%)
Industrial (7%)
MF Residential (18%)
SF Residential (63%)
Vacant (<1%)
Sierra Vista Park
Catchment Size: 120 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 0.8 acres
Note: Diversion at spreading grounds upstream
0 300 600 1,200 Feet
N
Image courtesy of USGS

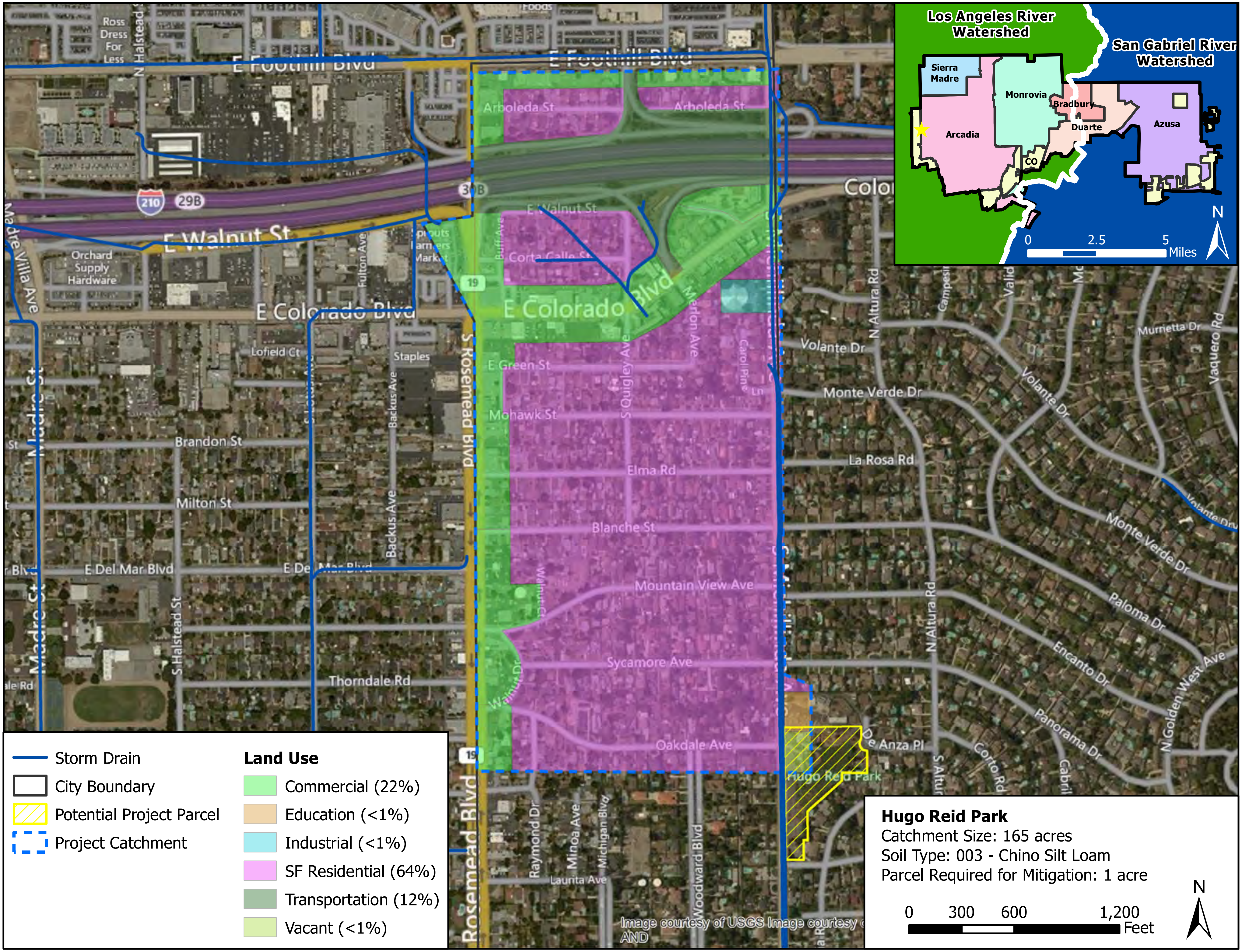


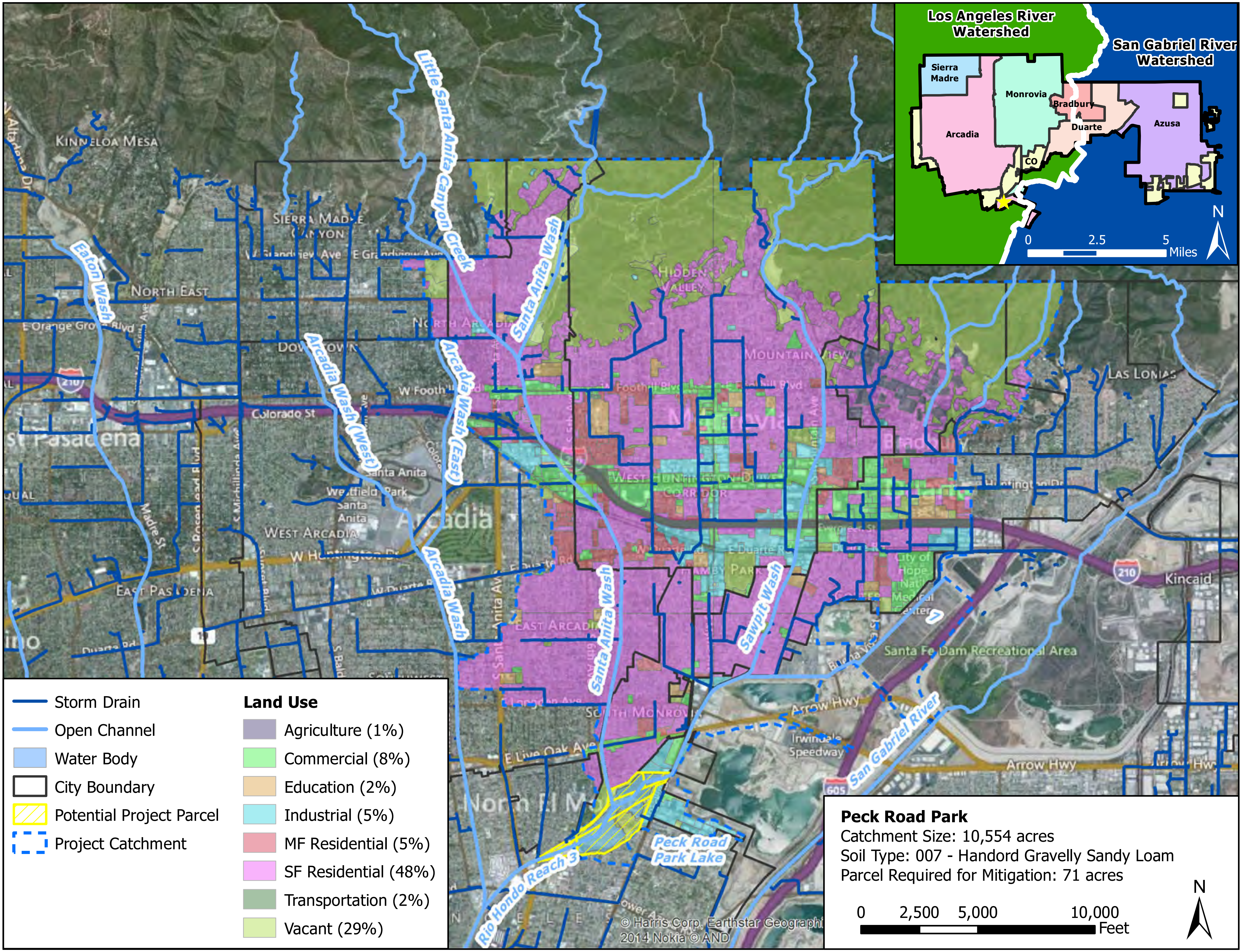
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Arcadia
Bradbury
Duarte
Azusa
CO
0 2.5 5 Miles
N
Sawpit Wash
Grand Ave Park
Recreation Park
Foothill Blvd
Royal Oaks Dr
Lemon Ave
Orange Ave
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (14%)
Education (1%)
Industrial (<1%)
SF Residential (56%)
Vacant (29%)
Royal Oaks Trail (LAR)
Catchment Size: 661 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 4.1 acres
Note: More than one diversion option available
0 600 1,200 2,400 Feet
N
Image courtesy of USGS Image co


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
W Foothill Blvd
E Foothill Blvd
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (7%)
Education (3%)
MF Residential (7%)
SF Residential (79%)
Vacant (4%)
L. Garcia Park
Catchment Size: 265 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 1.7 acres
0 500 1,000 2,000 Feet
N
Image courtesy of USGS Image co


Eisenhower Park
Catchment Size: 1,425 acres
Soil Type: 015 - Tujunga Fine Sandy Loam
Parcel Required for Mitigation: 4.6 acres
Note: More than one diversion option available
0 1,000 2,000 4,000 Feet
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (<1%)
Commercial (3%)
Education (<1%)
Industrial (1%)
MF Residential (1%)
SF Residential (51%)
Transportation (2%)
Vacant (42%)
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
Little Santa Anita Canyon Creek
Santa Anita Wash
Arcadia Wash
Image courtesy of USGS Image co


Santa Anita Golf Course Alternative 2
Catchment Size: 315 acres
Soil Type: 006 - Handford Fine Sandy Loam
Parcel Required for Mitigation: 2.1 acres
Note: More than one diversion option available
0 600 1,200 2,400 Feet
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (44%)
Education (1%)
Industrial (4%)
MF Residential (2%)
SF Residential (39%)
Transportation (2%)
Vacant (7%)
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
Santa Anita Park
Arcadia County Park
Santa Anita Golf Course
Methodist Hospital
Westfield Santa Anita
Arcadia Wash
Santa Anita Wash
W Huntington Dr
E Huntington Dr
S Santa Anita Ave
W Colorado Blvd
Campus Dr
W Duarte Rd


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Duarte
Arcadia
Azusa
CO
0 2.5 5 Miles
N
E Foothill Blvd
E Walnut St
E Colorado Blvd
Arboleda St
Corta Calle St
E Green St
Mohawk St
Elma Rd
Blanche St
Mountain View Ave
Sycamore Ave
Oakdale Ave
S Rosemead Blvd
S Quigley Ave
Brandon St
Milton St
E Del Mar Blvd
Thorndale Rd
Volante Dr
Monte Verde Dr
La Rosa Rd
N Altura Rd
De Anza Pl
Hugo Reid Park
Storm Drain
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (22%)
Education (<1%)
Industrial (<1%)
SF Residential (64%)
Transportation (12%)
Vacant (<1%)
Hugo Reid Park
Catchment Size: 165 acres
Soil Type: 003 - Chino Silt Loam
Parcel Required for Mitigation: 1 acre
0 300 600 1,200 Feet
N
Image courtesy of USGS Image courtesy of



Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
Storm Drain
Open Channel
Water Body
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (1%)
Commercial (8%)
Education (2%)
Industrial (5%)
MF Residential (5%)
SF Residential (48%)
Transportation (2%)
Vacant (29%)
Peck Road Park
Catchment Size: 10,554 acres
Soil Type: 007 - Handord Gravelly Sandy Loam
Parcel Required for Mitigation: 71 acres
0
2,500
5,000
10,000
Feet
N
Little Santa Anita Canyon Creek
Santa Anita Wash
Eaton Wash
Arcadia Wash (West)
Arcadia Wash (East)
Arcadia Wash
Sawpit Wash
San Gabriel River
Rio Hondo Reach 3
Peck Road Park Lake
Santa Fe Dam Recreational Area
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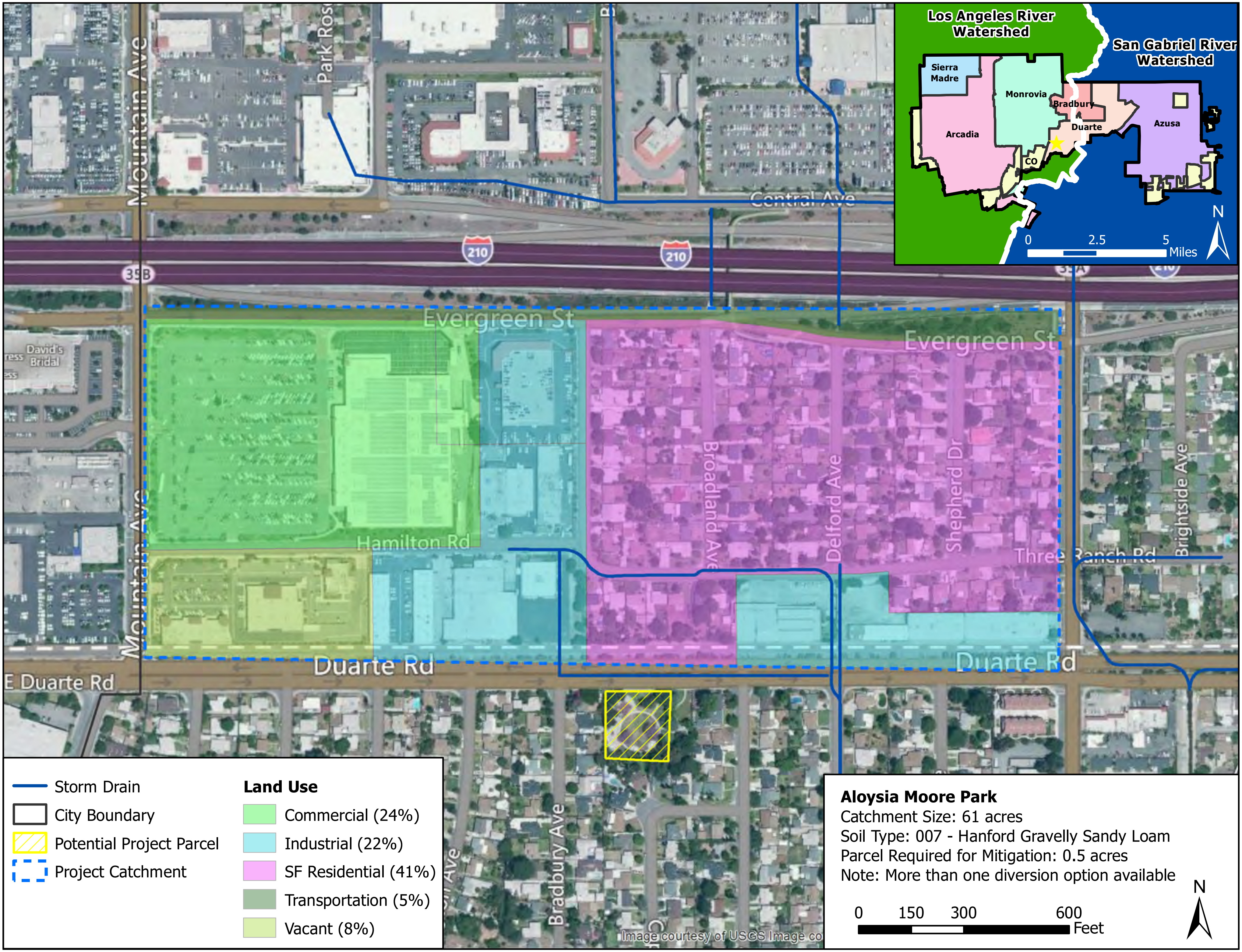
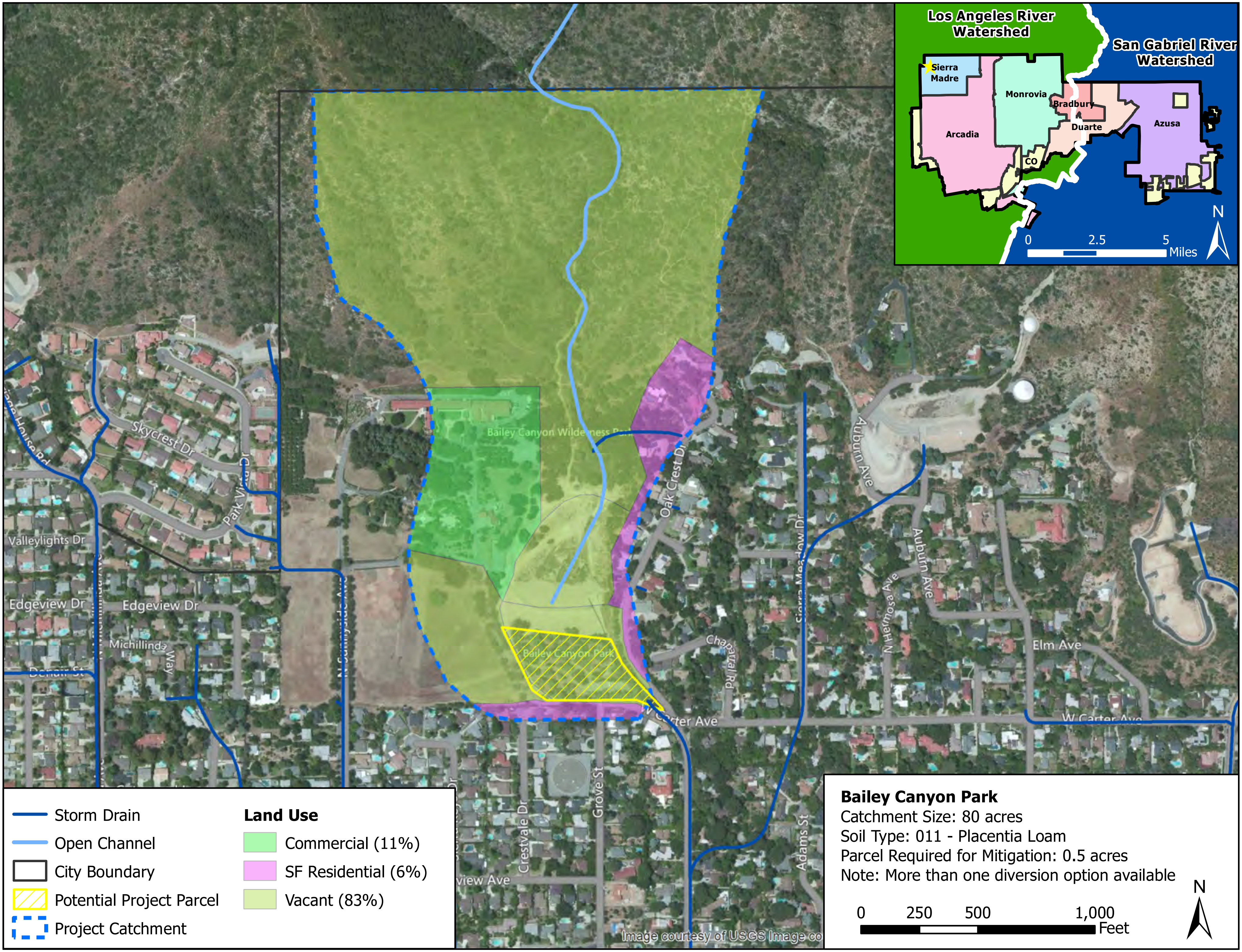
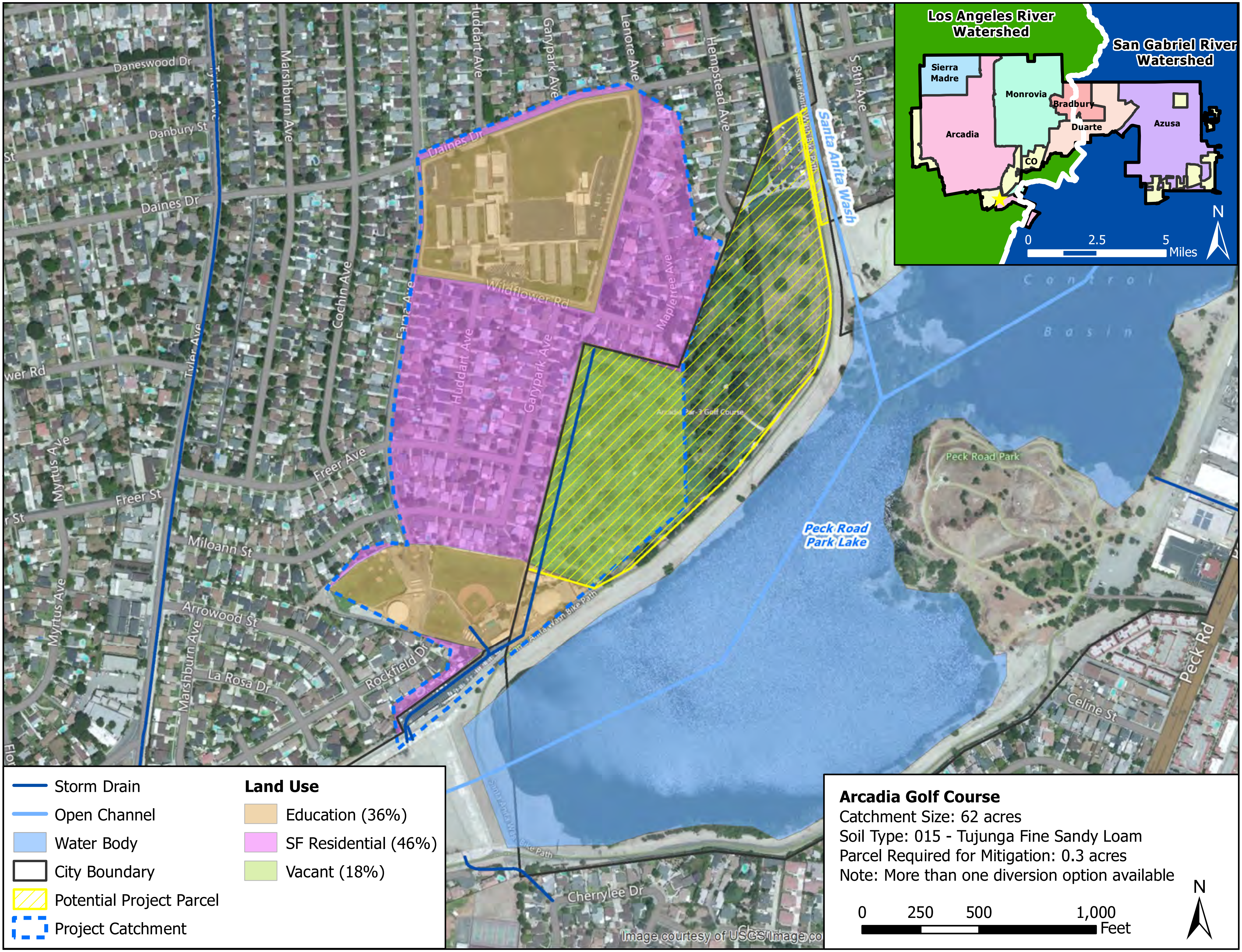
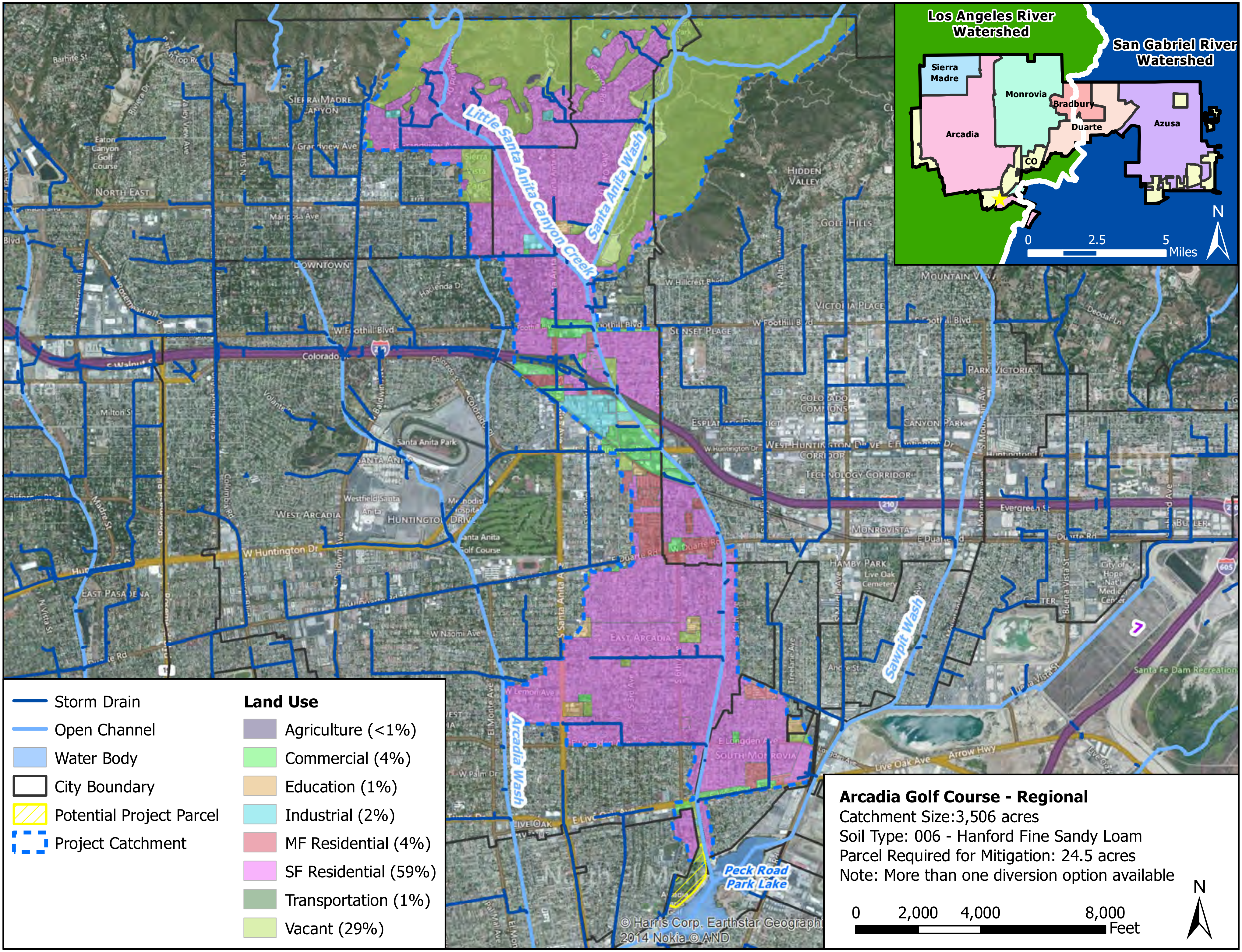


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
Park Rose
Mountain Ave
Central Ave
210
35B
Evergreen St
Hamilton Rd
Broadland Ave
Delford Ave
Shepherd Dr
Brightside Ave
Three Ranch Rd
Duarte Rd
E Duarte Rd
Bradbury Ave
David's Bridal
Image courtesy of USGS Image co
Storm Drain
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (24%)
Industrial (22%)
SF Residential (41%)
Transportation (5%)
Vacant (8%)
Aloysia Moore Park
Catchment Size: 61 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 0.5 acres
Note: More than one diversion option available
0 150 300 600 Feet
N



Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
N
0
2.5
5
Miles
Skycrest Dr
Park Vista Dr
Valleylights Dr
Edgeview Dr
Edgeview Dr
Michillinda Way
Oak Crest Dr
Auburn Ave
Auburn Ave
N Hermosa Ave
Chaparral Rd
Elm Ave
W Carter Ave
W Carter Ave
Grove St
Crestvale Dr
Adams St
Bailey Canyon Park
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (11%)
SF Residential (6%)
Vacant (83%)
Bailey Canyon Park
Catchment Size: 80 acres
Soil Type: 011 - Placentia Loam
Parcel Required for Mitigation: 0.5 acres
Note: More than one diversion option available
0
250
500
1,000
Feet
N


Arcadia Golf Course
Catchment Size: 62 acres
Soil Type: 015 - Tujunga Fine Sandy Loam
Parcel Required for Mitigation: 0.3 acres
Note: More than one diversion option available
0 250 500 1,000 Feet
N
Storm Drain
Open Channel
Water Body
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Education (36%)
SF Residential (46%)
Vacant (18%)
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Duarte
Azusa
Arcadia
CO
0 2.5 5 Miles
Santa Anita Wash
Peck Road Park Lake
Peck Road Park
Control Basin
Daneswood Dr
Danbury St
Daines Dr
Wildflower Rd
Freer Ave
Freer St
Miloann St
Arrowood St
La Rosa Dr
Rockfield Dr
Cherrylee Dr
Celine St
Peck Rd
Tyler Ave
Marshburn Ave
Cochin Ave
Huddart Ave
Garypark Ave
Lenore Ave
Hempstead Ave
Maplerree Ave
Myrtus Ave
S 8th Ave
Image courtesy of USGS



Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
Little Santa Anita Canyon Creek
Santa Anita Wash
Arcadia Wash
Sawpit Wash
Peck Road Park Lake
Storm Drain
Open Channel
Water Body
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (<1%)
Commercial (4%)
Education (1%)
Industrial (2%)
MF Residential (4%)
SF Residential (59%)
Transportation (1%)
Vacant (29%)
Arcadia Golf Course - Regional
Catchment Size:3,506 acres
Soil Type: 006 - Hanford Fine Sandy Loam
Parcel Required for Mitigation: 24.5 acres
Note: More than one diversion option available
0 2,000 4,000 8,000 Feet
N
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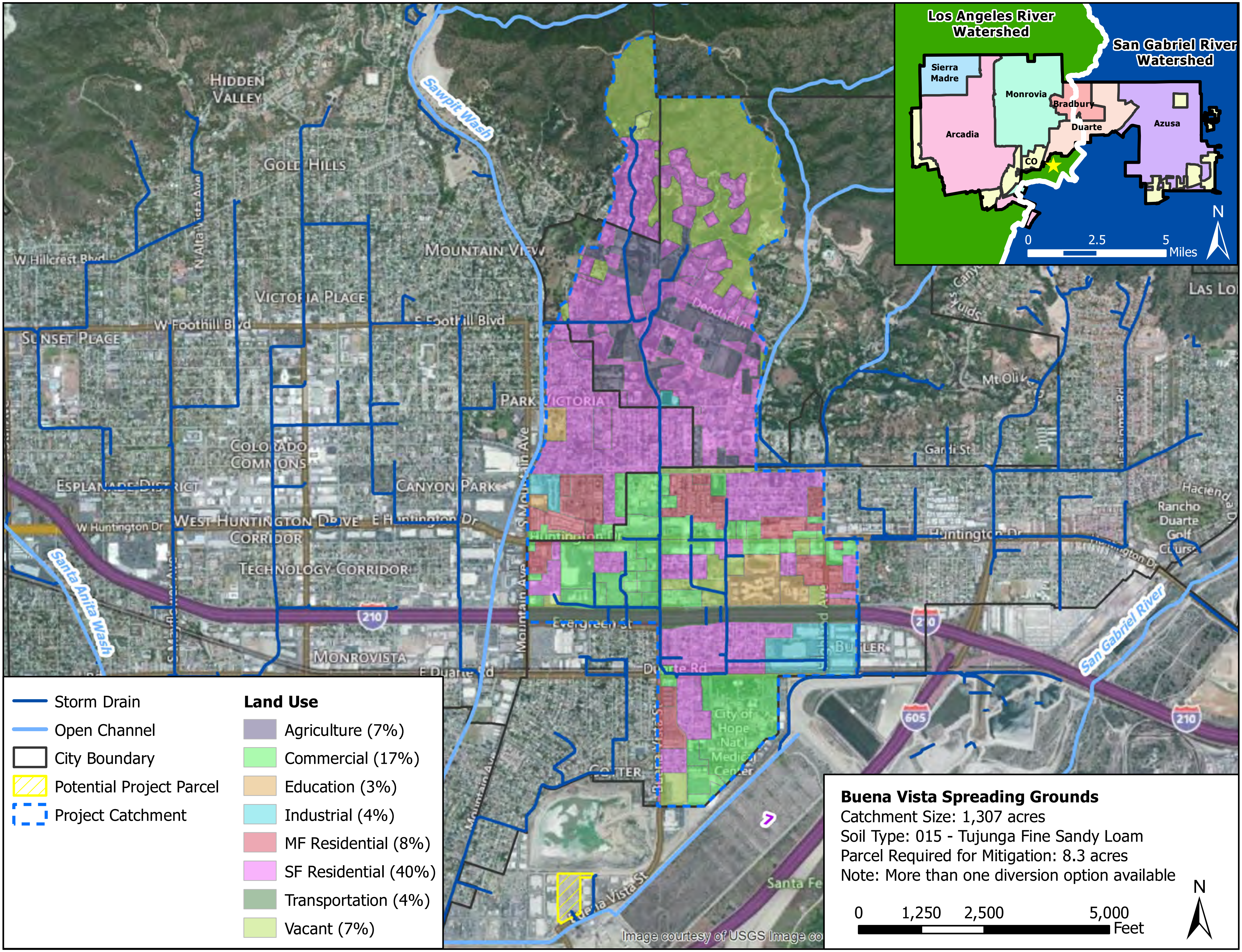
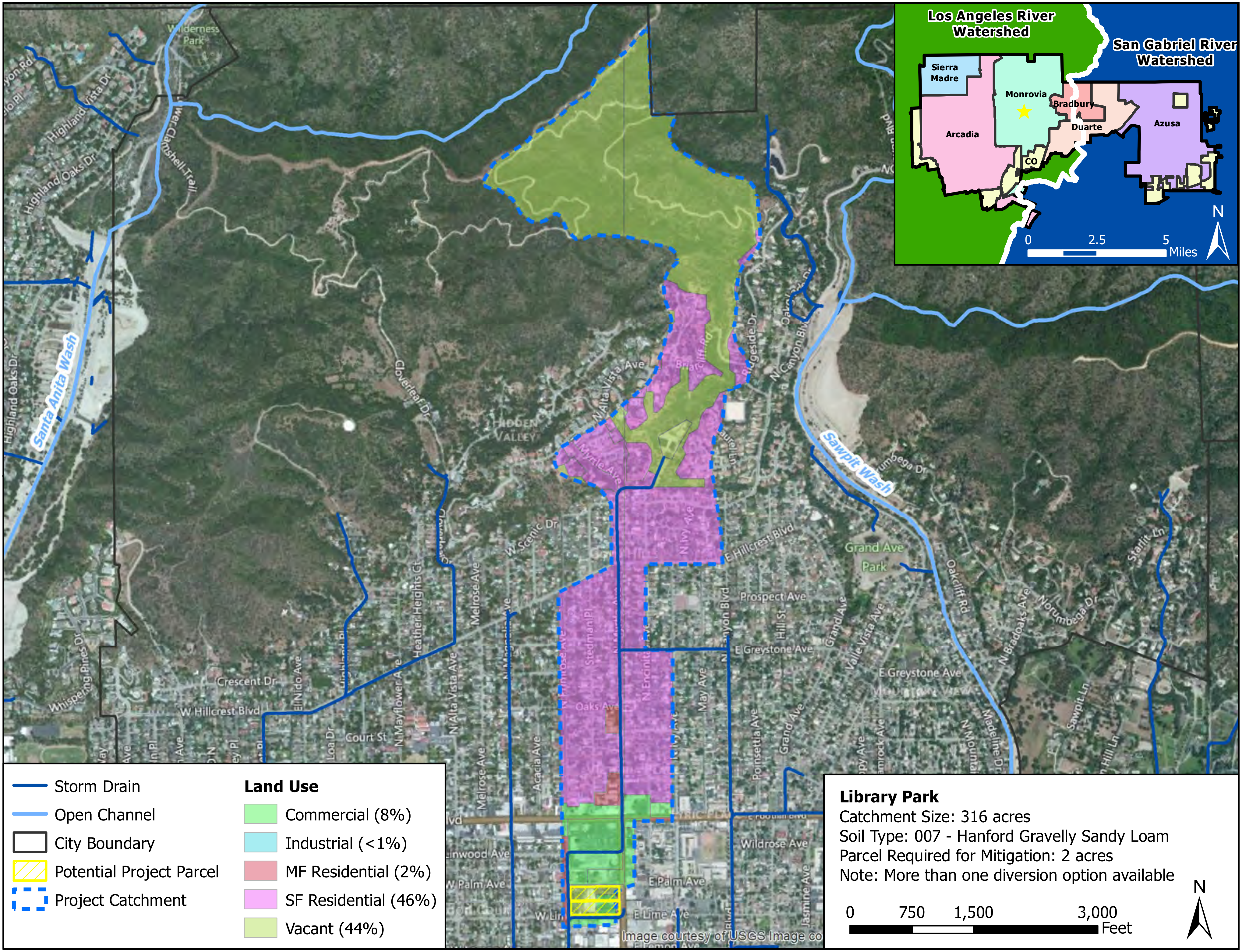
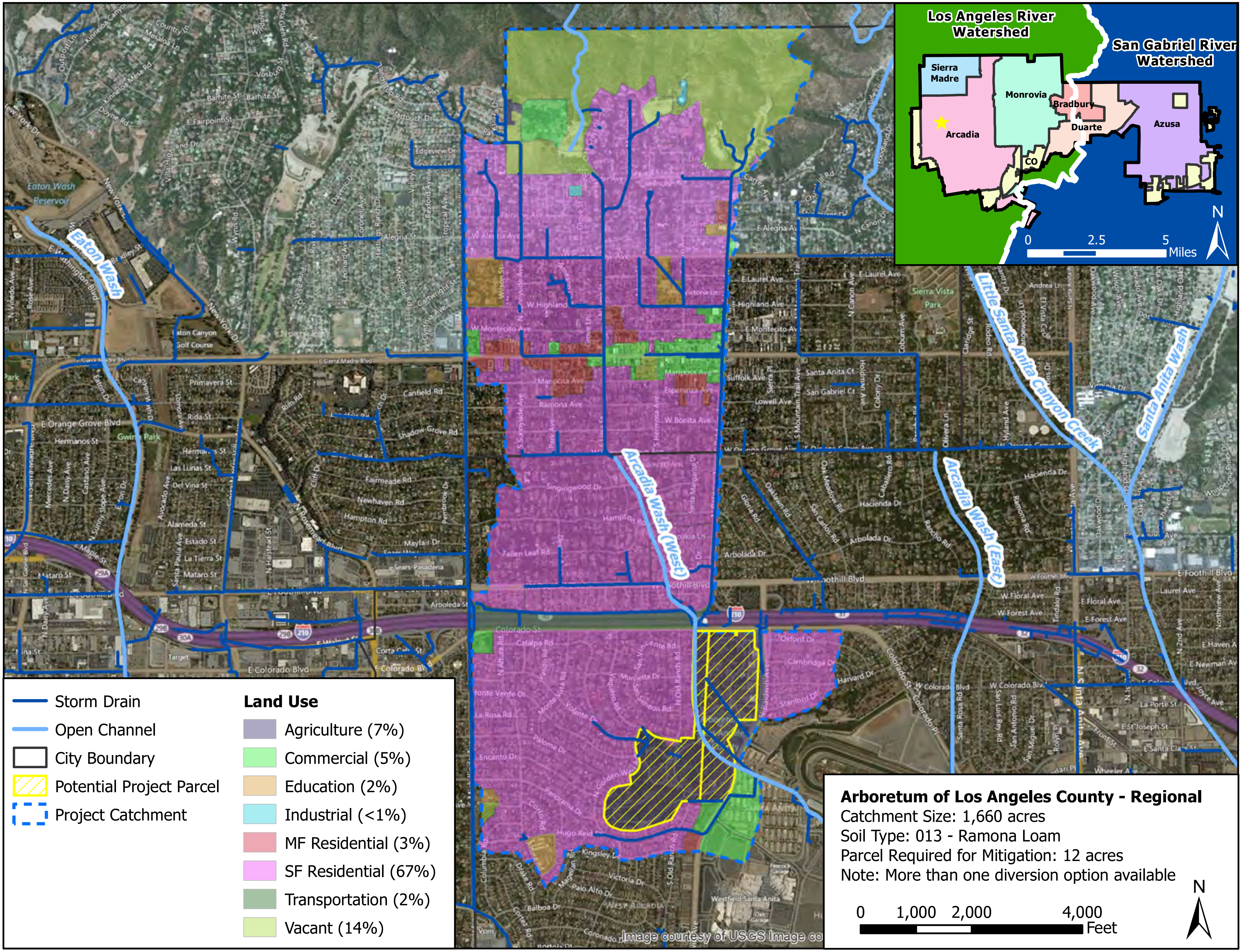
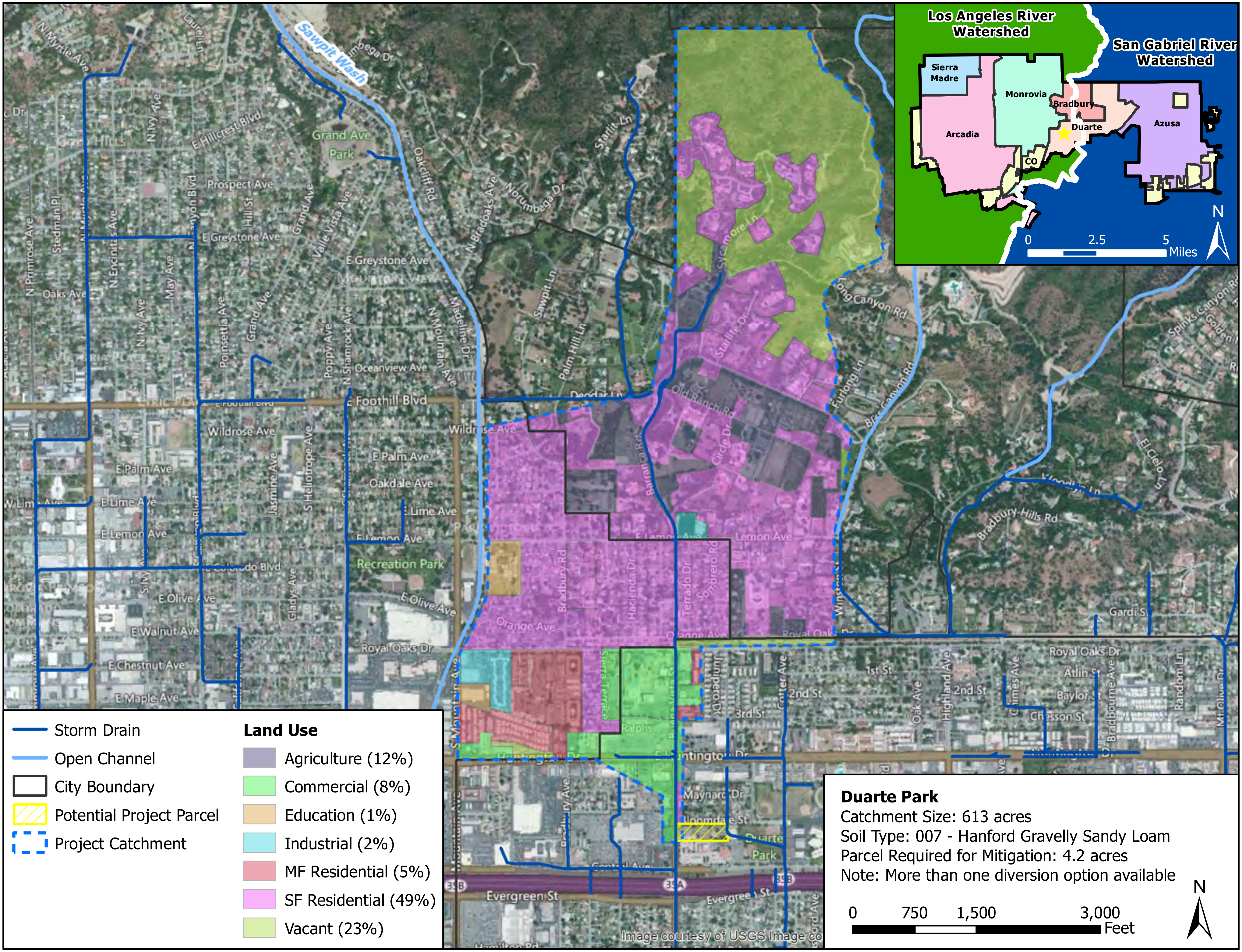
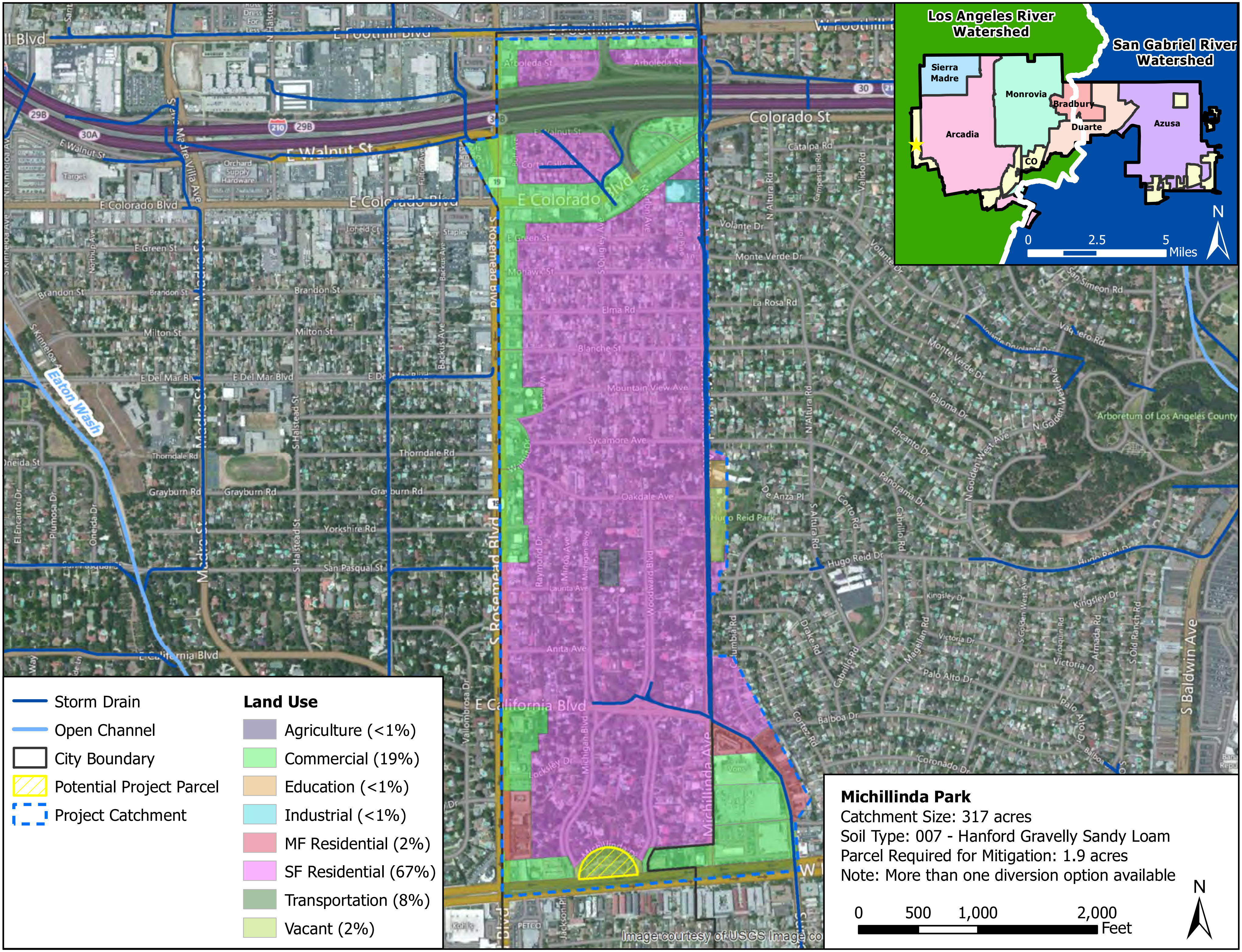

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (7%)
Commercial (17%)
Education (3%)
Industrial (4%)
MF Residential (8%)
SF Residential (40%)
Transportation (4%)
Vacant (7%)
Buena Vista Spreading Grounds
Catchment Size: 1,307 acres
Soil Type: 015 - Tujunga Fine Sandy Loam
Parcel Required for Mitigation: 8.3 acres
Note: More than one diversion option available
0 1,250 2,500 5,000 Feet
N
Image courtesy of USGS

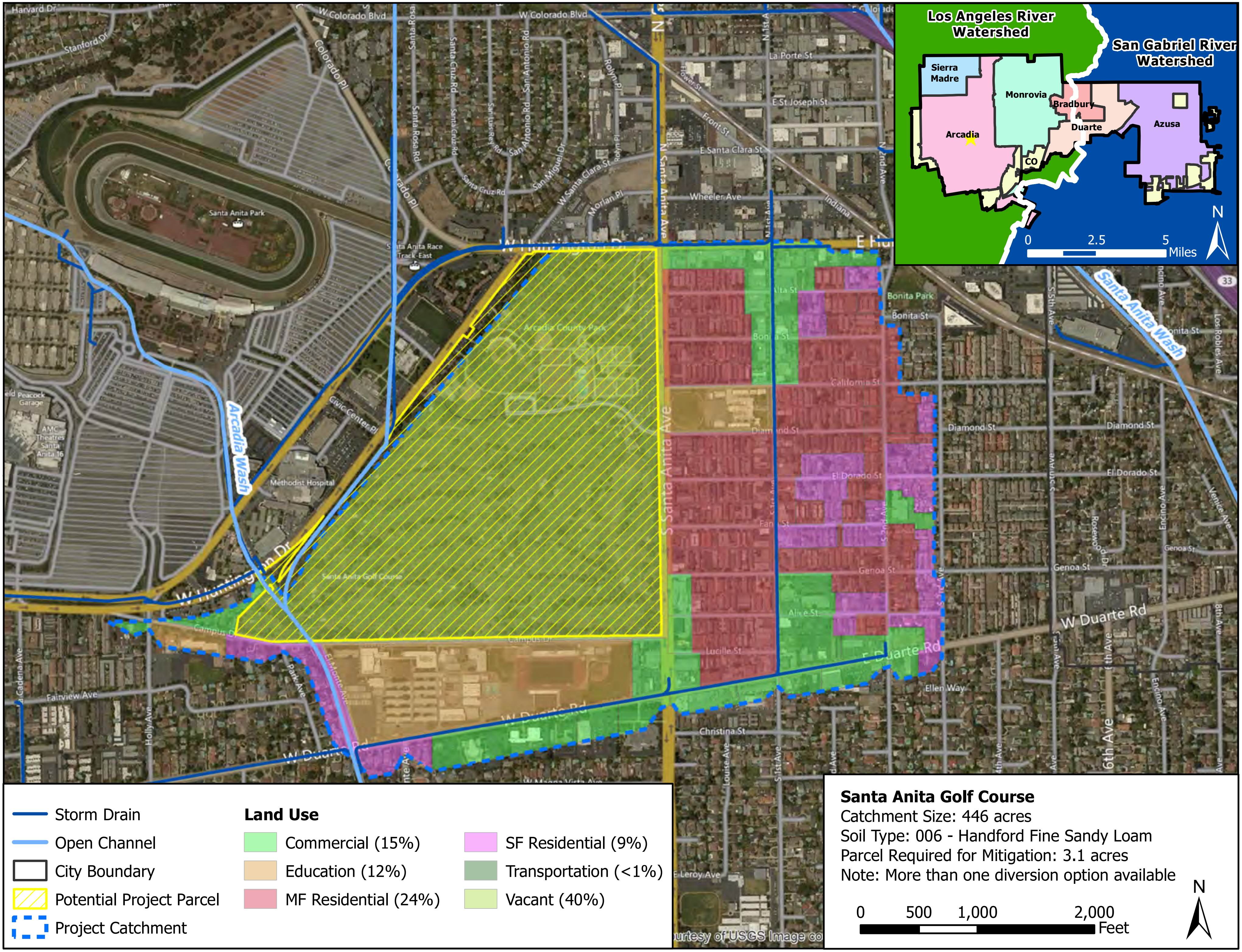


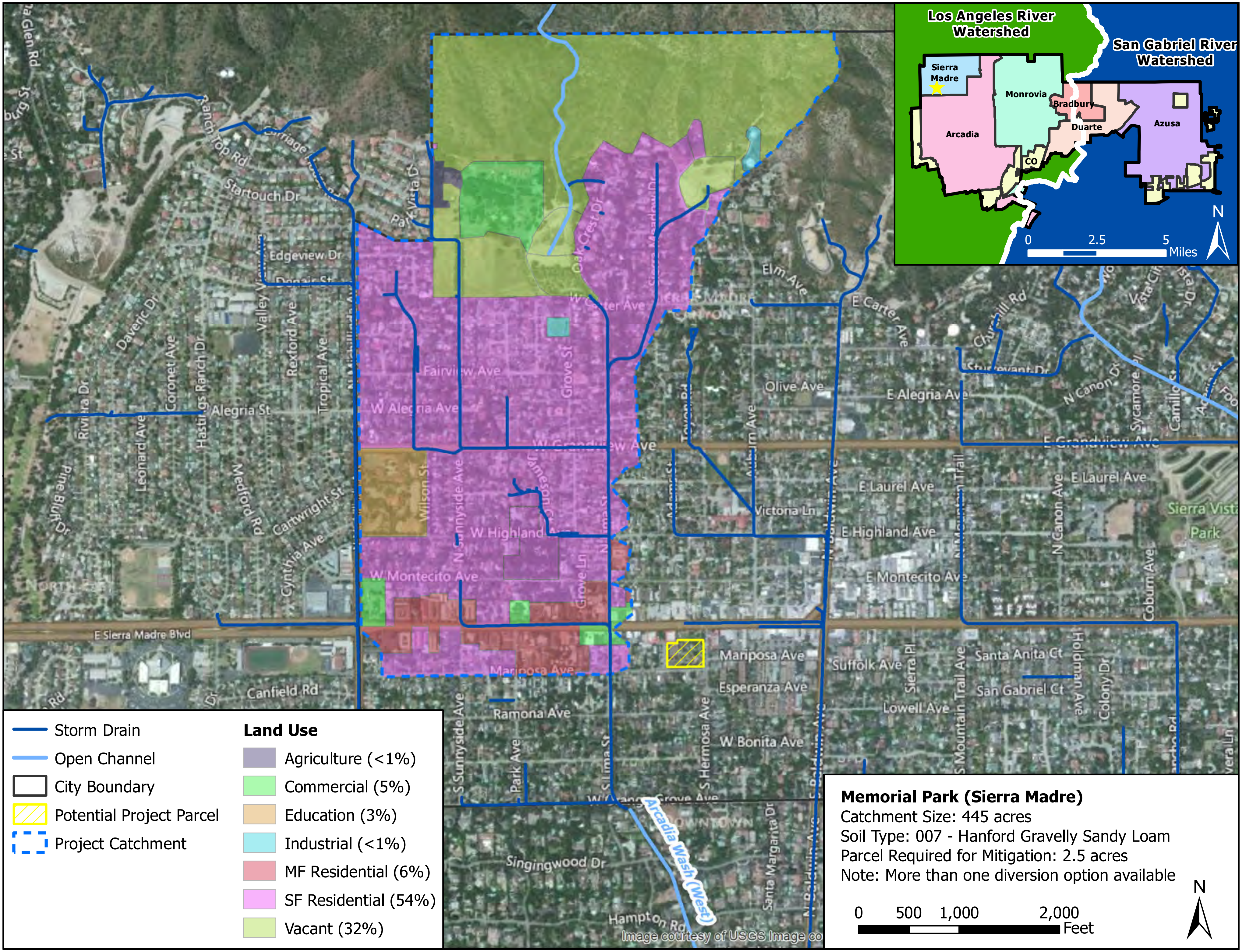
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
Santa Anita Wash
Sawpit Wash
Grand Ave Park
Hidden Valley
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (8%)
Industrial (<1%)
MF Residential (2%)
SF Residential (46%)
Vacant (44%)
Library Park
Catchment Size: 316 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 2 acres
Note: More than one diversion option available
0
750
1,500
3,000
Feet
N
Image courtesy of USGS Image co


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
Eaton Wash
Little Santa Anita Canyon Creek
Santa Anita Wash
Arcadia Wash (West)
Arcadia Wash (East)
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (7%)
Commercial (5%)
Education (2%)
Industrial (<1%)
MF Residential (3%)
SF Residential (67%)
Transportation (2%)
Vacant (14%)
Arboretum of Los Angeles County - Regional
Catchment Size: 1,660 acres
Soil Type: 013 - Ramona Loam
Parcel Required for Mitigation: 12 acres
Note: More than one diversion option available
0 1,000 2,000 4,000 Feet
N
Image courtesy of USGS Image co

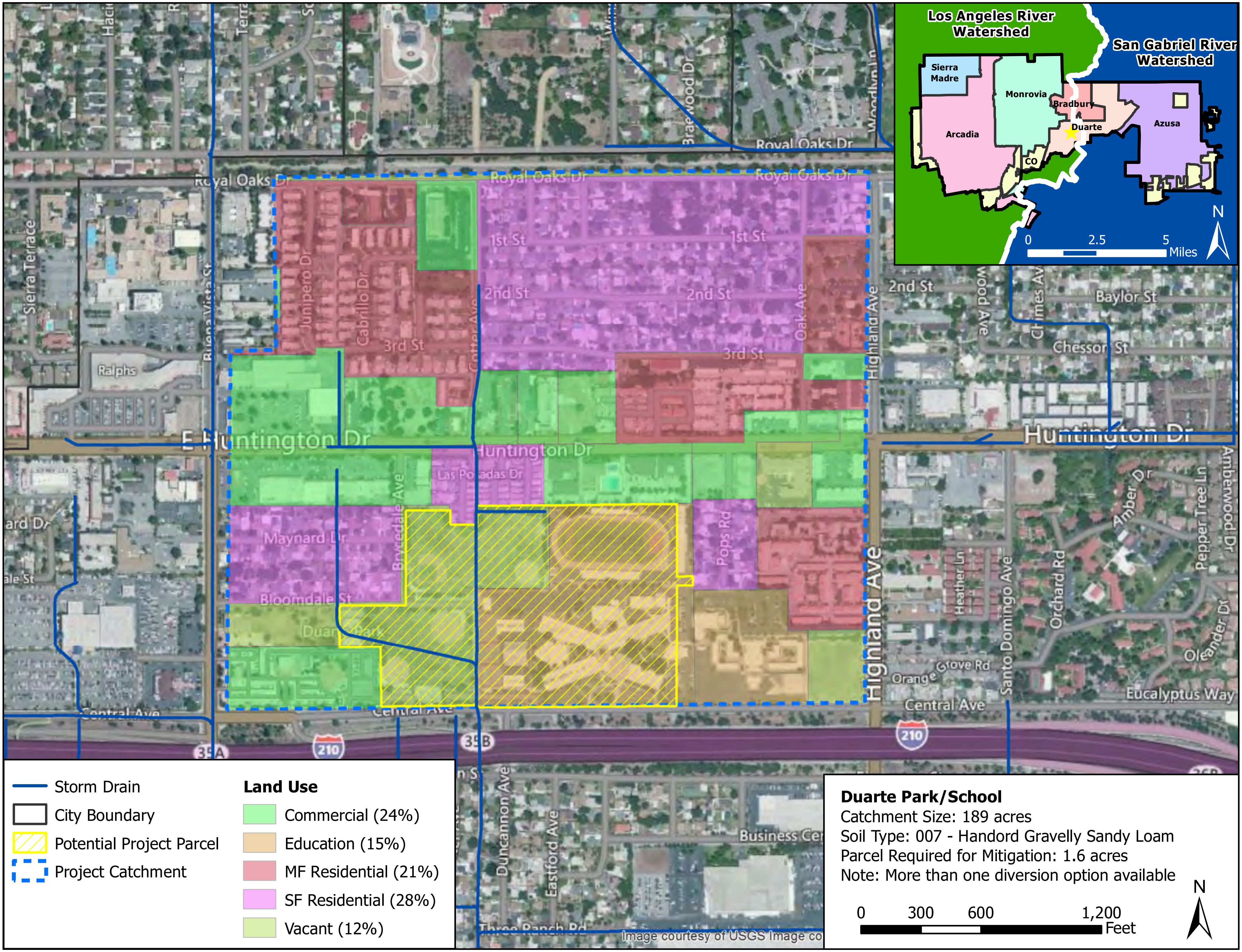

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (12%)
Commercial (8%)
Education (1%)
Industrial (2%)
MF Residential (5%)
SF Residential (49%)
Vacant (23%)
Duarte Park
Catchment Size: 613 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 4.2 acres
Note: More than one diversion option available
0
750
1,500
3,000
Feet
N
Image courtesy of USGS Image co
Sawpit Wash
Grand Ave Park
Recreation Park
Duarte Park
Foothill Blvd
Royal Oaks Dr
Evergreen St


Michillinda Park
Catchment Size: 317 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 1.9 acres
Note: More than one diversion option available
0 500 1,000 2,000 Feet
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (<1%)
Commercial (19%)
Education (<1%)
Industrial (<1%)
MF Residential (2%)
SF Residential (67%)
Transportation (8%)
Vacant (2%)
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
E Foothill Blvd
Colorado St
E Walnut St
E Colorado Blvd
S Rosemead Blvd
Michillinda Ave
E California Blvd
Eaton Wash
Hugo Reid Park
Arboretum of Los Angeles County
S Baldwin Ave
Image courtesy of USGS

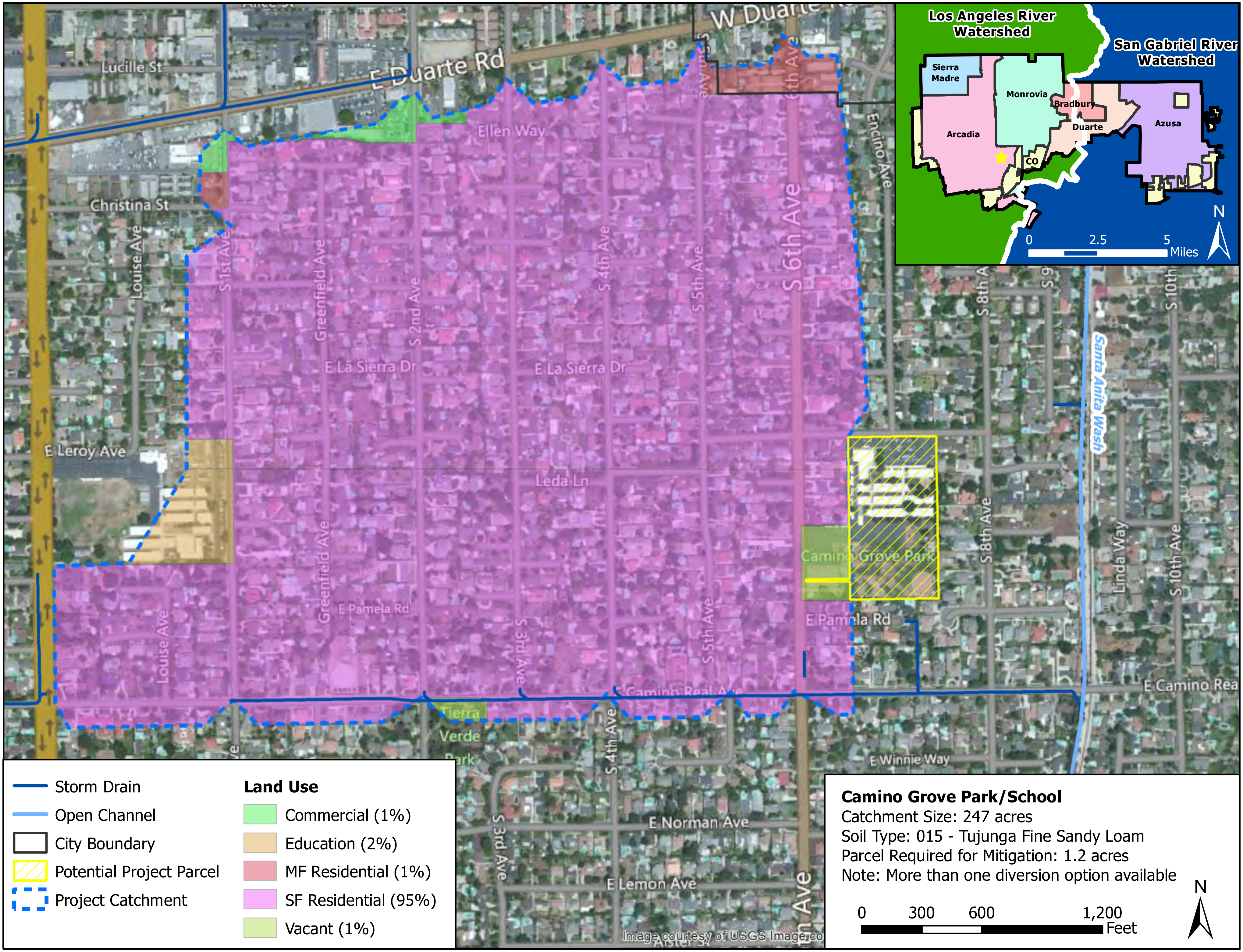

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
Santa Anita Park
Arcadia Wash
Santa Anita Wash
Methodist Hospital
W Huntington Dr
S Santa Anita Ave
W Duarte Rd
E Duarte Rd
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (15%)
Education (12%)
MF Residential (24%)
SF Residential (9%)
Transportation (<1%)
Vacant (40%)
Santa Anita Golf Course
Catchment Size: 446 acres
Soil Type: 006 - Handford Fine Sandy Loam
Parcel Required for Mitigation: 3.1 acres
Note: More than one diversion option available
0 500 1,000 2,000 Feet
N



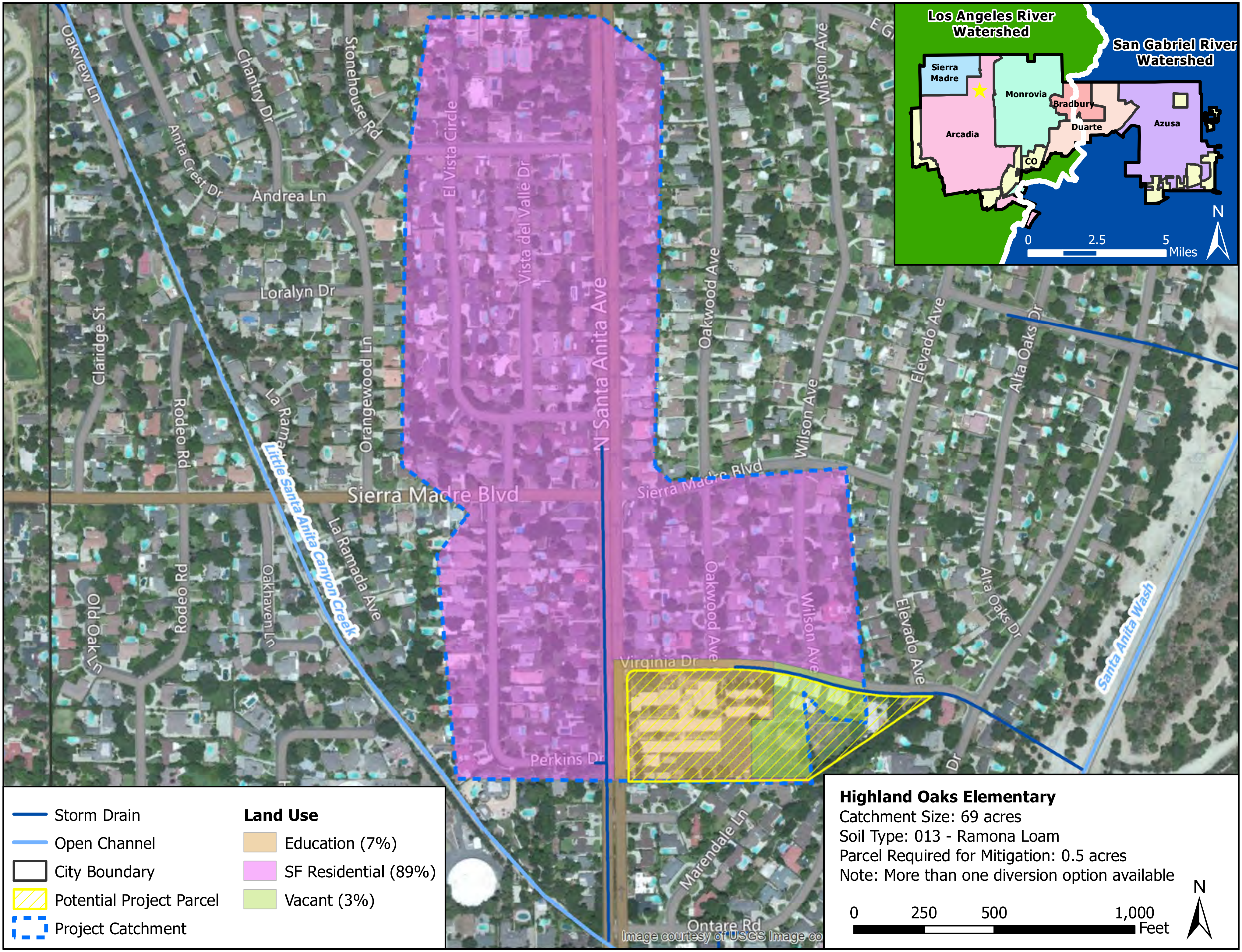
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (<1%)
Commercial (5%)
Education (3%)
Industrial (<1%)
MF Residential (6%)
SF Residential (54%)
Vacant (32%)
Memorial Park (Sierra Madre)
Catchment Size: 445 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 2.5 acres
Note: More than one diversion option available
0
500
1,000
2,000
Feet
N
Startouch Dr
Edgeview Dr
Alegria St
W Alegria Ave
Fairview Ave
W Grandview Ave
W Highland Ave
W Montecito Ave
E Sierra Madre Blvd
Mariposa Ave
Esperanza Ave
Canfield Rd
Ramona Ave
W Bonita Ave
Singingwood Dr
Arcadia Wash (West)
Elm Ave
E Carter Ave
Olive Ave
E Alegria Ave
E Grandview Ave
E Laurel Ave
Victoria Ln
E Highland Ave
E Montecito Ave
Suffolk Ave
Lowell Ave
Santa Anita Ct
San Gabriel Ct
Sierra Vista Park
Image courtesy of USGS

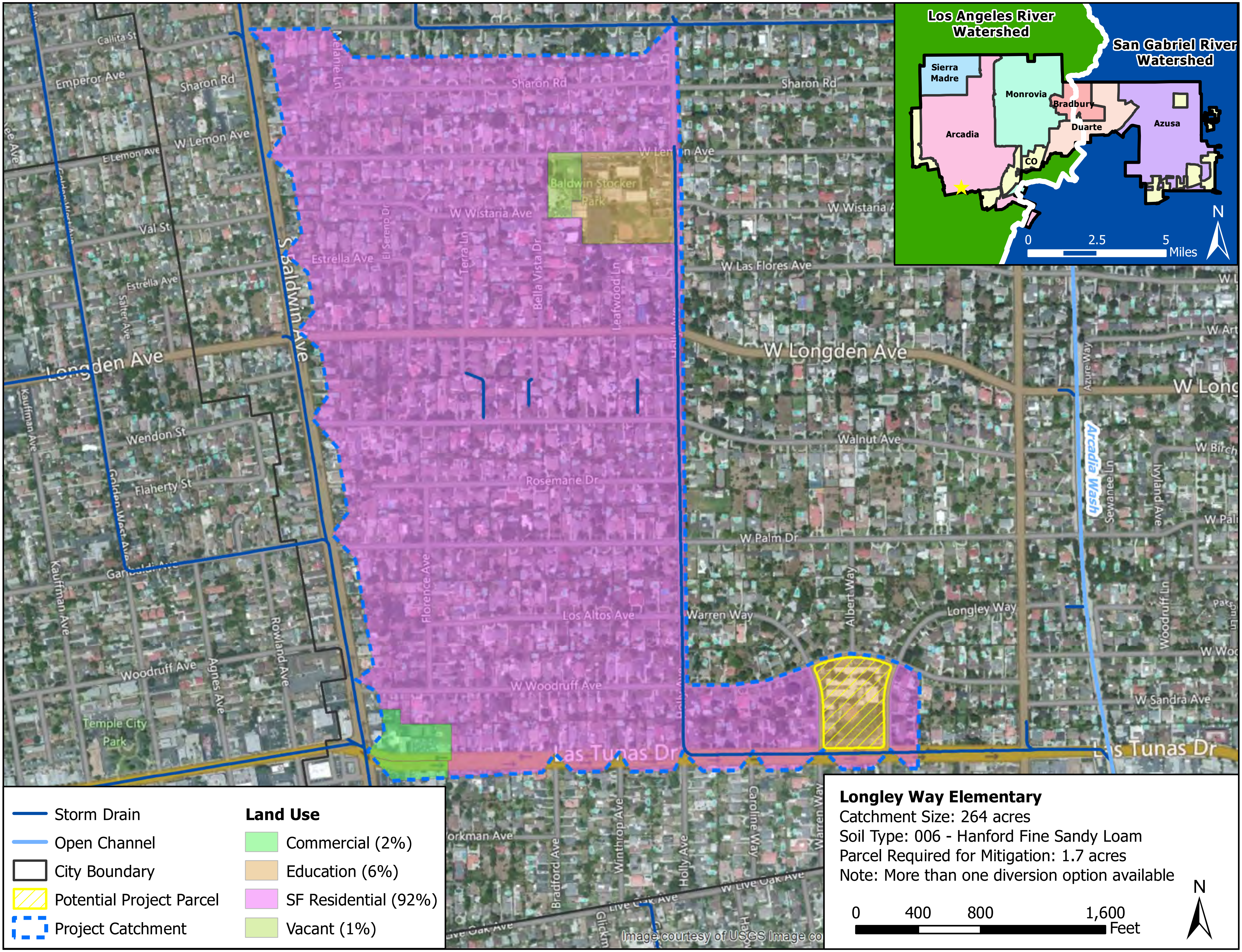


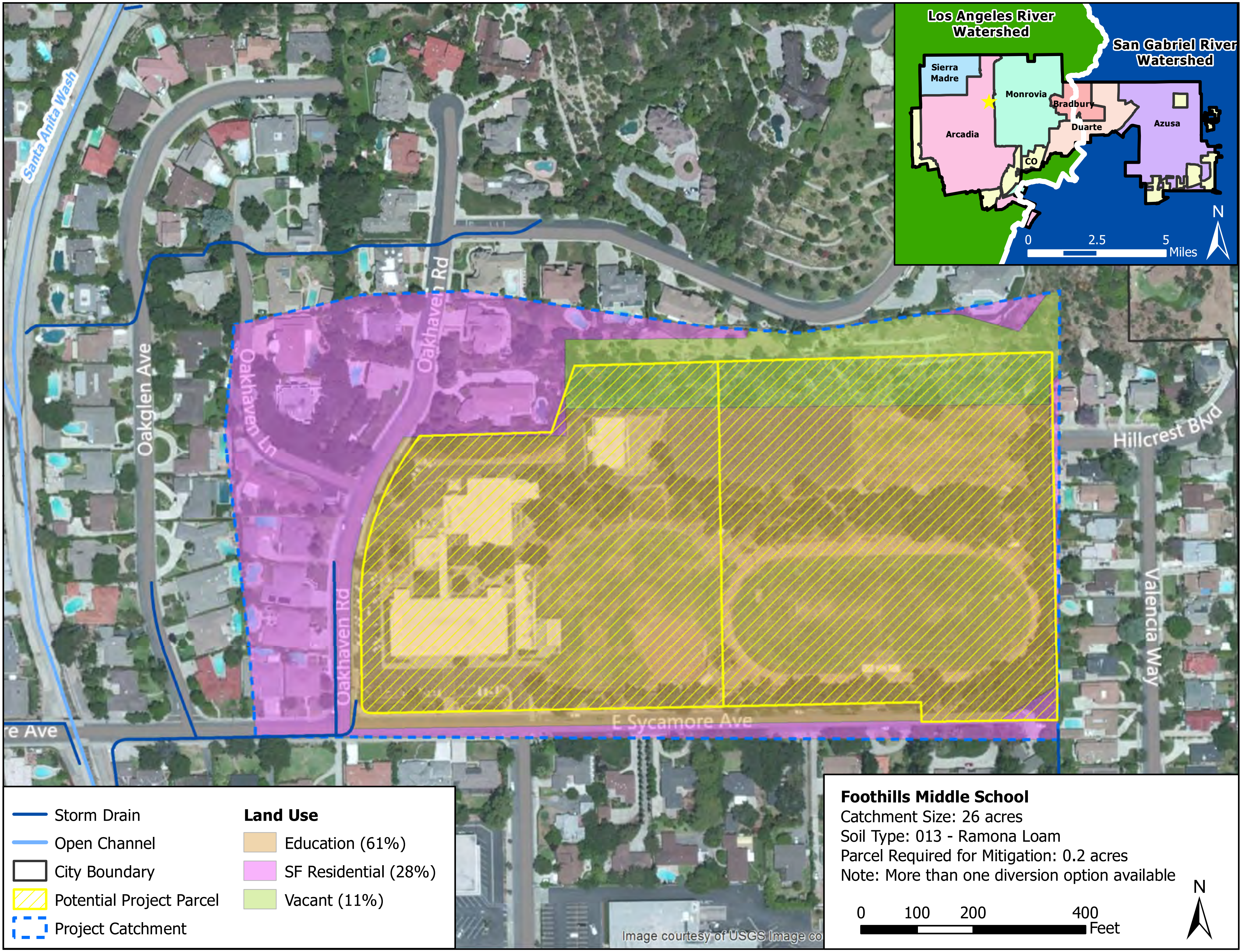
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
N
0
2.5
5
Miles
Royal Oaks Dr
1st St
2nd St
3rd St
Junipero Dr
Cabrillo Dr
Oak Ave
Highland Ave
E Huntington Dr
Huntington Dr
Las Posadas Dr
Maynard Dr
Bloomdale St
Brycedale Ave
Pops Rd
Central Ave
Buena Vista St
Sierra Terrace
Ralphs
Braewood Dr
Woodlyn Ln
Baylor St
Chesson St
Amber Dr
Pepper Tree Ln
Amberwood Dr
Heather Ln
Santo Domingo Ave
Orchard Rd
Orange Grove Rd
Oleander Dr
Eucalyptus Way
Duncannon Ave
Eastford Ave
Business Cen
Three Ranch Rd
210
35A
35B
Image courtesy of USGS Image co
Storm Drain
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (24%)
Education (15%)
MF Residential (21%)
SF Residential (28%)
Vacant (12%)
Duarte Park/School
Catchment Size: 189 acres
Soil Type: 007 - Handord Gravelly Sandy Loam
Parcel Required for Mitigation: 1.6 acres
Note: More than one diversion option available
0
300
600
1,200
Feet
N



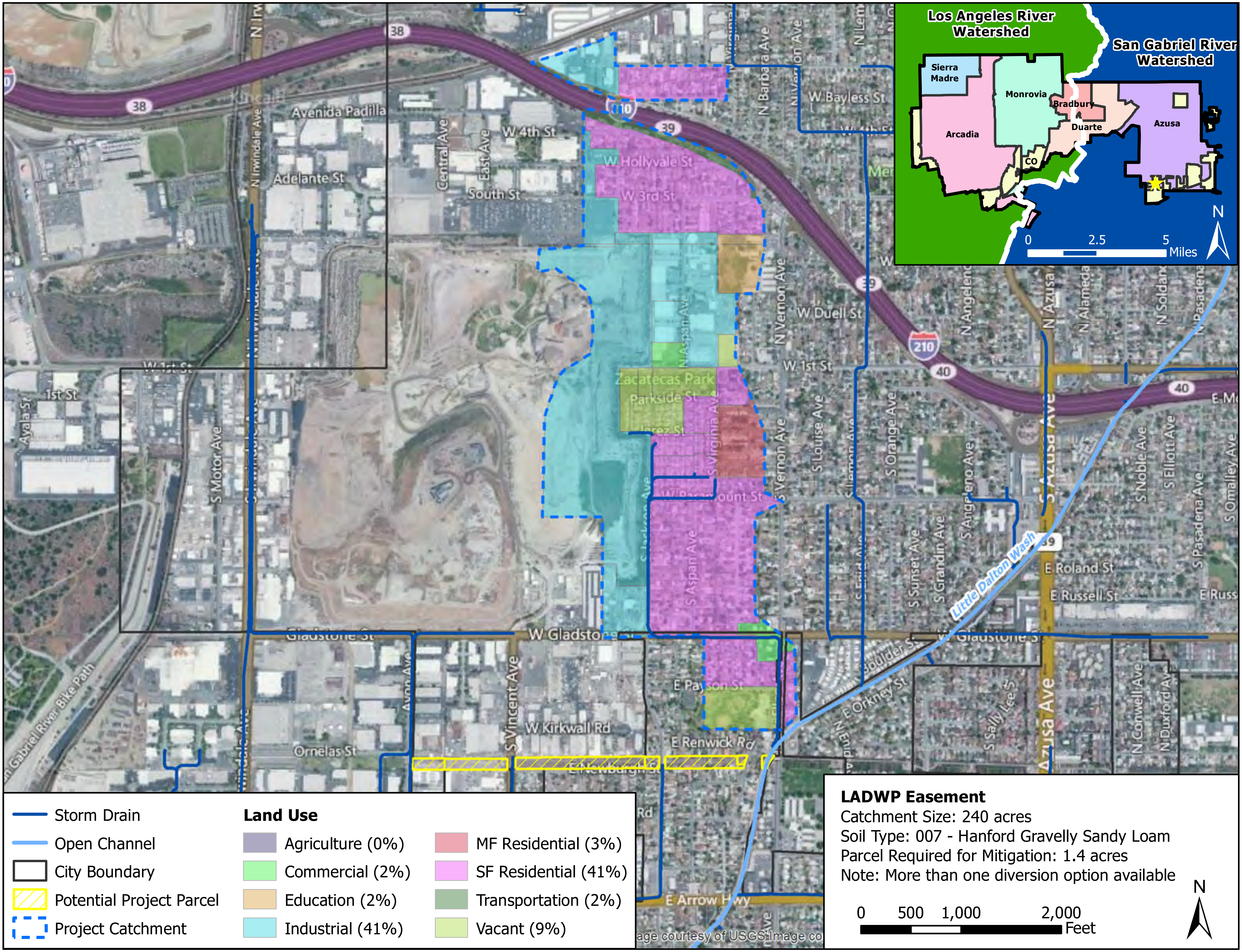
E Duarte Rd
W Duarte Rd
Lucille St
Christina St
Ellen Way
Louise Ave
S 1st Ave
Greenfield Ave
S 2nd Ave
S 3rd Ave
S 4th Ave
S 5th Ave
S 6th Ave
S 8th Ave
S 10th Ave
Encino Ave
E La Sierra Dr
E Leroy Ave
Leda Ln
E Pamela Rd
Camino Grove Park
Camino Real Ave
E Camino Real
Tierra Verde Park
E Winnie Way
E Norman Ave
E Lemon Ave
Linda Way
Santa Anita Wash
Image courtesy of USGS Image co
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Arcadia
Bradbury
Duarte
Azusa
CO
0
2.5
5
Miles
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (1%)
Education (2%)
MF Residential (1%)
SF Residential (95%)
Vacant (1%)
Camino Grove Park/School
Catchment Size: 247 acres
Soil Type: 015 - Tujunga Fine Sandy Loam
Parcel Required for Mitigation: 1.2 acres
Note: More than one diversion option available
0
300
600
1,200
Feet
N

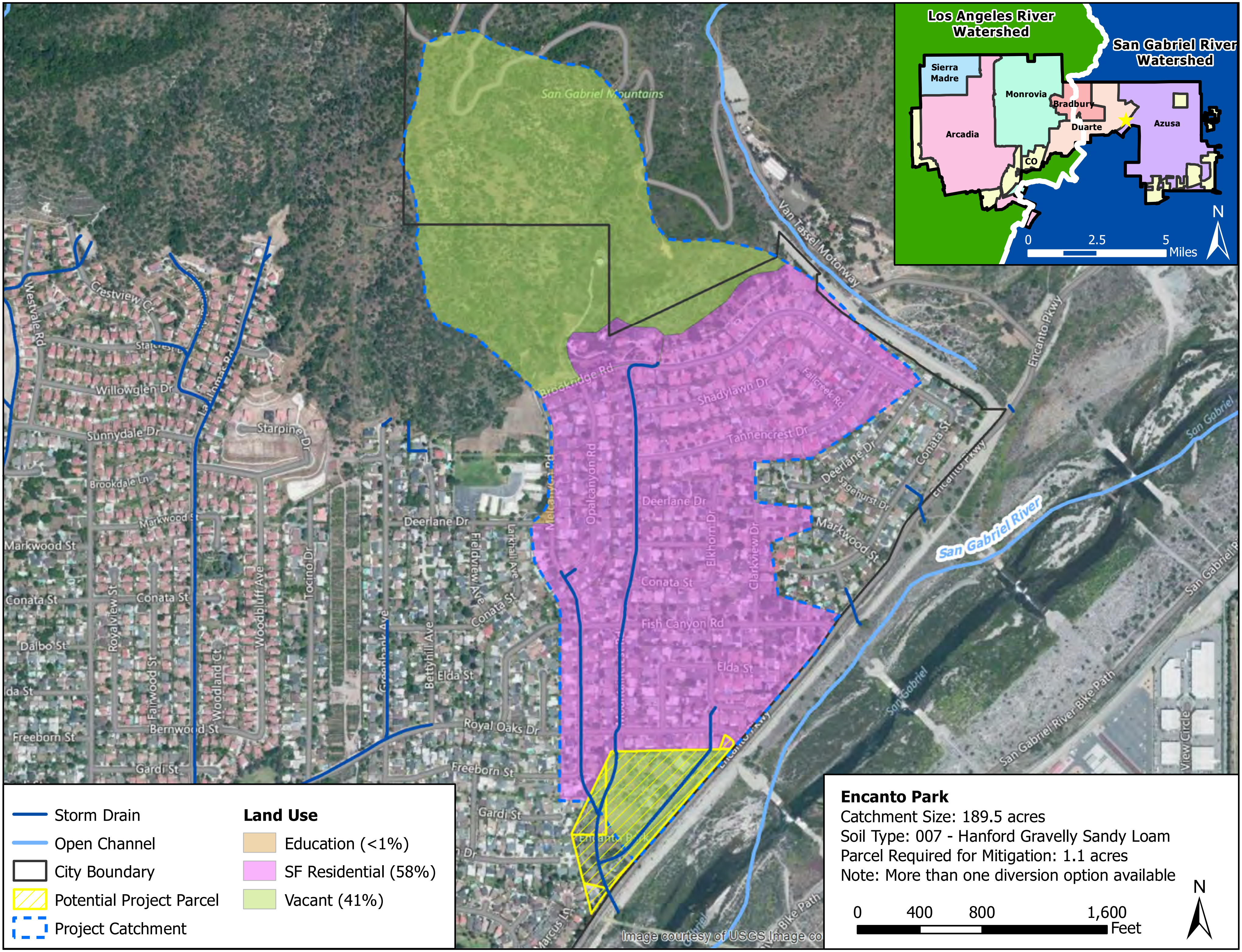

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Arcadia
Monrovia
Bradbury
Duarte
CO
Azusa
N
0
2.5
5
Miles
Oakview Ln
Chantry Dr
Stonehouse Rd
Anita Crest Dr
Andrea Ln
El Vista Circle
Vista del Valle Dr
Wilson Ave
Loralyn Dr
Claridge St
Orangewood Ln
N Santa Anita Ave
Oakwood Ave
Elevado Ave
Alta Oaks Dr
La Ramada Ave
Rodeo Rd
Little Santa Anita Canyon Creek
Sierra Madre Blvd
Old Oak Ln
Oakhaven Ln
Virginia Dr
Santa Anita Wash
Perkins Dr
Marendale Ln
Ontare Rd
Image courtesy of USGS Image co
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Education (7%)
SF Residential (89%)
Vacant (3%)
Highland Oaks Elementary
Catchment Size: 69 acres
Soil Type: 013 - Ramona Loam
Parcel Required for Mitigation: 0.5 acres
Note: More than one diversion option available
0
250
500
1,000
Feet
N


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
Sharon Rd
W Lemon Ave
W Wistaria Ave
Baldwin Stocker Park
Estrella Ave
S Baldwin Ave
W Longden Ave
Rosemarie Dr
W Palm Dr
Los Altos Ave
Warren Way
Longley Way
W Woodruff Ave
W Sandra Ave
Las Tunas Dr
Arcadia Wash
Temple City Park
Walnut Ave
W Las Flores Ave
Emperor Ave
Wendon St
Flaherty St
Woodruff Ave
Image courtesy of USGS Image co
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (2%)
Education (6%)
SF Residential (92%)
Vacant (1%)
Longley Way Elementary
Catchment Size: 264 acres
Soil Type: 006 - Hanford Fine Sandy Loam
Parcel Required for Mitigation: 1.7 acres
Note: More than one diversion option available
0
400
800
1,600
Feet
N

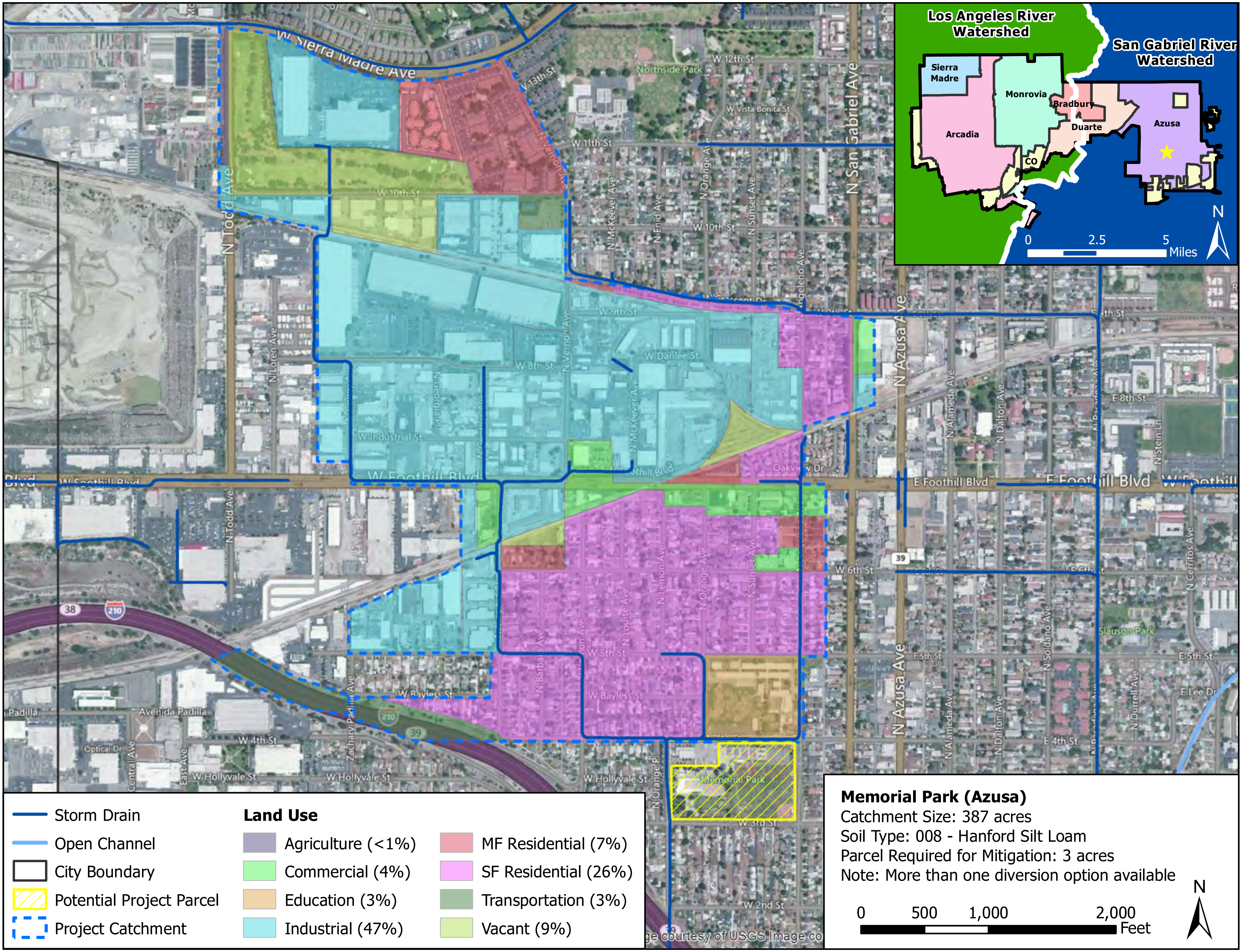

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
N
0
2.5
5
Miles
Santa Anita Wash
Oakglen Ave
Oakhaven Rd
Oakhaven Ln
Hillcrest Blvd
Valencia Way
E Sycamore Ave
re Ave
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Education (61%)
SF Residential (28%)
Vacant (11%)
Image courtesy of USGS Image co
Foothills Middle School
Catchment Size: 26 acres
Soil Type: 013 - Ramona Loam
Parcel Required for Mitigation: 0.2 acres
Note: More than one diversion option available
0
100
200
400
Feet
N

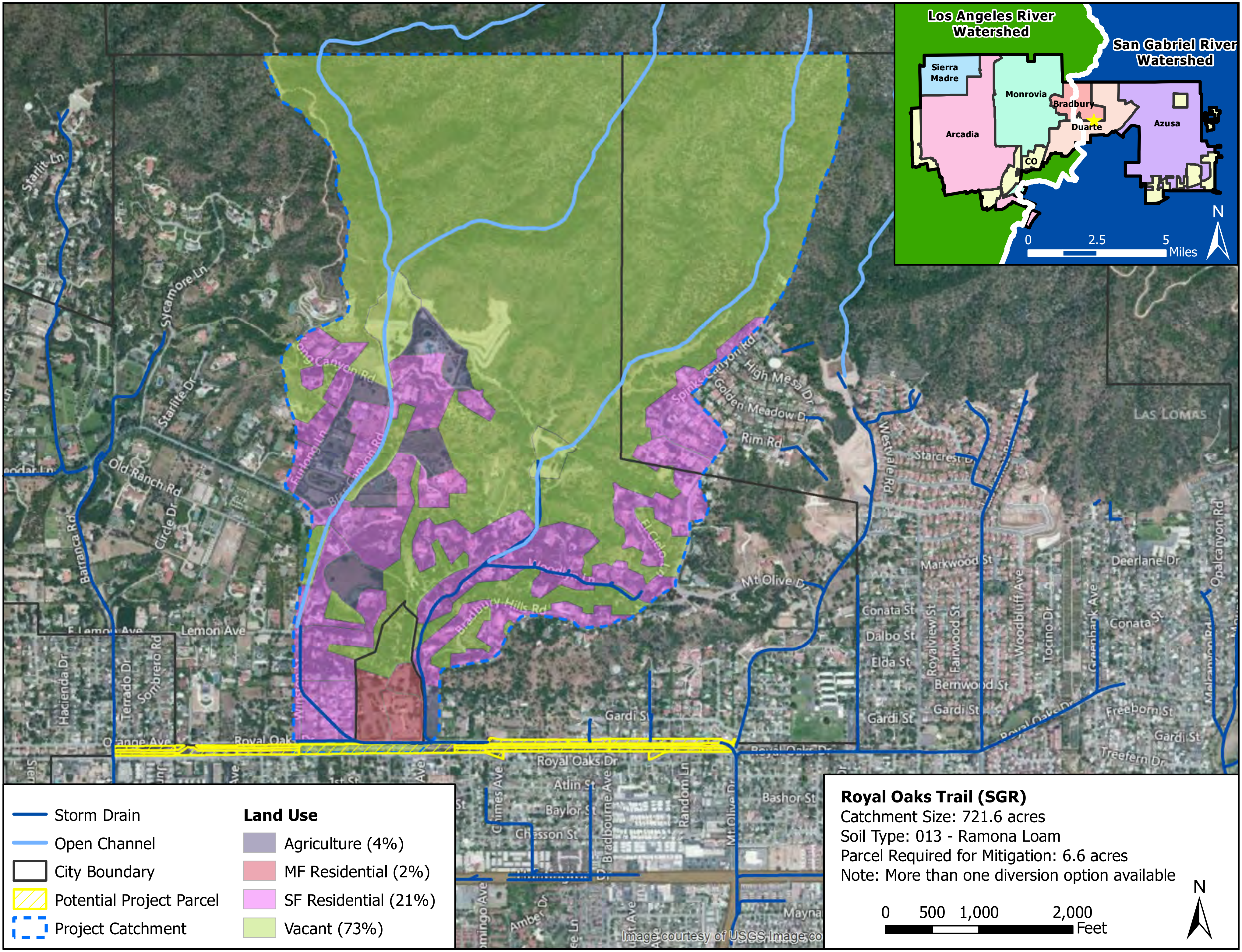
SGR Watershed

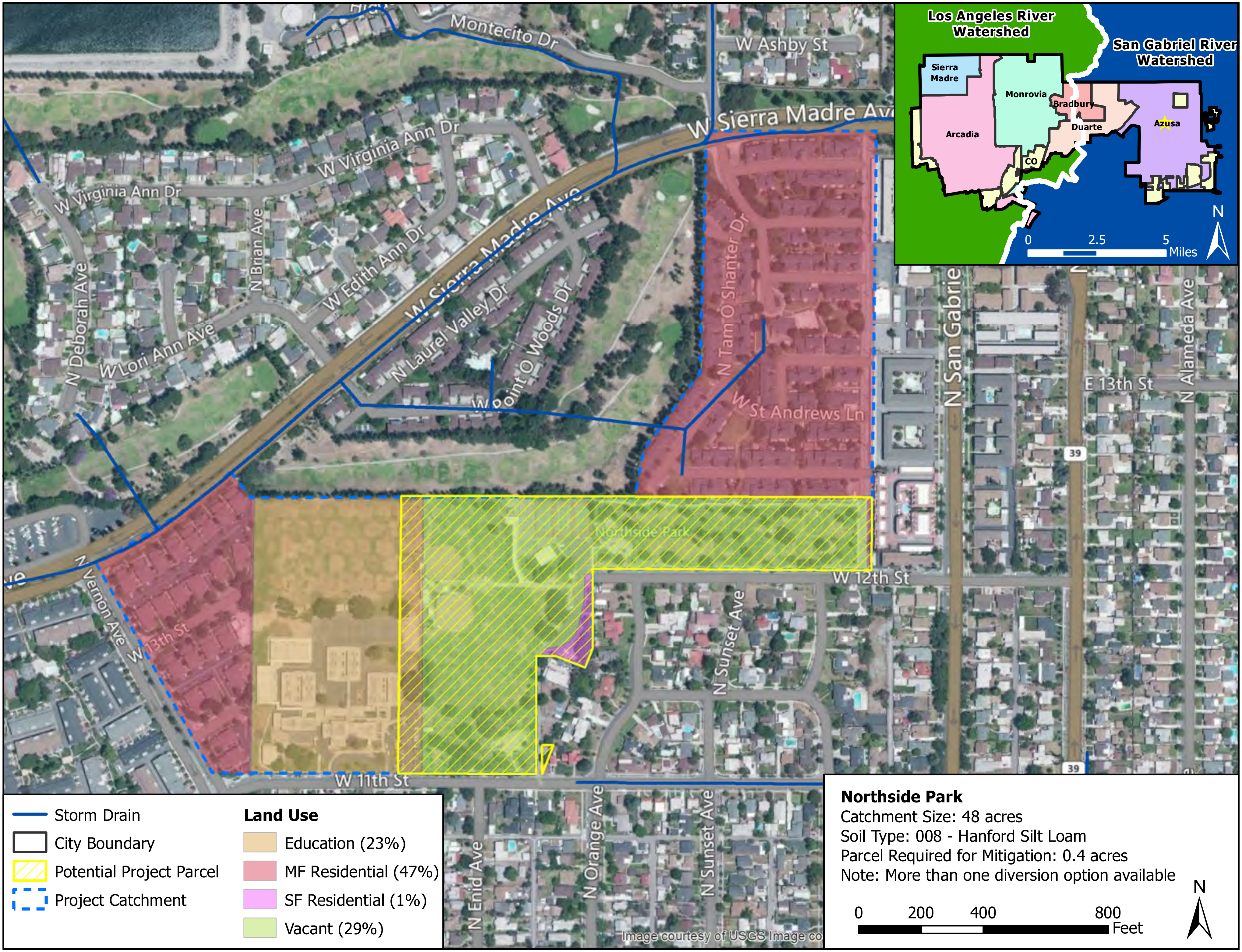

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
W Hollyvale St
W 3rd St
Zacatecas Park
Parkside St
W Duell St
W 1st St
W Gladstone St
W Kirkwall Rd
E Renwick Rd
E Arrow Hwy
Avenida Padilla
Adelante St
South St
W 4th St
Little Dalton Wash
E Roland St
E Russell St
S Azusa Ave
N Irwindale Ave
S Vincent Ave
Ornelas St
San Gabriel River Bike Path
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (0%)
Commercial (2%)
Education (2%)
Industrial (41%)
MF Residential (3%)
SF Residential (41%)
Transportation (2%)
Vacant (9%)
LADWP Easement
Catchment Size: 240 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 1.4 acres
Note: More than one diversion option available
0 500 1,000 2,000 Feet
N
Image courtesy of USGS Image co



Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
San Gabriel Mountains
Van Tassel Motorway
Encanto Pkwy
Crestview Ct
Westvale Rd
Starcrest Dr
Willowglen Dr
Sunnydale Dr
Starpine Dr
Brookdale Ln
Markwood St
Conata St
Dalbo St
Freeborn St
Gardi St
Bernwood St
Royalview St
Fairwood St
Woodland Ct
Woodbluff Ave
Tocino Dr
Greenbank Ave
Bettyhill Ave
Elda St
Royal Oaks Dr
Deerlane Dr
Fieldview Ave
Larkhall Ave
Melcanyon Rd
Opalcanyon Rd
Brookridge Rd
Shadylawn Dr
Fallcreek Rd
Tannencrest Dr
Elkhorn Dr
Clarkview Dr
Fish Canyon Rd
Sagehurst Dr
San Gabriel River
San Gabriel River Bike Path
Encanto Park
Image courtesy of USGS Image co
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Education (<1%)
SF Residential (58%)
Vacant (41%)
Encanto Park
Catchment Size: 189.5 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 1.1 acres
Note: More than one diversion option available
0
400
800
1,600
Feet
N


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
W Sierra Madre Ave
W Foothill Blvd
E Foothill Blvd
N Azusa Ave
N San Gabriel Ave
N Todd Ave
Northside Park
Slauson Park
Memorial Park
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (<1%)
Commercial (4%)
Education (3%)
Industrial (47%)
MF Residential (7%)
SF Residential (26%)
Transportation (3%)
Vacant (9%)
Memorial Park (Azusa)
Catchment Size: 387 acres
Soil Type: 008 - Hanford Silt Loam
Parcel Required for Mitigation: 3 acres
Note: More than one diversion option available
0 500 1,000 2,000 Feet
N


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
N
0 2.5 5 Miles
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (4%)
MF Residential (2%)
SF Residential (21%)
Vacant (73%)
Royal Oaks Trail (SGR)
Catchment Size: 721.6 acres
Soil Type: 013 - Ramona Loam
Parcel Required for Mitigation: 6.6 acres
Note: More than one diversion option available
0 500 1,000 2,000 Feet
N
Image courtesy of USGS Image co
Las Lomas
Royal Oaks Dr
Mt Olive Dr
Westvale Rd
Bradbury Hills Rd
Long Canyon Rd
Spinks Canyon Rd
High Mesa Dr
Golden Meadow Dr
Rim Rd
Starcrest Dr
Markwood St
Deerlane Dr
Conata St
Dalbo St
Elda St
Bernwood St
Gardi St
Freeborn St
Treefern Dr
Lemon Ave
E Lemon Ave
Orange Ave
Old Ranch Rd
Circle Dr
Starlite Dr
Sycamore Ln
Starlit Ln
Barranca Rd
Hacienda Dr
Terrado Dr
Sombrero Rd
Atlin St
Baylor St
Chesson St
Bashor St
Chimes Ave
Bradbourne Ave
Random Ln
Royalview St
Fairwood St
Woodbluff Ave
Tocino Dr
Greenbank Ave
Opalcanyon Rd



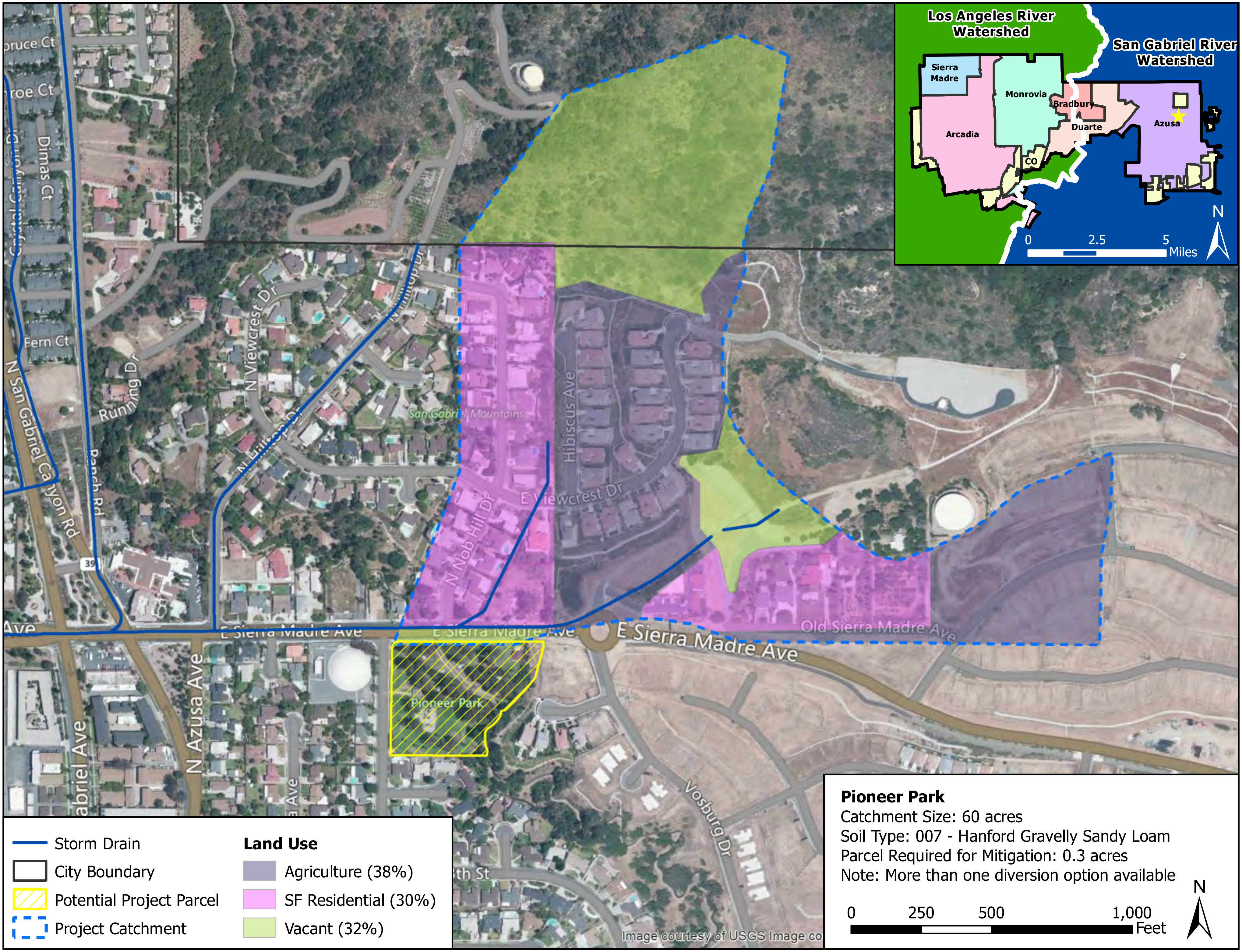
Northside Park

Catchment Size: 48 acres

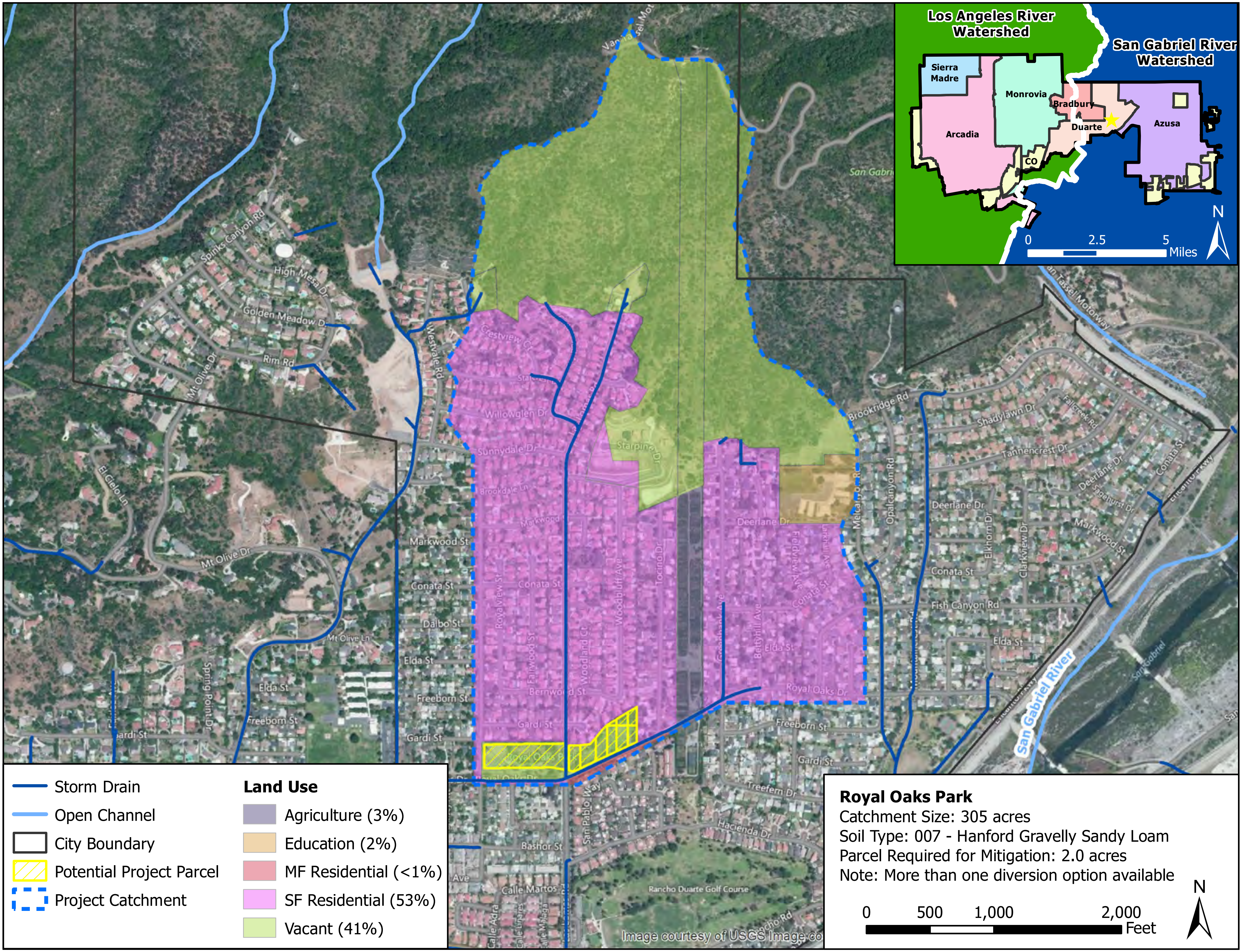
Soil Type: 008 - Hanford Silt Loam

Parcel Required for Mitigation: 0.4 acres

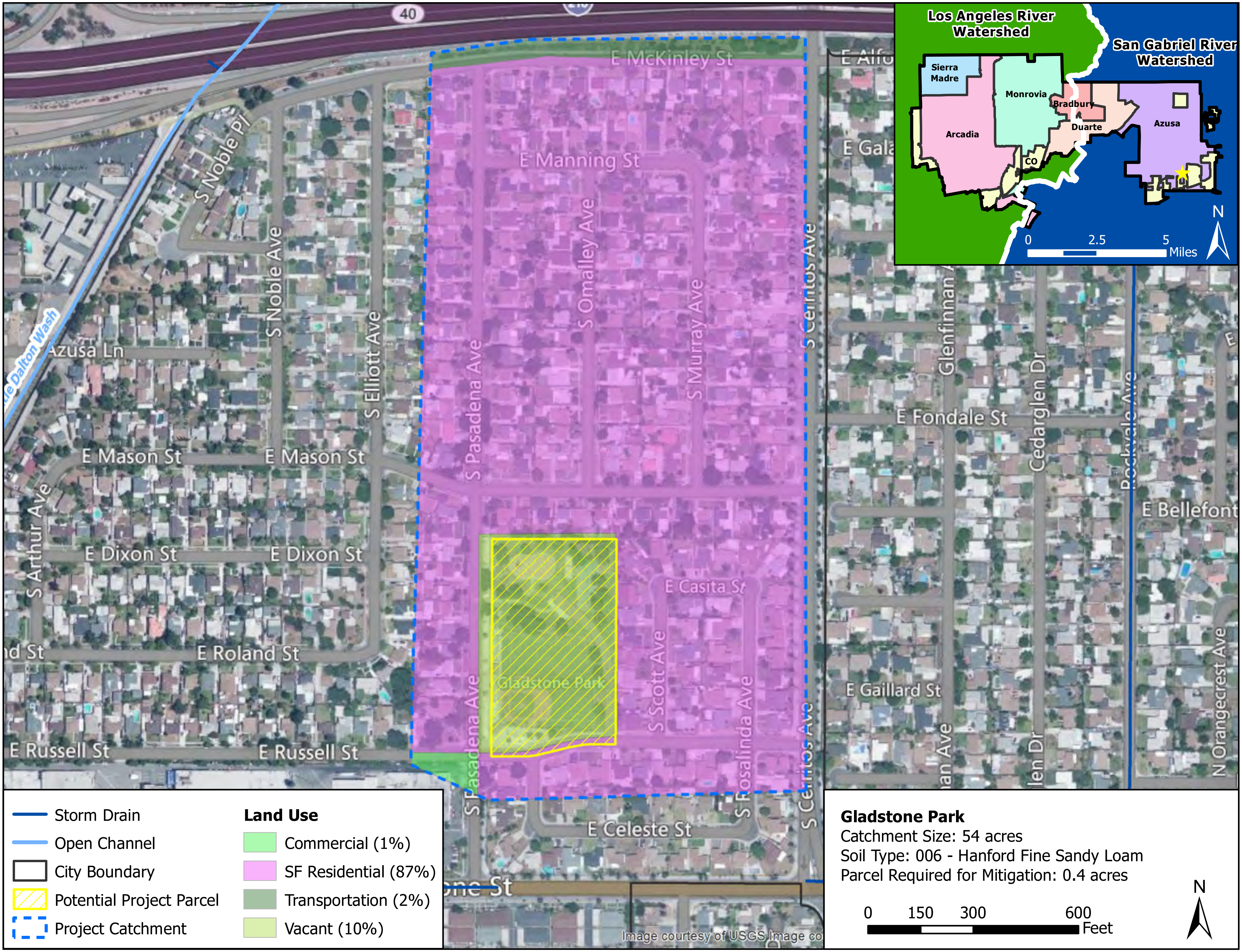
Note: More than one diversion option available

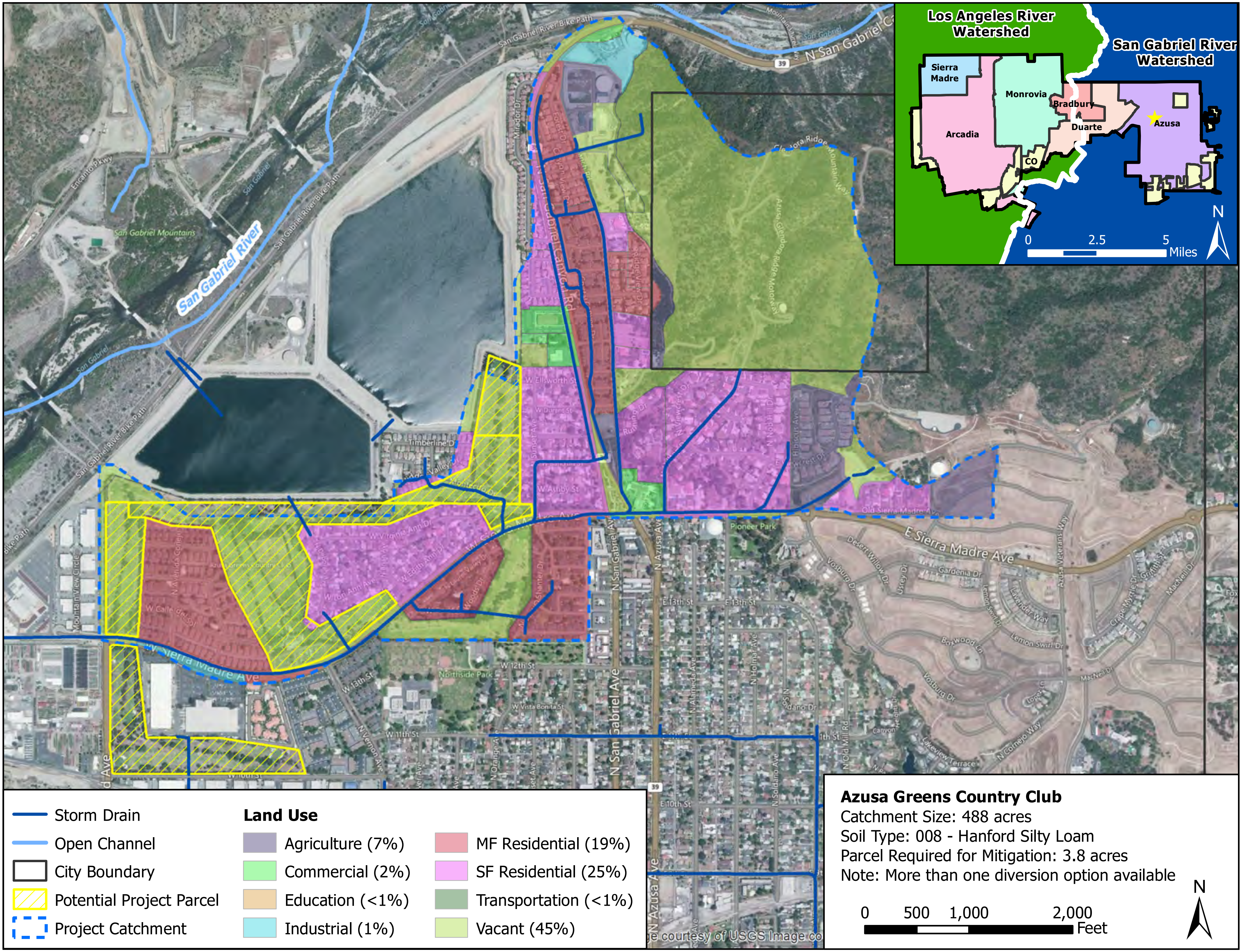


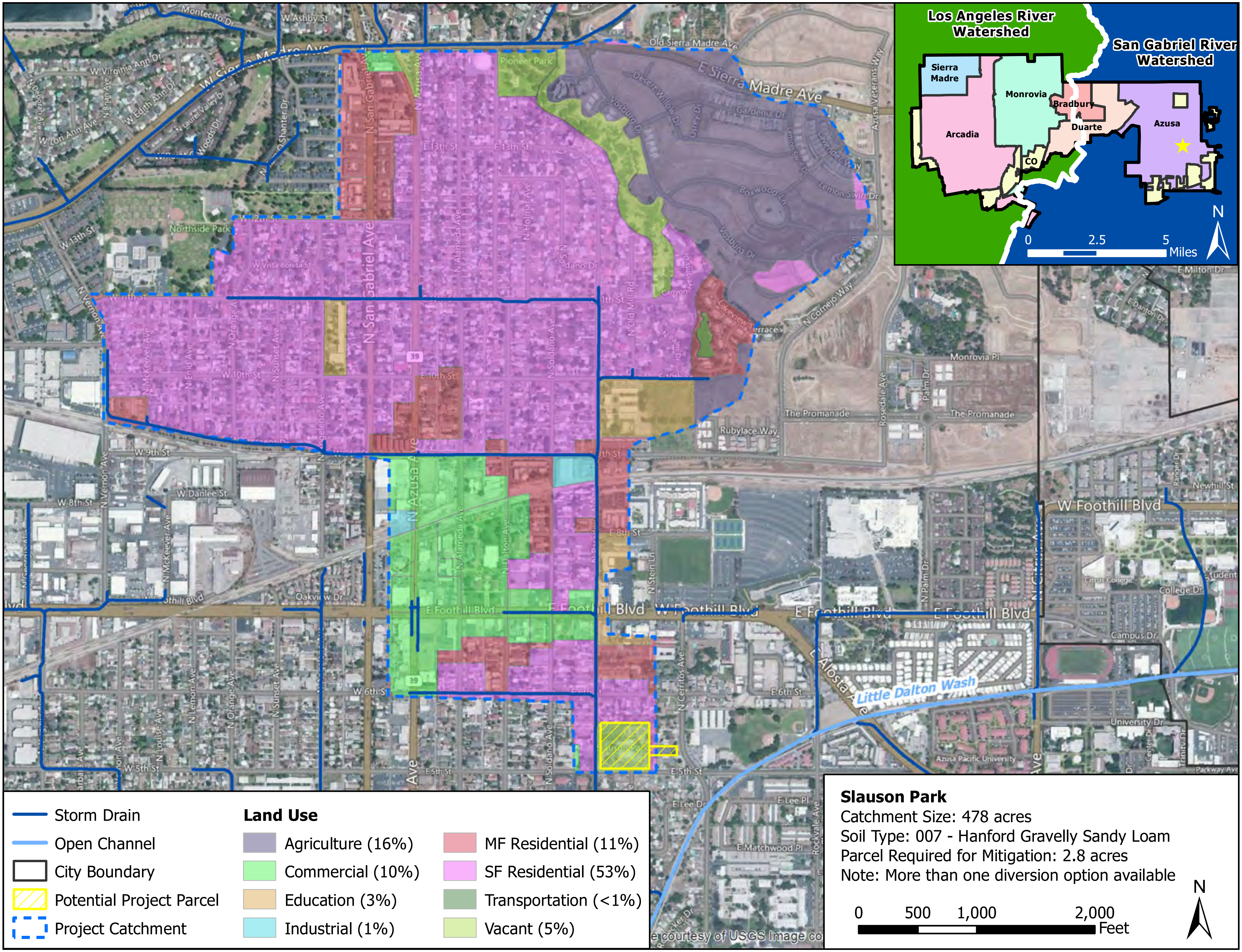
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
Spruce Ct
Monroe Ct
Dimas Ct
Fern Ct
N San Gabriel Canyon Rd
Running Dr
N Viewcrest Dr
N Hilltop Dr
San Gabriel Mountains
Hibiscus Ave
E Viewcrest Dr
N Nob Hill Dr
Ranch Rd
E Sierra Madre Ave
Old Sierra Madre Ave
N Azusa Ave
Pioneer Park
Vosburg Dr
Image courtesy of USGS Image co
Storm Drain
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (38%)
SF Residential (30%)
Vacant (32%)
Pioneer Park
Catchment Size: 60 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 0.3 acres
Note: More than one diversion option available
0
250
500
1,000
Feet
N



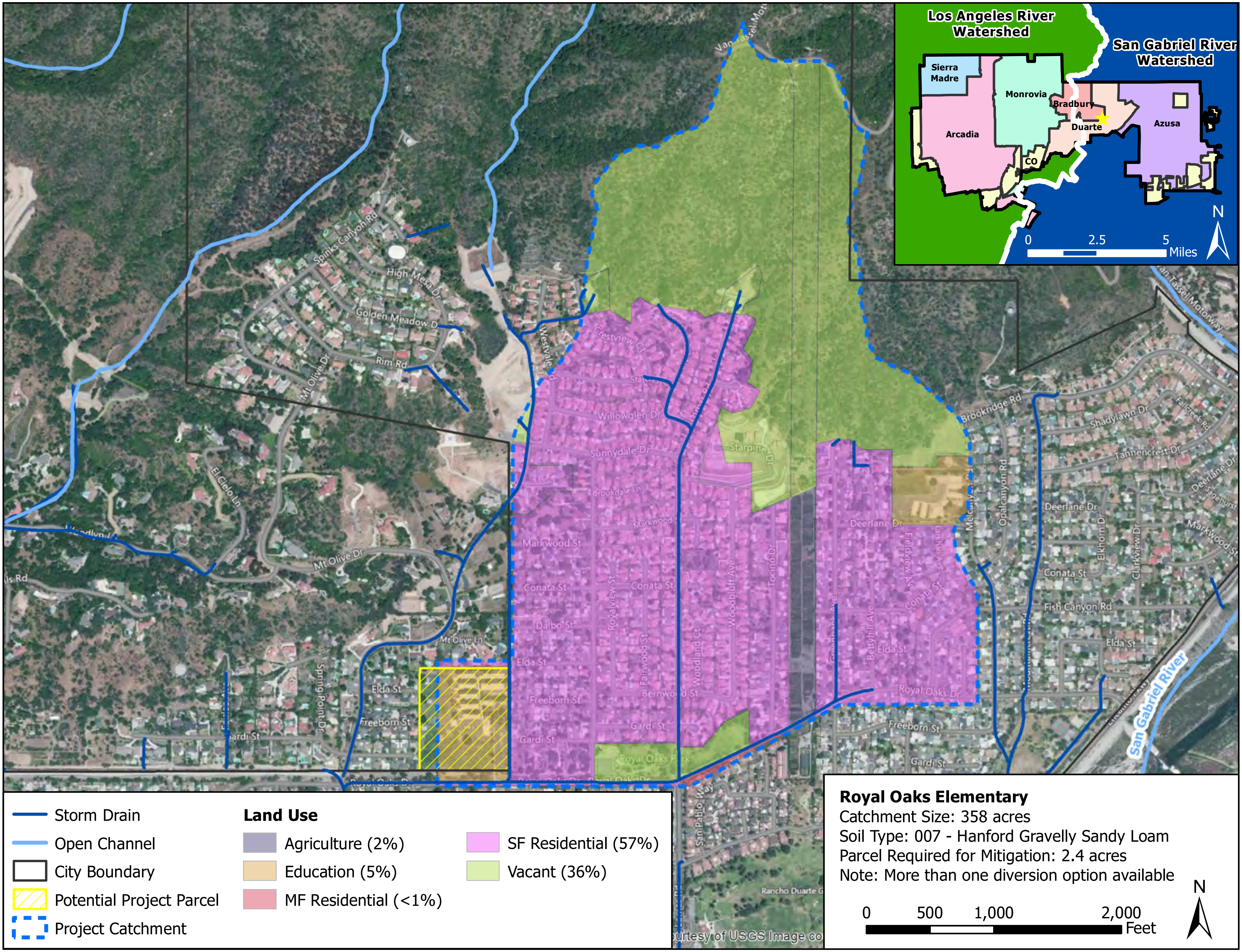
Royal Oaks Park
Catchment Size: 305 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 2.0 acres
Note: More than one diversion option available
0 500 1,000 2,000 Feet
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (3%)
Education (2%)
MF Residential (<1%)
SF Residential (53%)
Vacant (41%)
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
San Gabriel River
Image courtesy of USGS Image co

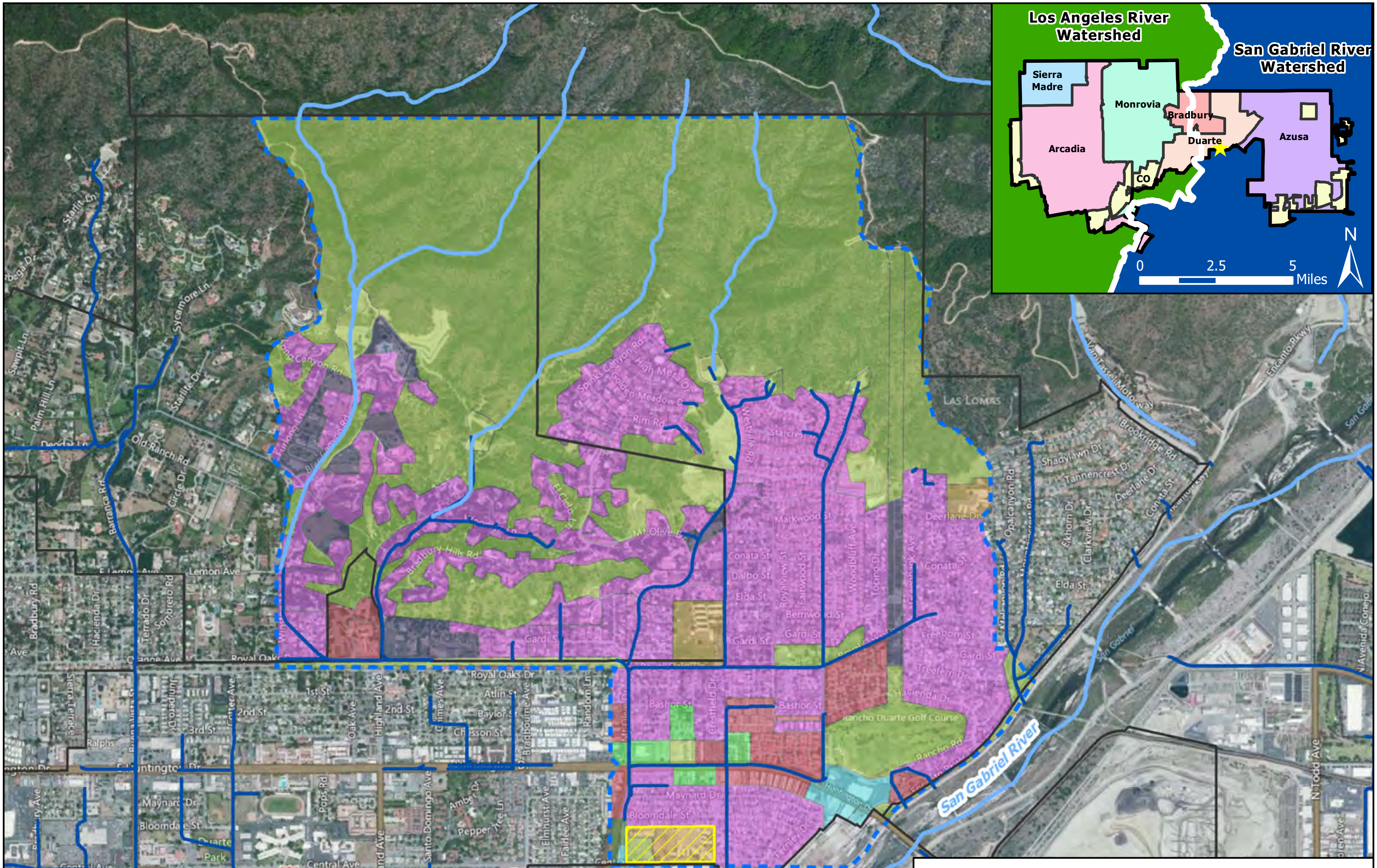

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
E McKinley St
E Manning St
S Noble Pl
S Noble Ave
S Elliott Ave
S Omalley Ave
S Murray Ave
S Cerritos Ave
S Pasadena Ave
Azusa Ln
E Mason St
E Dixon St
E Roland St
E Russell St
S Arthur Ave
E Casita St
Gladstone Park
S Scott Ave
S Rosalinda Ave
E Celeste St
E Fondale St
Cedarglen Dr
E Bellefont
E Gaillard St
N Orangecrest Ave
Image courtesy of USGS Image co
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (1%)
SF Residential (87%)
Transportation (2%)
Vacant (10%)
Gladstone Park
Catchment Size: 54 acres
Soil Type: 006 - Hanford Fine Sandy Loam
Parcel Required for Mitigation: 0.4 acres
0
150
300
600
Feet
N


Azusa Greens Country Club
Catchment Size: 488 acres
Soil Type: 008 - Hanford Silty Loam
Parcel Required for Mitigation: 3.8 acres
Note: More than one diversion option available
0 500 1,000 2,000 Feet
N
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (7%)
Commercial (2%)
Education (<1%)
Industrial (1%)
MF Residential (19%)
SF Residential (25%)
Transportation (<1%)
Vacant (45%)
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
San Gabriel River
San Gabriel Mountains
N San Gabriel Canyon Rd
E Sierra Madre Ave
W Sierra Madre Ave
N San Gabriel Ave
N Azusa Ave
Pioneer Park
Northside Park



Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
Little Dalton Wash
W Foothill Blvd
E Foothill Blvd
E Sierra Madre Ave
N San Gabriel Ave
N Azusa Ave
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (16%)
Commercial (10%)
Education (3%)
Industrial (1%)
MF Residential (11%)
SF Residential (53%)
Transportation (<1%)
Vacant (5%)
Slauson Park
Catchment Size: 478 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 2.8 acres
Note: More than one diversion option available
0 500 1,000 2,000 Feet
N


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
San Gabriel River
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (2%)
Education (5%)
MF Residential (<1%)
SF Residential (57%)
Vacant (36%)
Royal Oaks Elementary
Catchment Size: 358 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 2.4 acres
Note: More than one diversion option available
0
500
1,000
2,000
Feet
N



- Storm Drain
- Open Channel
- City Boundary
- Potential Project Parcel
- Project Catchment

Land Use

- Agriculture (3%)
- Commercial (1%)
- Education (2%)
- Industrial (1%)
- MF Residential (4%)
- SF Residential (36%)
- Transportation (<1%)
- Vacant (53%)

Image courtesy of USGS Image co...

Gordon Sports Park/School

Catchment Size: 1,782 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 11.2 acres
Note: More than one diversion option available

0 1,000 2,000 4,000 Feet

N

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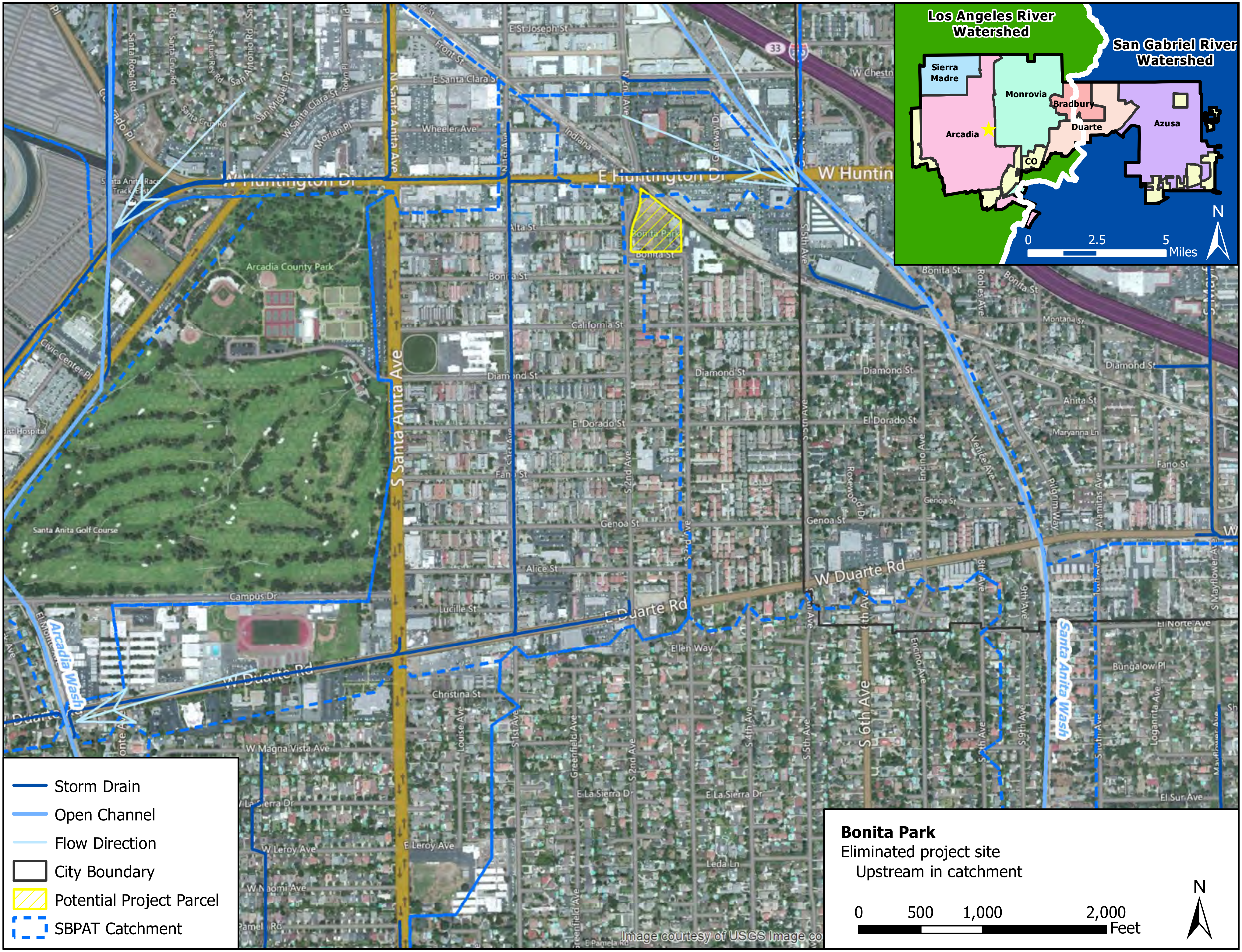
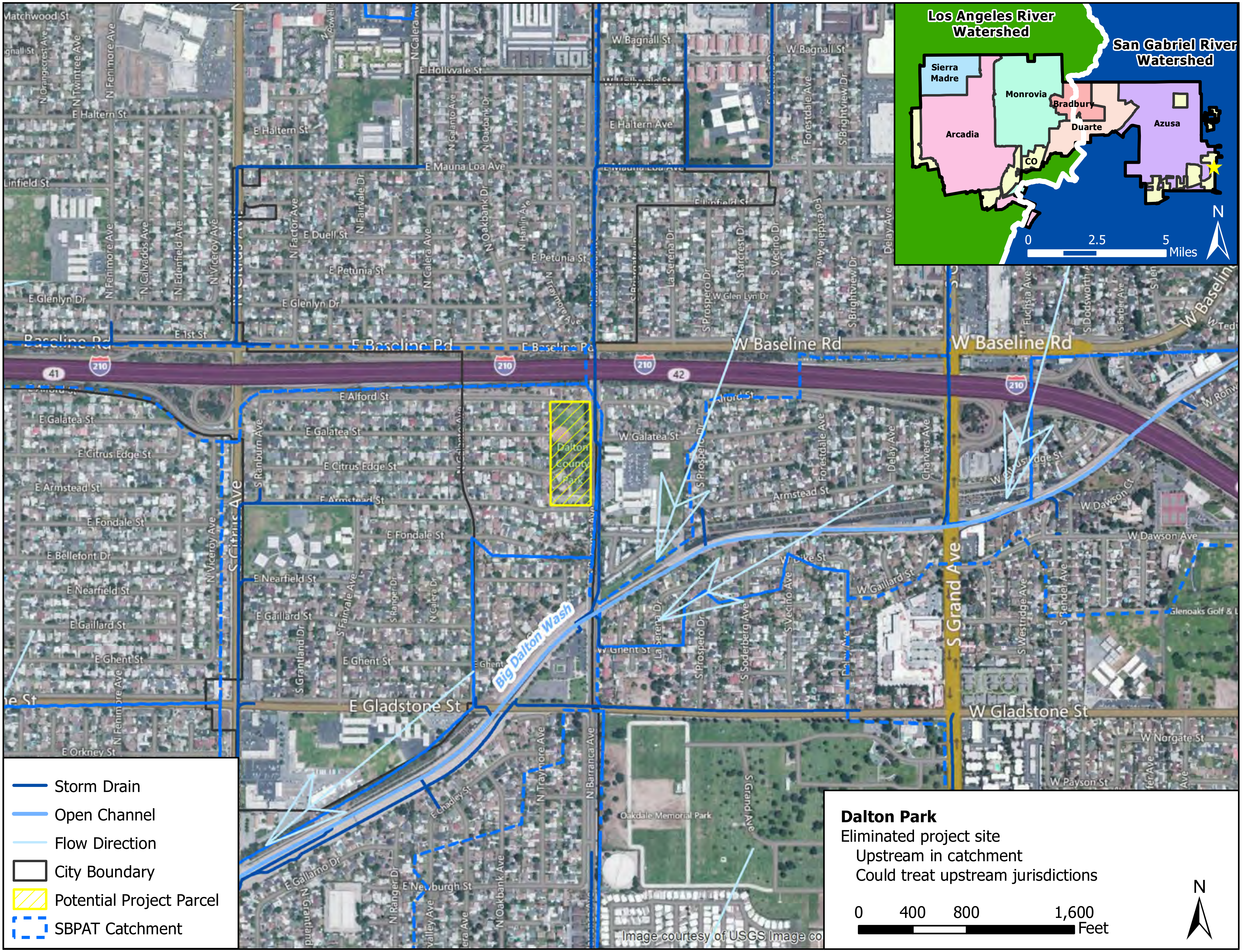
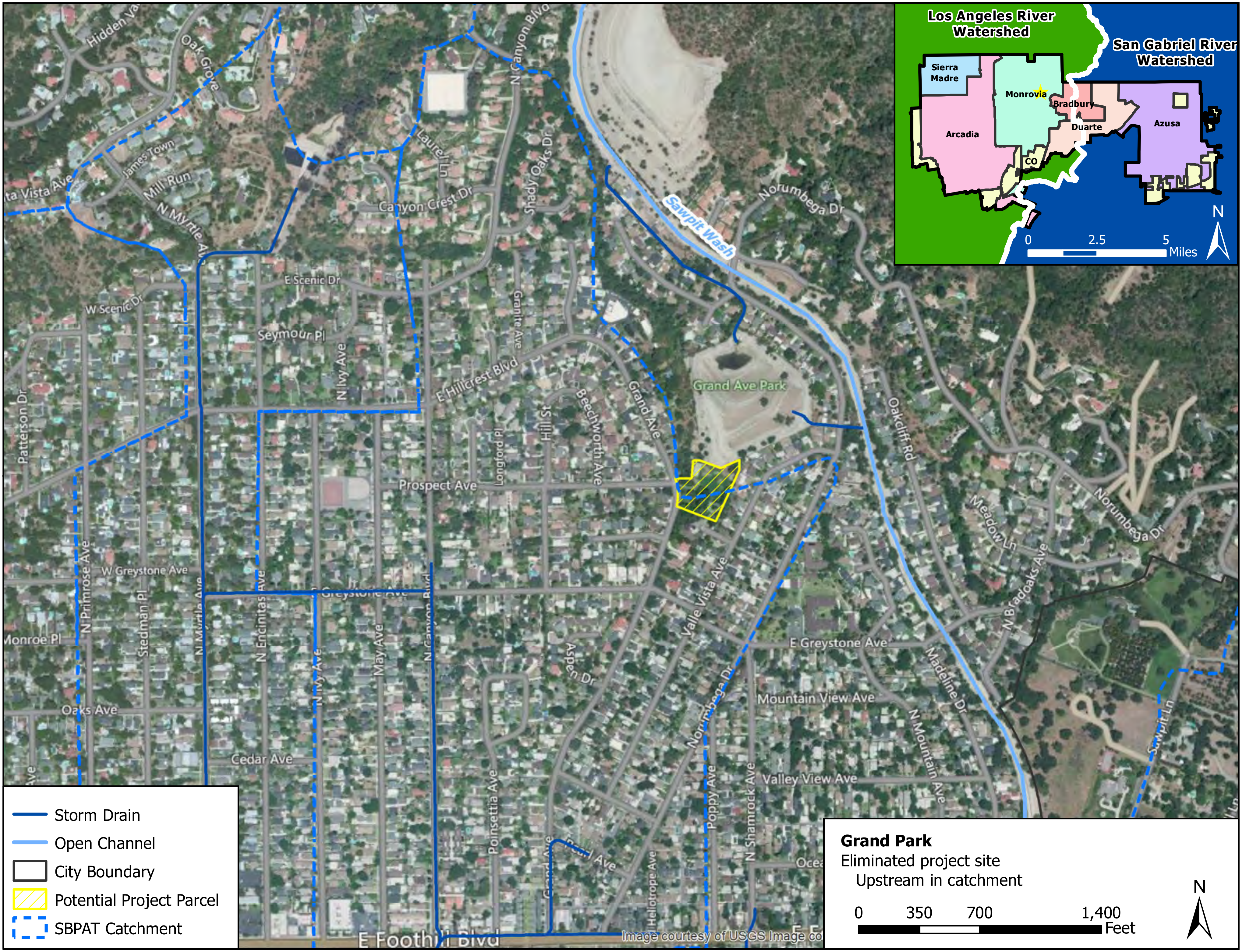
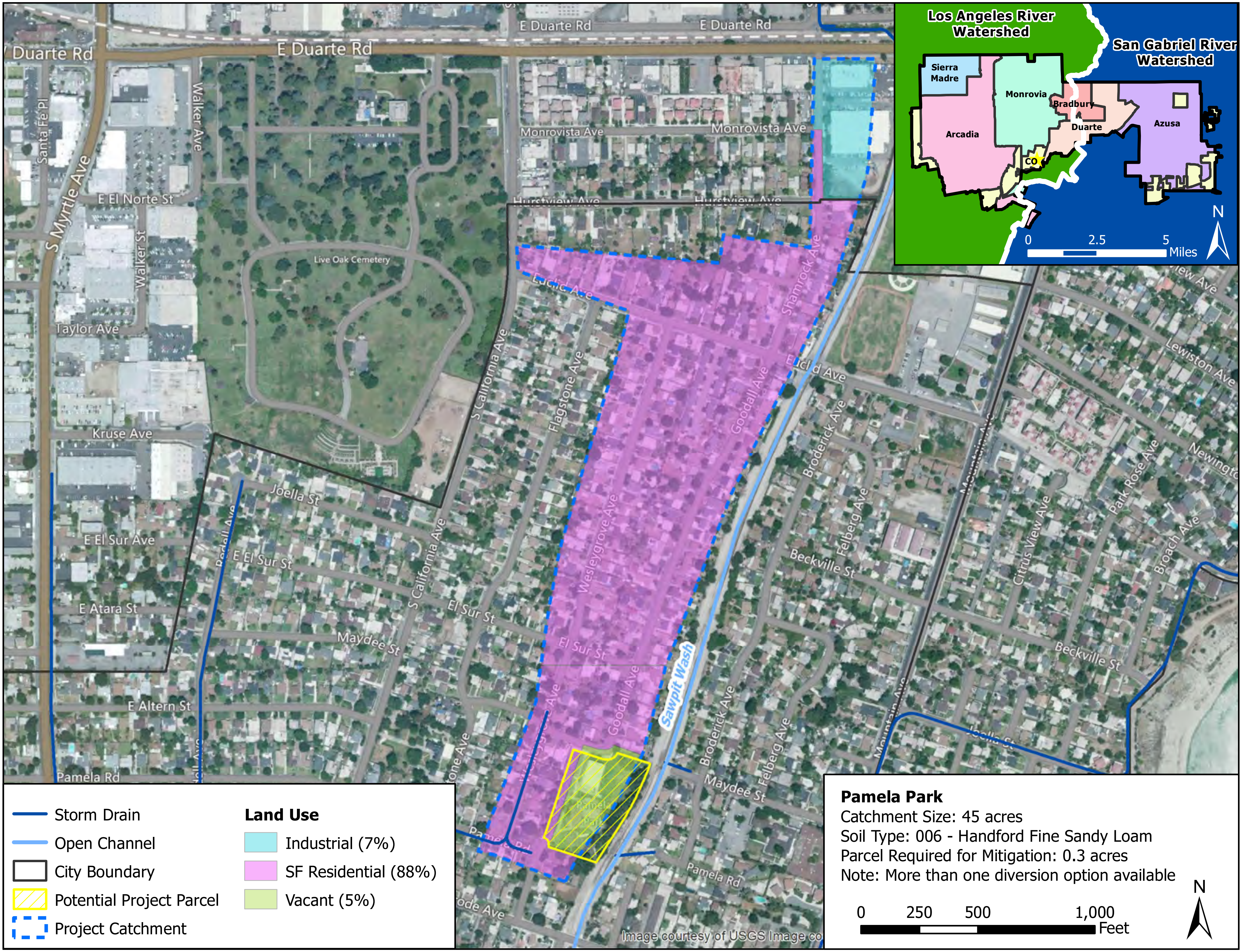
Eliminated Project Sites

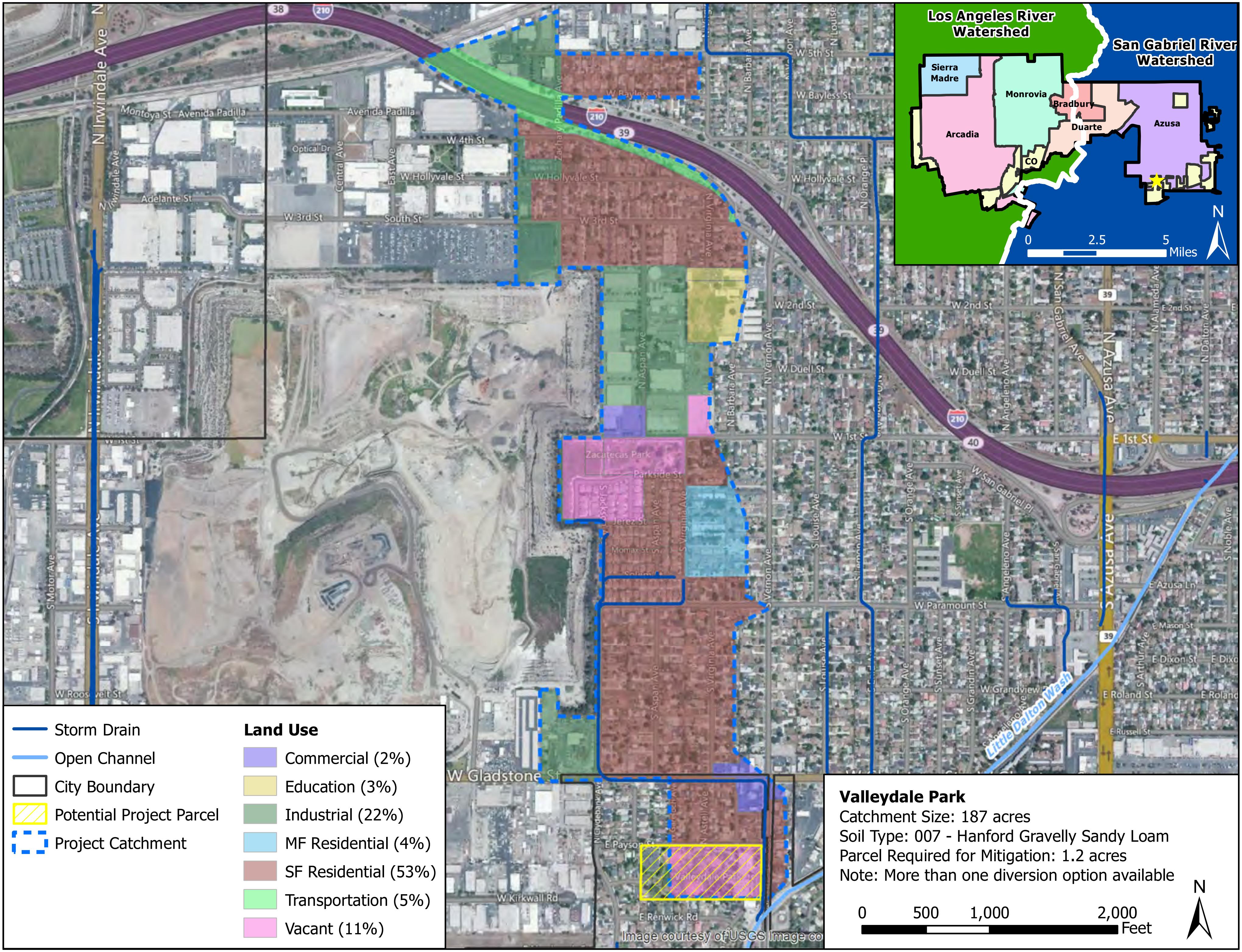

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
W Huntington Dr
E Huntington Dr
S Santa Anita Ave
N Santa Anita Ave
Arcadia County Park
Santa Anita Golf Course
Bonita Park
Bonita St
California St
Diamond St
El Dorado St
Genoa St
Alice St
Campus Dr
Lucille St
E Duarte Rd
W Duarte Rd
Christina St
W Magna Vista Ave
E La Sierra Dr
W Leroy Ave
E Leroy Ave
W Naomi Ave
S 2nd Ave
S 5th Ave
S 6th Ave
Arcadia Wash
Santa Anita Wash
Ellen Way
El Norte Ave
El Sur Ave
Bungalow Pl
Leda Ln
Image courtesy of USGS Image co
Storm Drain
Open Channel
Flow Direction
City Boundary
Potential Project Parcel
SBPAT Catchment
Bonita Park
Eliminated project site
Upstream in catchment
0
500
1,000
2,000
Feet
N



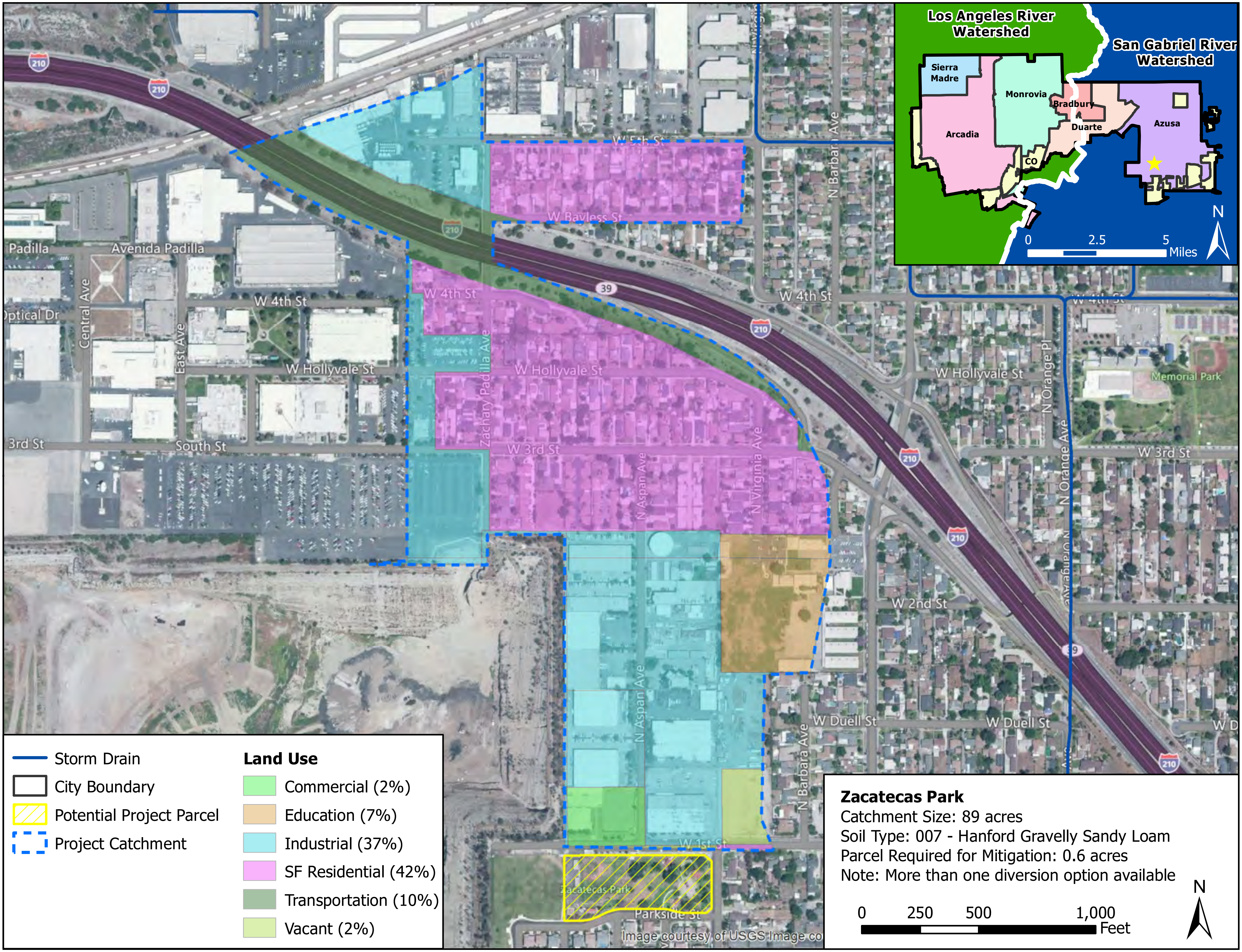
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0
2.5
5
Miles
N
W Baseline Rd
E Baseline Rd
E Gladstone St
W Gladstone St
S Citrus Ave
S Grand Ave
Big Dalton Wash
Dalton County Park
E Mauna Loa Ave
E Alford St
E Galatea St
E Citrus Edge St
E Armstead St
E Fondale St
E Nearfield St
E Gaillard St
E Ghent St
E Glenlyn Dr
E Petunia St
E Duell St
E Haltern St
E Hollyvale St
W Dawson Ave
W Norgate St
W Payson St
Oakdale Memorial Park
Glenoaks Golf & L
Image courtesy of USGS Image co
Storm Drain
Open Channel
Flow Direction
City Boundary
Potential Project Parcel
SBPAT Catchment
Dalton Park
Eliminated project site
Upstream in catchment
Could treat upstream jurisdictions
0
400
800
1,600
Feet
N

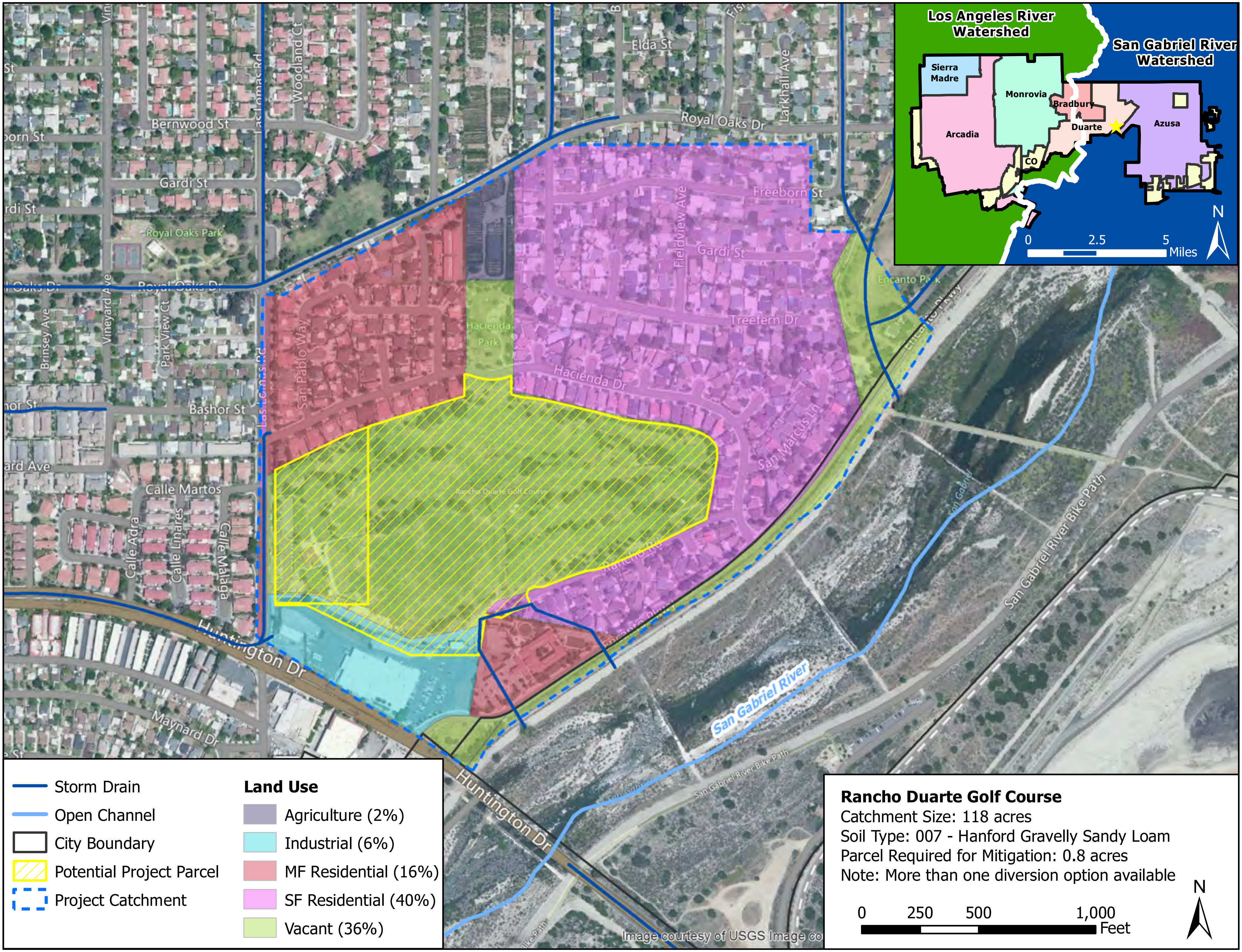

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
N
0
2.5
5
Miles
Sawpit Wash
Grand Ave Park
Norumbega Dr
Oakcliff Rd
E Hillcrest Blvd
Prospect Ave
E Greystone Ave
W Greystone Ave
Mountain View Ave
Valley View Ave
Cedar Ave
Oaks Ave
E Foothill Blvd
Image courtesy of USGS Image co
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
SBPAT Catchment
Grand Park
Eliminated project site
Upstream in catchment
0
350
700
1,400
Feet
N

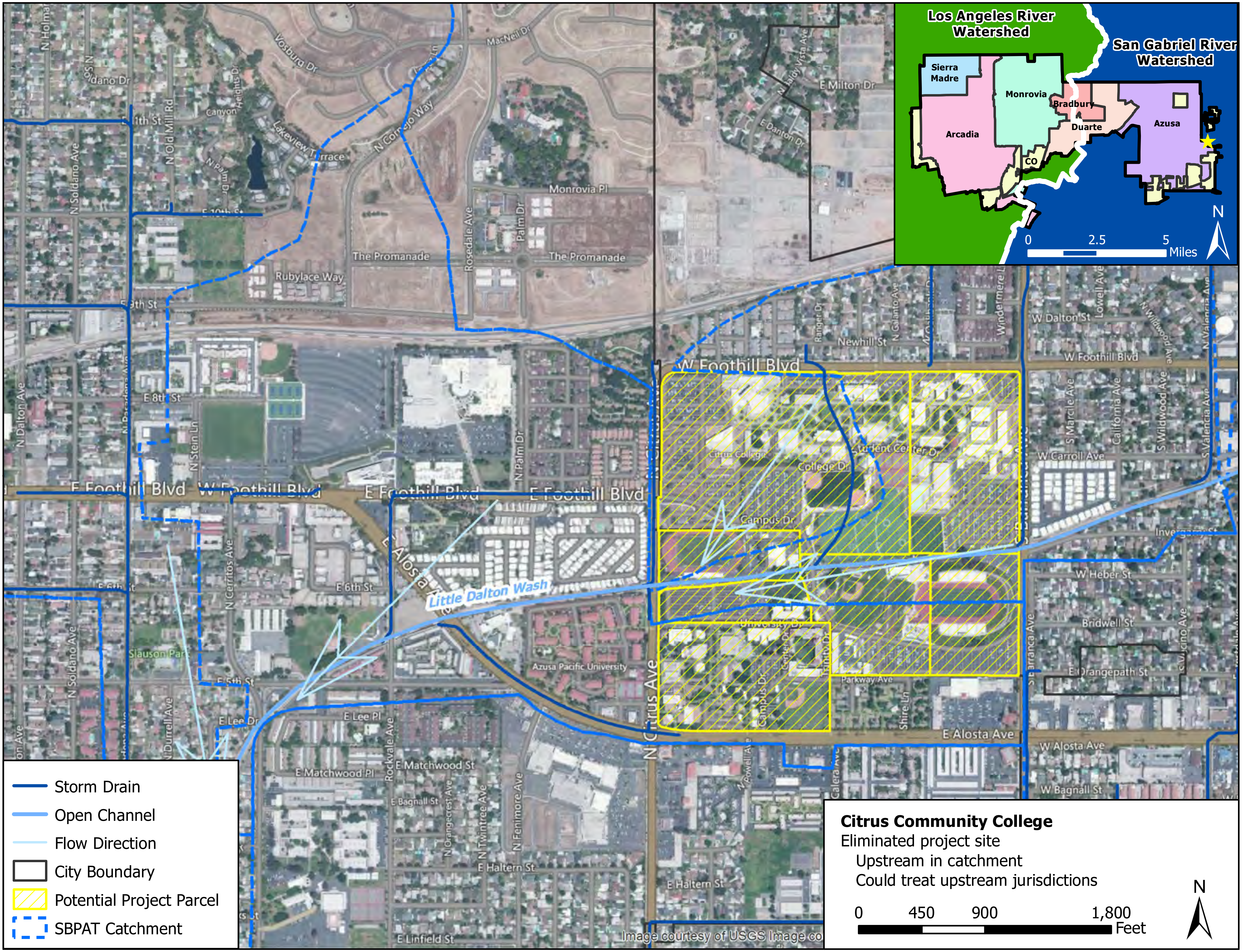

Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
N
0
2.5
5
Miles
E Duarte Rd
Duarte Rd
Monrovista Ave
Hurstview Ave
Walker Ave
Santa Fe Pl
S Myrtle Ave
E El Norte St
Live Oak Cemetery
Taylor Ave
Kruse Ave
Joella St
E El Sur Ave
E El Sur St
E Atara St
E Altern St
Pamela Rd
S California Ave
Flagstone Ave
Euclid Ave
Shamrock Ave
Goodall Ave
Wesleygrove Ave
El Sur St
El Sur St
Maydee St
Sawpit Wash
Broderick Ave
Felberg Ave
Beckville St
Citrus View Ave
Park Rose Ave
Broach Ave
Lewiston Ave
Newington
Maydee St
Pamela Rd
Image courtesy of USGS Image co
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Industrial (7%)
SF Residential (88%)
Vacant (5%)
Pamela Park
Catchment Size: 45 acres
Soil Type: 006 - Handford Fine Sandy Loam
Parcel Required for Mitigation: 0.3 acres
Note: More than one diversion option available
0
250
500
1,000
Feet
N



Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Duarte
Arcadia
Azusa
CO
N
0
2.5
5
Miles
N Irwindale Ave
Montoya St
Avenida Padilla
Optical Dr
Central Ave
East Ave
W 4th St
W Hollyvale St
Adelante St
W 3rd St
South St
W 5th St
W Bayless St
W 2nd St
W Duell St
W 1st St
Zacatecas Park
Parkside St
Jerez St
N Aspan Ave
N Virginia Ave
N Barbara Ave
N Vernon Ave
N Orange Pl
N San Gabriel Ave
N Azusa Ave
S Azusa Ave
N Alameda Ave
N Dalton Ave
E 1st St
E 2nd St
W San Gabriel Pl
W Paramount St
W Grandview
E Azusa Ln
E Mason St
E Dixon St
E Roland St
E Russell St
Little Dalton Wash
S Motor Ave
W Roosevelt St
W Gladstone St
E Payson St
W Kirkwall Rd
E Renwick Rd
Image courtesy of USGS Image co
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (2%)
Education (3%)
Industrial (22%)
MF Residential (4%)
SF Residential (53%)
Transportation (5%)
Vacant (11%)
Valleydale Park
Catchment Size: 187 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 1.2 acres
Note: More than one diversion option available
0
500
1,000
2,000
Feet
N


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
W 5th St
W Bayless St
N Barbara Ave
Padilla
Avenida Padilla
W 4th St
Optical Dr
Central Ave
East Ave
W Hollyvale St
3rd St
South St
Zachary Padilla Ave
W 3rd St
N Aspan Ave
N Virginia Ave
N Orange Pl
N Orange Ave
Memorial Park
W 2nd St
W Duell St
W 1st St
Zacatecas Park
Parkside St
Image courtesy of USGS Image co
Storm Drain
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Commercial (2%)
Education (7%)
Industrial (37%)
SF Residential (42%)
Transportation (10%)
Vacant (2%)
Zacatecas Park
Catchment Size: 89 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 0.6 acres
Note: More than one diversion option available
0 250 500 1,000 Feet
N


Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
N
Elda St
Woodland Ct
Bernwood St
Royal Oaks Dr
Larkhall Ave
Gardi St
Royal Oaks Park
Royal Oaks Dr
Freeborn St
Fieldview Ave
Gardi St
Encanto Park
Treefern Dr
Hacienda Park
Hacienda Dr
San Pablo Way
Vineyard Ave
Brinsley Ave
Park View Ct
Bashor St
San Marcus Ln
Calle Martos
Calle Adra
Calle Linares
Calle Malaga
Huntington Dr
Maynard Dr
San Gabriel River
San Gabriel River Bike Path
Huntington Dr
Image courtesy of USGS
Storm Drain
Open Channel
City Boundary
Potential Project Parcel
Project Catchment
Land Use
Agriculture (2%)
Industrial (6%)
MF Residential (16%)
SF Residential (40%)
Vacant (36%)
Rancho Duarte Golf Course
Catchment Size: 118 acres
Soil Type: 007 - Hanford Gravelly Sandy Loam
Parcel Required for Mitigation: 0.8 acres
Note: More than one diversion option available
0 250 500 1,000 Feet
N


Citrus Community College
Eliminated project site
Upstream in catchment
Could treat upstream jurisdictions
Storm Drain
Open Channel
Flow Direction
City Boundary
Potential Project Parcel
SBPAT Catchment
0 450 900 1,800 Feet
N
Los Angeles River Watershed
San Gabriel River Watershed
Sierra Madre
Monrovia
Bradbury
Arcadia
Duarte
Azusa
CO
0 2.5 5 Miles
Little Dalton Wash
E Foothill Blvd
W Foothill Blvd
E Alosta Ave
W Alosta Ave
N Citrus Ave
Citrus College
College Dr
Campus Dr
Student Center Dr
Azusa Pacific University
Monrovia Pl
The Promanade
Rubylace Way
Vosburg Dr
MacNeil Dr
Lakeview Terrace
N Palm Dr
E Milton Dr
E Danton Dr
W Dalton St
Newhill St
W Carroll Ave
W Heber St
Bridwell St
E Orangepath St
Parkway Ave
E Lee Pl
E Matchwood St
E Matchwood Pl
E Bagnall St
W Bagnall St
E Haltern St
E Linfield St
E 6th St
E 5th St
E 8th St
E 10th St
Slauson Park
Image courtesy of USGS Image co

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Attachment M

Detailed Summary Statistics for BMP Inflow and Outflow for all 23 Constituents

This attachment includes summary tables created to compare statistics for pollutants in each pollutant category (metals, solids, bacteria, nutrients) among each of the Best Management Practice (BMP) subcategories (site scale detention, flow-through treatment, catch basin inserts, and constructed wetlands) for Southern California. The BMP performance data will be used by the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) during the BMP selection process required in the Enhanced Watershed Management Program (EWMP) development. This attachment corresponds with **Section 3.2** of the RH/SGRWQG EWMP. The tables presented can be summarized as follows:

- **Tables M-1** through **M-8** represent metals for each BMP subcategory.
- **Tables M-9** through **M-11** represent solids for each BMP subcategory.
- **Tables M-12** through **M-13** represent bacteria for each BMP subcategory.
- **Tables M-14** through **M-22** represent nutrients for each BMP subcategory.

Attachment M List of Tables

Table M-1 Influent/Effluent Summary Statistics for Total Arsenic (ug/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	41	39	1.80	1.50	2.50	1.90	3.25	2.50
Flow Through Treatment BMP	11	11	94	91	0.90	0.78	1.35	1.10	3.05	2.50
Constructed Wetland	2	2	8	9	1.28	0.50	1.80	0.63	2.93	1.03
Catch Basin Insert	0	6	---	27	---	2.2	---	3.05	---	5.8
Bioswale (non-Caltrans)	12	12	63	44	1.60	1.10	4.30	2.40	11	4.65
Bioswale (combined)	31	31	118	76	1.14	1.16	2.85	2.23	7.15	4.28
Bioswale (Caltrans only)	19	19	55	32	0.92	1.21	1.71	2.22	3.19	4.04

Table M-2 Influent/Effluent Summary Statistics for Total Cadmium (ug/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	41	39	3.65	1.80	6.20	3.10	9.20	3.90
Flow Through Treatment BMP	11	11	95	91	0.30	0.20	0.50	0.26	0.90	0.60
Constructed Wetland	2	2	16	17	0.22	0.15	0.47	0.18	1.00	0.21
Catch Basin Insert	0	6	---	27	---	0.3	---	0.6	---	0.8
Bioswale (non-Caltrans)	12	12	100	75	0.24	0.10	0.56	0.19	1.30	0.36
Bioswale (combined)	31	31	119	76	0.49	0.19	0.82	0.34	1.35	0.60
Bioswale (Caltrans only)	19	19	55	32	0.41	0.14	0.66	0.33	1.07	0.82

Table M-3 Influent/Effluent Summary Statistics for Total Chromium (ug/L)										
BMP Category	**Number of BMP Sampling Locations**		**Number of Samples Analyzed**		**25^{th} Percentile**		**Median (50^{th} Percentile)**		**75^{th} Percentile**	
	Inflow	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**
Site Scale Detention	5	5	76	68	26.25	15.00	39.45	20.50	63.75	28.00
Flow Through Treatment BMP	11	11	95	91	1.50	1.00	2.70	1.70	4.00	2.90
Constructed Wetland	2	2	8	9	3.78	1.00	8.55	1.00	9.93	1.60
Catch Basin Insert	0	6	---	27	---	2.1	---	3.5	---	5.3
Bioswale (non-Caltrans)	12	12	64	44	2.83	1.40	5.65	2.20	9.95	4.55
Bioswale (combined)	31	31	119	76	3.50	1.73	6.90	4.00	9.60	6.20
Bioswale (Caltrans only)	19	19	55	32	5.70	3.78	7.40	5.30	9.20	7.13

Table M-4 Influent/Effluent Summary Statistics for Total Copper (ug/L)										
BMP Category	**Number of BMP Sampling Locations**		**Number of Samples Analyzed**		**25^{th} Percentile**		**Median (50^{th} Percentile)**		**75^{th} Percentile**	
	Inflow	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**
Site Scale Detention	5	5	76	68	26.25	15.00	39.45	20.50	63.75	28.00
Flow Through Treatment BMP	11	11	150	146	11.98	6.20	18.00	11.00	33.00	21.25
Constructed Wetland	2	2	21	22	11.15	5.55	62.00	8.80	110.00	14.75
Catch Basin Insert	0	6	---	88	---	5.95	---	13	---	22
Bioswale (non-Caltrans)	12	12	131	99	11.00	5.40	25.20	10.00	64.0	16.0
Bioswale (combined)	31	31	150	100	22.00	8.23	41.00	13.00	70.50	19.90
Bioswale (Caltrans only)	19	19	55	32	24.00	9.95	41.00	16.00	60.00	26.00

Table M-5 Influent/Effluent Summary Statistics for Total Iron (ug/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25^{th} Percentile		Median (50^{th} Percentile)		75^{th} Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	---	---	---	---	---	---	---	---	---	---
Flow Through Treatment BMP	---	---	---	---	---	---	---	---	---	---
Constructed Wetland	---	---	---	---	---	---	---	---	---	---
Catch Basin Insert	---	---	---	---	---	---	---	---	---	---
Bioswale (non-Caltrans)	---	---	---	---	---	---	---	---	---	---
Bioswale (combined)	8	8	9	7	1060	690	2500	970	3400	1500
Bioswale (Caltrans only)	8	8	8	7	990	690	1850	970	3175	1500

Table M-6 Influent/Effluent Summary Statistics for Total Lead (ug/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25^{th} Percentile		Median (50^{th} Percentile)		75^{th} Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	76	69	34.40	13.00	54.00	22.00	108.25	36.50
Flow Through Treatment BMP	11	11	149	146	6.50	1.00	13.00	3.10	25.50	7.10
Constructed Wetland	2	2	21	22	3.32	2.70	170.00	4.40	315.00	8.32
Catch Basin Insert	0	6	---	88	---	2.3	---	6	---	12.45
Bioswale (non-Caltrans)	12	12	131	99	9.67	3.60	21.85	7.06	73.0	18.26
Bioswale (combined)	31	31	150	100	13.92	3.53	32.89	7.55	77.75	21.50
Bioswale (Caltrans only)	19	19	55	32	11.16	2.95	26.02	6.50	60.68	15.00

TableM-7 Influent/Effluent Summary Statistics for Total Nickel (ug/L)										
BMP Category	**Number of BMP Sampling Locations**		**Number of Samples Analyzed**		**25th Percentile**		**Median (50th Percentile)**		**75th Percentile**	
	Inflow	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**
Site Scale Detention	5	5	41	39	4.75	2.70	7.30	4.00	13.00	5.20
Flow Through Treatment BMP	11	11	95	91	2.90	2.00	4.90	3.50	8.50	6.40
Constructed Wetland	2	2	8	9	5.90	3.70	8.70	5.50	16.50	6.65
Catch Basin Insert	0	6	---	27	---	3	---	4.7	---	9.8
Bioswale (non-Caltrans)	12	12	64	44	4.43	2.00	9.25	2.50	15.75	4.15
Bioswale (combined)	31	31	119	76	4.50	2.10	8.00	2.85	13.00	5.08
Bioswale (Caltrans only)	19	19	55	32	4.50	2.53	7.30	3.90	10.00	6.40

Table M-8 Influent/Effluent Summary Statistics for Total Zinc (ug/L)										
BMP Category	**Number of BMP Sampling Locations**		**Number of Samples Analyzed**		**25th Percentile**		**Median (50th Percentile)**		**75th Percentile**	
	Inflow	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Inflow**	**Outflow**
Site Scale Detention	5	5	76	68	152.75	68.25	280.00	99.00	504.75	150.00
Flow Through Treatment BMP	11	11	150	146	110	23.00	221	55.5	400	131
Constructed Wetland	2	2	21	22	109.00	28.53	270.00	39.00	450.00	84.35
Catch Basin Insert	0	6	---	88	---	50.5	---	107	---	220
Bioswale (non-Caltrans)	12	12	131	99	90.00	29.00	160	50.16	313	76
Bioswale (combined)	31	31	150	100	110	29.5	228	55.5	360	82.5
Bioswale (Caltrans only)	19	19	55	32	110	24.75	220	52.50	350	84.50

Table M-9 Influent/Effluent Summary Statistics for Total Suspended Solids (TSS, mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	76	69	75	23	100	38	169	59
Flow Through Treatment BMP	13	13	230	218	8.875	2.875	39.5	7.00	89.25	22.25
Constructed Wetland	1	1	13	14	140	3.50	230	11.0	255	13.5
Catch Basin Insert	0	6	---	88	---	20	---	37.5	---	71
Bioswale (non-Caltrans)	12	12	104	71	47.3	18.0	72.0	30.0	134	50.0
Bioswale (combined)	31	31	159	103	45.0	18.0	76.0	31.0	130	54
Bioswale (Caltrans only)	19	19	55	32	39	20.5	78	38	124	81.75

Table M-10 Influent/Effluent Summary Statistics for Total Dissolved Solids (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	49	37	65	66	88	88	135	120
Flow Through Treatment BMP	10	11	85	90	32.0	44.0	48.0	56.0	96.0	98.25
Constructed Wetland	1	1	8	9	63	940	87	1600	178	1850
Catch Basin Insert	0	6	---	27	---	38	---	58	---	76
Bioswale (non-Caltrans)	12	12	71	45	42.0	57.0	80.0	78.0	154	120
Bioswale (combined)	31	31	126	77	47.5	61.0	82.0	88.0	126.75	120
Bioswale (Caltrans only)	19	19	55	32	56	77.5	89	100	112	128.5

Table M-11 Influent/Effluent Summary Statistics for Turbidity (NTU)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	0	0	---	---	---	---	---	---	---	---
Flow Through Treatment BMP	1	1	3	3	---	2.69	---	6.29	---	6.30
Constructed Wetland	0	0	---	---	---	---	---	---	---	---
Catch Basin Insert	0	0	---	---	---	---	---	---	---	---
Bioswale (non-Caltrans)	0	0	---	---	---	---	---	---	---	---
Bioswale (combined)	11	11	16	11	29.0	18.0	75.0	37.0	140	42
Bioswale (Caltrans only)	11	11	16	11	29	18	75	37	140	42

Table M-12 Influent/Effluent Summary Statistics for Fecal Coliform (#/100ml)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	9	9	34	30	300	475	600	850	1700	3075
Flow Through Treatment BMP	11	11	172	152	300	7.47	900	77.1	3000	797
Constructed Wetland	2	2	13	14	230	20.0	1300	95.0	3800	255
Catch Basin Insert	0	6	---	---	---	---	---	---	---	---
Bioswale (non-Caltrans)	8	8	33	19	500	130	5000	900	16500	5000
Bioswale (combined)	8	8	33	19	500	130	5000	900	16500	5000
Bioswale (Caltrans only)	0	0	---	---	---	---	---	---	---	---

Table M-13 Influent/Effluent Summary Statistics for Total Coliform (#/100ml)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	0	0	---	---	---	---	---	---	---	---
Flow Through Treatment BMP	1	1	64	64	5000	3.86	20000	20.0	90000	40.0
Constructed Wetland	1	1	8	8	1875	278	3700	1370	50000	24750
Catch Basin Insert	0	0	---	---	---	---	---	---	---	---
Bioswale (non-Caltrans)	0	0	---	---	---	---	---	---	---	---
Bioswale (combined)	0	0	---	---	---	---	---	---	---	---
Bioswale (Caltrans only)	0	0	---	---	---	---	---	---	---	---

Table M-14 Influent/Effluent Summary Statistics for Kjeldahl Nitrogen, TKN (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	76	68	1.33	1.10	1.88	1.50	2.70	2.17
Flow Through Treatment BMP	11	11	149	146	1.2	0.6675	1.76	1.215	2.8	2.415
Constructed Wetland	2	2	21	22	1.15	1.48	1.80	1.95	3.86	2.36
Catch Basin Insert		6	---	78	---	1.37	---	1.70	---	2.39
Bioswale (non-Caltrans)	12	12	105	72	1.43	1.035	2.1	1.57	3.39	2.3425
Bioswale (combined)	31	31	160	102	1.17	0.97	1.80	1.53	2.98	2.22
Bioswale (Caltrans only)	19	19	55	30	0.79	0.80	1.20	1.40	2.00	2.22

Table M-15 Influent/Effluent Summary Statistics for Nitrogen, ammonia as N (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention			---	---	---	---	---	---	---	---
Flow Through Treatment BMP	2	1	8	9	0.2	0.575	0.8	1.2	2	3.45
Constructed Wetland	1	2	13	21	0.13	0.052	0.28	0.12	0.47	0.20
Catch Basin Insert			---	---	---	---	---	---	---	---
Bioswale (non-Caltrans)	1		10	---	0.65	---	0.91	---	1.15	---
Bioswale (combined)	20	19	58	30	0.20	0.12	0.38	0.29	0.74	0.71
Bioswale (Caltrans only)	19	19	48	30	0.16	0.12	0.31	0.29	0.61	0.71

Table M-16 Influent/Effluent Summary Statistics for Nitrogen, Nitrate (NO3) as N (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	75	68	0.52	0.51	0.85	0.76	1.20	1.16
Flow Through Treatment BMP	11	11	150	145	0.29	0.45	0.495	0.7	0.8075	1.105
Constructed Wetland	2	2	26	24	0.75	0.057	1.74	0.21	3.00	0.78
Catch Basin Insert		6	---	78	---	0.43	---	0.67	---	1.148
Bioswale (non-Caltrans)	12	12	104	71	0.435	0.30	0.73	0.56	1.375	0.9
Bioswale (combined)	31	31	159	103	0.42	0.29	0.79	0.62	1.48	1.10
Bioswale (Caltrans only)	19	19	55	32	0.46	0.24	0.79	0.78	1.36	1.75

Table M-17 Influent/Effluent Summary Statistics for Nitrogen, Nitrite (NO2) as N (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	---	---	---	---	---	---	---	---	---	---
Flow Through Treatment BMP	---	---	---	---	---	---	---	---	---	---
Constructed Wetland	1	1	8	8	0.017	---	0.05	---	0.16	---
Catch Basin Insert	---	---	---	---	---	---	---	---	---	---
Bioswale (non-Caltrans)	---	---	---	---	---	---	---	---	---	---
Bioswale (combined)	19	11	16	11	0.03	0.03	0.06	0.07	0.12	0.20
Bioswale (Caltrans only)	19	11	16	11	0.03	0.03	0.06	0.07	0.12	0.20

Table M-18 Influent/Effluent Summary Statistics for Organic carbon, Dissolved (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	41	38	9.55	8.65	11.00	12.00	20.50	19.75
Flow Through Treatment BMP	11	11	95	91	8.4	8.7	14	13	26	24
Constructed Wetland	1	1	7	9	10.00	10.00	22.00	13.00	30.00	16.50
Catch Basin Insert	---	6	---	27	---	8.3	---	14.1	---	23.0
Bioswale (non-Caltrans)	9	9	58	42	9.875	8.15	14.5	12.45	31.5	22
Bioswale (combined)	28	28	113	74	7.00	8.55	12.00	12.90	23.50	22.00
Bioswale (Caltrans only)	19	19	55	32	6.20	8.68	9.70	13.00	19.00	21.75

TableM-19 Influent/Effluent Summary Statistics for Organic carbon, Total (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	41	39	10.00	10.00	13.20	14.00	23.50	20.00
Flow Through Treatment BMP	11	11	95	91	11	10	17.2	15	31	26
Constructed Wetland	1	1	7	9	11.00	12.00	15.00	14.00	33.00	20.50
Catch Basin Insert	---	6	---	27	---	8.8	---	19.0	---	31.0
Bioswale (non-Caltrans)	9	9	59	42	12	11	18	17	33	23.25
Bioswale (combined)	28	28	114	74	7.98	11.00	15.00	15.00	28.00	23.00
Bioswale (Caltrans only)	19	19	55	32	7.40	10.25	11.00	13.00	21.00	23.00

TableM-20 Influent/Effluent Summary Statistics for Phosphorus as P, Dissolved (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	41	39	0.06	0.07	0.09	0.11	0.17	0.18
Flow Through Treatment BMP	11	11	85	91	-0.03	-0.03	0.09	0.08	0.155	0.14
Constructed Wetland	1	1	8	8	0.071	0.075	0.08	0.16	0.18	0.36
Catch Basin Insert	---	6	---	27	---	-0.03	---	0.07	---	0.1
Bioswale (non-Caltrans)	9	9	58	41	0.058	0.175	0.08	0.28	0.14	0.5
Bioswale (combined)	9	9	58	41	0.06	0.18	0.08	0.28	0.14	0.50
Bioswale (Caltrans only)	---	---	---	---	---	---	---	---	---	---

Table M-21 Influent/Effluent Summary Statistics for Phosphorus as P, Total (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	5	5	74	69	0.24	0.20	0.36	0.29	0.66	0.40
Flow Through Treatment BMP	11	11	147	146	0.17	0.1	0.24	0.18	0.42	0.28
Constructed Wetland	2	2	20	21	0.28	0.26	0.46	0.39	0.76	1.10
Catch Basin Insert	---	6	---	77	---	0.07	---	0.10	---	0.18
Bioswale (non-Caltrans)	11	11	105	72	0.12	0.26	0.22	0.37	0.4	0.5825
Bioswale (combined)	30	30	160	102	0.11	0.25	0.20	0.40	0.36	0.67
Bioswale (Caltrans only)	19	19	55	30	0.08	0.18	0.15	0.57	0.29	0.92

Table M-22 Influent/Effluent Summary Statistics for Phosphorus, orthophosphate as P (mg/L)

BMP Category	Number of BMP Sampling Locations		Number of Samples Analyzed		25th Percentile		Median (50th Percentile)		75th Percentile	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Site Scale Detention	1	1	---	---	---	---	---	---	---	---
Flow Through Treatment BMP	2	2	20		0.049		0.07		0.315	
Constructed Wetland	1	1	---	---	---	---	---	---	---	---
Catch Basin Insert	---	---	---	---	---	---	---	---	---	---
Bioswale (non-Caltrans)	3	3	12	4	0.0725	0.09	0.235	0.31	0.3325	0.65
Bioswale (combined)	21	22	67	34	0.03	0.09	0.06	0.39	0.13	0.67
Bioswale (Caltrans only)	18	19	55	30	0.02	0.09	0.05	0.42	0.10	0.67

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Attachment N

Detailed Performance Metrics for all BMP Categories and Constituents

This attachment includes summary tables and box plots to show Best Management Practice (BMP) effectiveness based on statistics for each common pollutant of concern (Total Suspended Solids [TSS], fecal coliform, total copper, total lead, and total zinc) for each BMP subcategory (site scale detention, flow-through treatment, catch basin inserts, and constructed wetlands) for Southern California. The BMP performance data will be used by the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) during the BMP selection process required in the Enhanced Watershed Management Program (EWMP) development. This attachment corresponds with **Section 3.2** of the RH/SGRWQG EWMP. The tables presented can be summarized as follows:

- **Tables N-1** through **N-5** represent site scale detention
- **Tables N-6** through **N-10** represent bioswales
- **Tables N-11** through **N-15** represent flow through treatment BMPs
- **Tables N-16** through **N-19** represent catch basin inserts
- **Tables N-20** through **N-24** represent constructed wetlands
- **Tables N-25** through **N-29** represent non-Caltrans bioswales
- **Tables N-30** through **N-33** represent Caltrans only bioswales

The following tables were created to show statistics for all pollutants category (metals, bacteria, nutrients, and solids) and each BMP subcategory (site scale detention, bioswales, flow-through treatment, catch basin inserts, and constructed wetlands) for Southern California.

- **Tables N-34** through **N-37** represent site scale detention.
- **Tables N-38** through **N-41** represent bioswales.
- **Tables N-42** through **N-45** represent flow through treatment BMPs.
- **Tables N-46** through **N-48** represent catch basin inserts.
- **Tables N-49** through **N-52** represent constructed wetlands.
- **Tables N-53** through **N-56** represent non-Caltrans bioswales.
- **Tables N-57** through **N-59** represent Caltrans only bioswales.

Attachment N List of Tables

Table N-1 Site Scale Detention – TSS

Run ID	Total suspended solids, Inflow (mg/L)	Total suspended solids, Outflow (mg/L)	Change, Total suspended solids, Inflow to Outflow
n	**76**	**69**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**133**	**50**	**-62.82%**
Standard Deviation	**94**	**46**	**---**
Coefficient of Variation	**0.71**	**0.94**	**---**
Lower 95% Confidence Limit about Mean	**112**	**39**	**---**
Upper 95% Confidence Limit about Mean	**154**	**60**	**---**
Lower Quartile (25th percentile)	**75**	**23**	**-69.80%**
Median (50th percentile)	**100**	**38**	**-62.00%**
Upper Quartile (75th percentile)	**169**	**59**	**-65.33%**
Inter Quartile Range	**94**	**36**	**---**
Minimum Detected Value	**19**	**9**	**---**
Maximum Detected Value	**500**	**260**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 4.686 + 0.667*z	ln(y) = 3.637 + 0.722*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

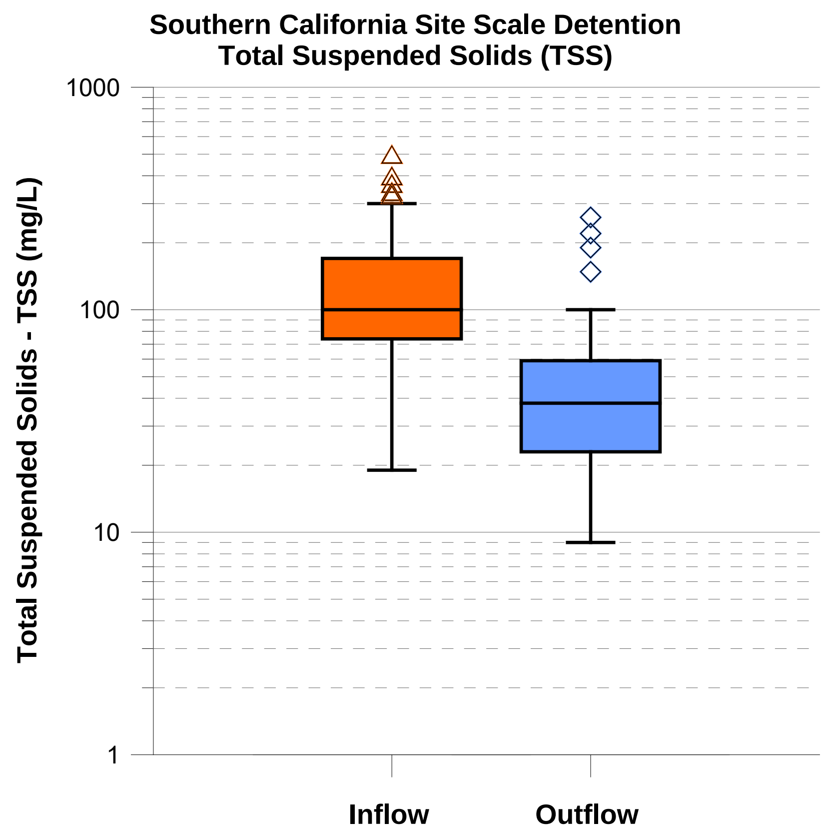

Table N-2 Site Scale Detention – Fecal Coliform

Run ID	Fecal Coliform, Inflow (#/100mL)	Fecal Coliform, Outflow (#/100mL)	Change, Fecal Coliform, Inflow to Outflow
n	**34**	**30**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**2504**	**4987**	**99.1%**
Standard Deviation	**6023**	**21843**	---
Coefficient of Variation	**2.4**	**4.4**	---
Lower 95% Confidence Limit about Mean	**479**	**-2830**	---
Upper 95% Confidence Limit about Mean	**4529**	**12803**	---
Lower Quartile (25th percentile)	**300**	**475**	**58.3%**
Median (50th percentile)	**600**	**850**	**41.7%**
Upper Quartile (75th percentile)	**1700**	**3075**	**80.9%**
Inter Quartile Range	**1400**	**2600**	---
Minimum Detected Value	**110**	**2**	---
Maximum Detected Value	**28000**	**90000**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 6.703 + 1.447*z	ln(y) = 6.955 + 1.811*z	---
Note:	1	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.

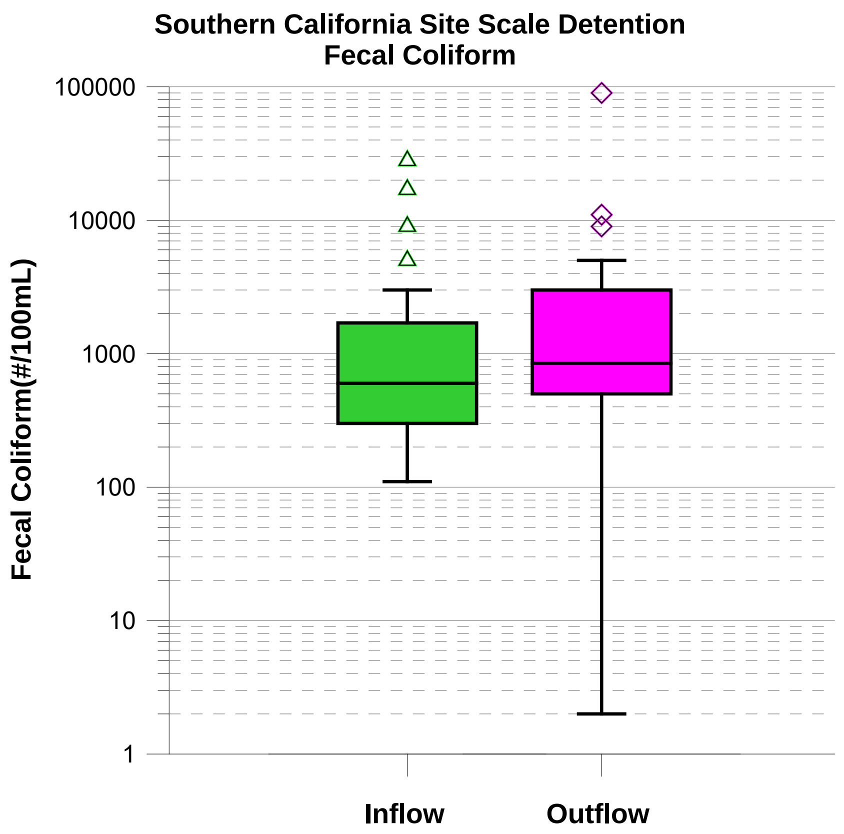

Table N-3 Site Scale Detention – Total Copper			
Run ID	**Total Copper, Inflow (ug/L)**	**Total Copper, Outflow (ug/L)**	**Change, Total Copper, Inflow to Outflow**
n	**76**	**68**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**48.69**	**23.45**	**-51.83%**
Standard Deviation	**35.12**	**13.93**	**---**
Coefficient of Variation	**0.72**	**0.59**	**---**
Lower 95% Confidence Limit about Mean	**40.80**	**20.14**	**---**
Upper 95% Confidence Limit about Mean	**56.59**	**26.76**	**---**
Lower Quartile (25th percentile)	**26.25**	**15.00**	**-42.86%**
Median (50th percentile)	**39.45**	**20.50**	**-48.04%**
Upper Quartile (75th percentile)	**63.75**	**28.00**	**-56.08%**
Inter Quartile Range	**37.50**	**13.00**	**---**
Minimum Detected Value	**6.3**	**6.7**	**---**
Maximum Detected Value	**230**	**82**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 3.682 + 0.670*z	ln(y) = 3.014 + 0.549*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

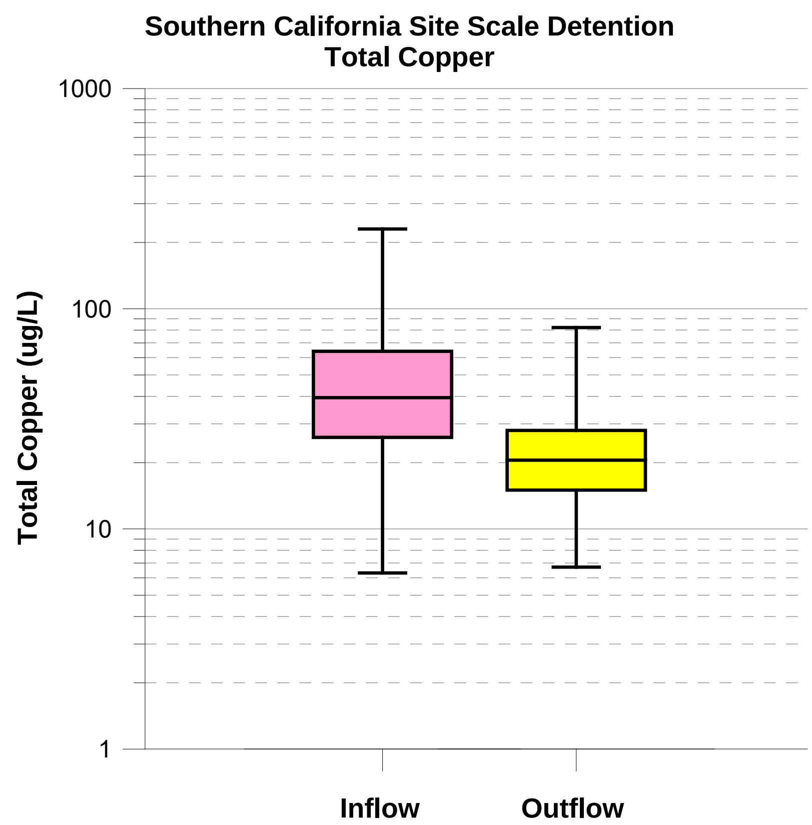

Table N-4 Site Scale Detention – Total Lead			
Run ID	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**
n	**76**	**69**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**83.02**	**28.03**	**-66.23%**
Standard Deviation	**80.13**	**24.39**	**---**
Coefficient of Variation	**0.97**	**0.87**	**---**
Lower 95% Confidence Limit about Mean	**65.00**	**22.28**	**---**
Upper 95% Confidence Limit about Mean	**101.03**	**33.79**	**---**
Lower Quartile (25th percentile)	**34.40**	**13.00**	**-62.21%**
Median (50th percentile)	**54.00**	**22.00**	**-59.26%**
Upper Quartile (75th percentile)	**108.25**	**36.50**	**-66.28%**
Inter Quartile Range	**73.85**	**23.50**	**---**
Minimum Detected Value	**5.1**	**5.3**	**---**
Maximum Detected Value	**440**	**140**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 4.066 + 0.886*z	ln(y) = 3.061 + 0.766*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

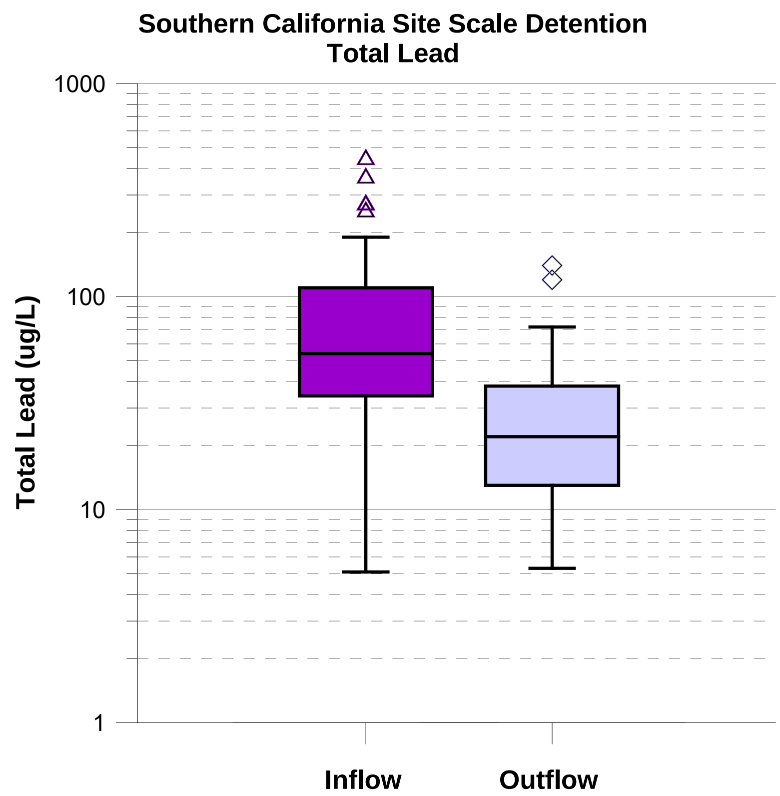

Table N-5 Site Scale Detention – Total Zinc

Run ID	Total Zinc, Inflow (ug/L)	Total Zinc, Outflow (ug/L)	Change, Total Zinc, Inflow to Outflow
n	**76**	**68**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**378.89**	**117.54**	**-68.98%**
Standard Deviation	**357.12**	**69.82**	**---**
Coefficient of Variation	**0.94**	**0.59**	**---**
Lower 95% Confidence Limit about Mean	**298.60**	**100.95**	**---**
Upper 95% Confidence Limit about Mean	**459.18**	**134.14**	**---**
Lower Quartile (25th percentile)	**152.75**	**68.25**	**-55.32%**
Median (50th percentile)	**280.00**	**99.00**	**-64.64%**
Upper Quartile (75th percentile)	**504.75**	**150.00**	**-70.28%**
Inter Quartile Range	**352.00**	**81.75**	**---**
Minimum Detected Value	**4.6**	**29**	**---**
Maximum Detected Value	**2100**	**390**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 5.591 + 0.904*z	ln(y) = 4.608 + 0.596*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

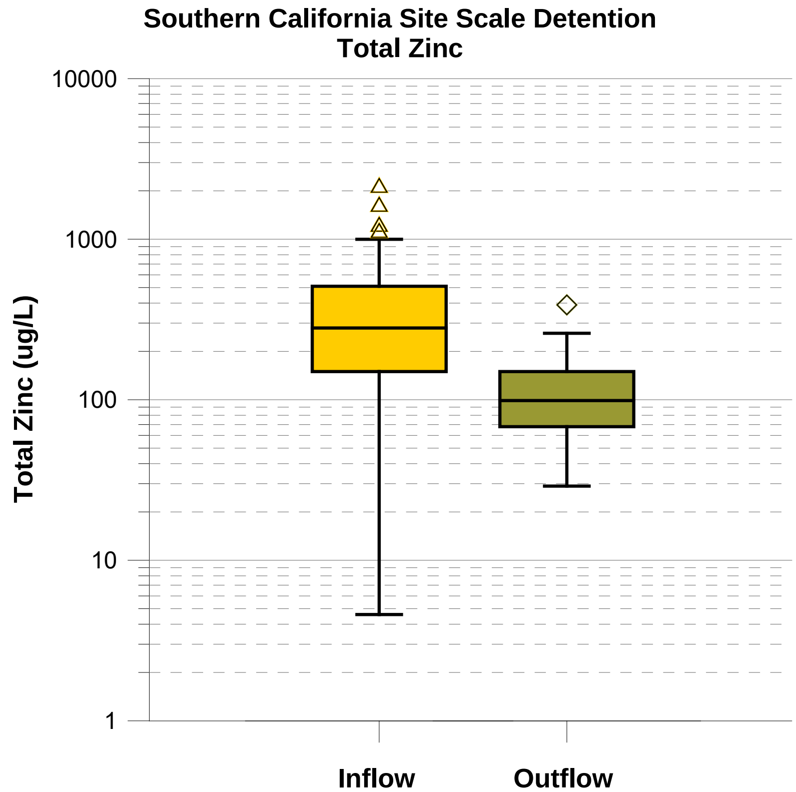

Table N-6 Bioswales – TSS

Run ID	Total suspended solids, Inflow (mg/L)	Total suspended solids, Outflow (mg/L)	Change, Total suspended solids, Inflow to Outflow
n	**159**	**103**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**98.9**	**49.0**	**-50.46%**
Standard Deviation	**80.5**	**55.1**	---
Coefficient of Variation	**0.81**	**1.12**	---
Lower 95% Confidence Limit about Mean	**86.3**	**38.3**	---
Upper 95% Confidence Limit about Mean	**111.4**	**59.6**	---
Lower Quartile (25th percentile)	**45.0**	**18.0**	**-60.00%**
Median (50th percentile)	**76.0**	**31.0**	**-59.21%**
Upper Quartile (75th percentile)	**130**	**54**	**-58.46%**
Inter Quartile Range	**85**	**36**	---
Minimum Detected Value	**2**	**1**	---
Maximum Detected Value	**474**	**330**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 4.290 + 0.842*z	ln(y) = 3.472 + 0.948*z	---
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

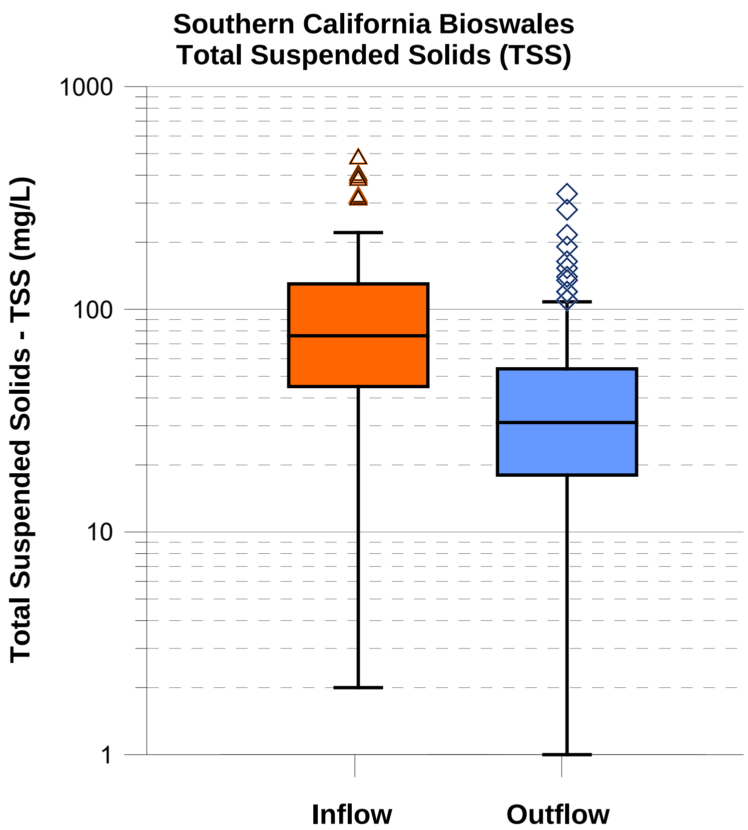

Table N-7 Bioswales – Fecal Coliform

Run ID	Fecal Coliform, Inflow (#/100mL)	Fecal Coliform, Outflow (#/100mL)	Change, Fecal Coliform, Inflow to Outflow
n	**33**	**19**	---
Percent detected	**97.0%**	**100.0%**	---
Mean	12725	**10982**	**-13.70%**
Standard Deviation	22363	**49927**	---
Coefficient of Variation	1.76	**4.55**	---
Lower 95% Confidence Limit about Mean	5095	**-11468**	---
Upper 95% Confidence Limit about Mean	20355	**33432**	---
Lower Quartile (25th percentile)	**500**	**130**	**-74.00%**
Median (50th percentile)	**5000**	**900**	**-82.00%**
Upper Quartile (75th percentile)	**16500**	**5000**	**-69.70%**
Inter Quartile Range	**16000**	**4870**	---
Minimum Detected Value	**17**	**17**	---
Maximum Detected Value	**90000**	**160000**	---
Minimum Reporting Limit	**1**	---	---
Maximum Reporting Limit	**1**	---	---
Regression Equation	ln(y) = 7.667 + 2.695*z	ln(y) = 6.585 + 2.773*z	---
Note:	3	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

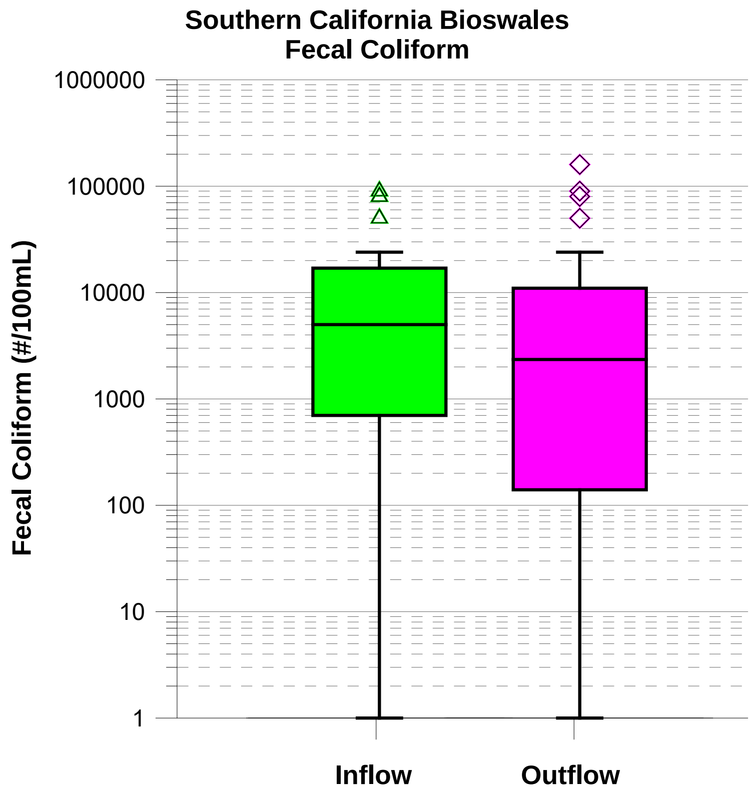

Table N-8 Bioswales – Copper

Run ID	Total Copper, Inflow (ug/L)	Total Copper, Outflow (ug/L)	Change, Total Copper, Inflow to Outflow
n	**150**	**100**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**49.82**	**15.43**	**-69.02%**
Standard Deviation	**37.27**	**11.07**	**---**
Coefficient of Variation	**0.75**	**0.72**	**---**
Lower 95% Confidence Limit about Mean	**43.86**	**13.26**	**---**
Upper 95% Confidence Limit about Mean	**55.79**	**17.60**	**---**
Lower Quartile (25th percentile)	**22.00**	**8.23**	**-62.61%**
Median (50th percentile)	**41.00**	**13.00**	**-68.29%**
Upper Quartile (75th percentile)	**70.50**	**19.90**	**-71.77%**
Inter Quartile Range	**48.50**	**11.68**	**---**
Minimum Detected Value	**1.1**	**1**	**---**
Maximum Detected Value	**232**	**73**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 3.593 + 0.894*z	ln(y) = 2.484 + 0.786*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

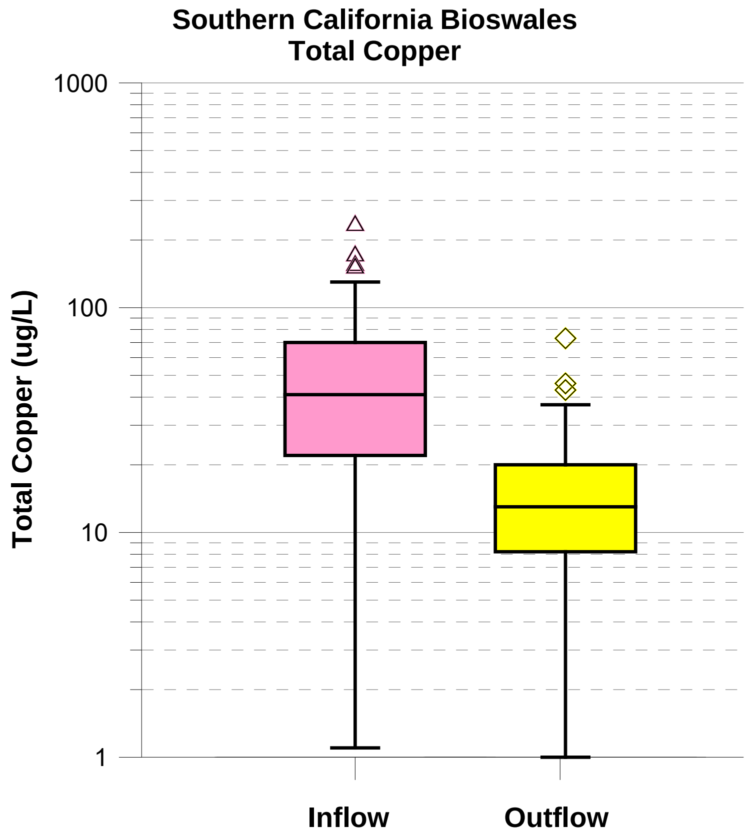

Table N-9 Bioswales – Lead			
Run ID	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**
n	**150**	**100**	**---**
Percent detected	**98.7%**	**99.0%**	**---**
Mean	73.08	17.93	**-75.46%**
Standard Deviation	213	27.42	**---**
Coefficient of Variation	2.91	1.53	**---**
Lower 95% Confidence Limit about Mean	39.00	12.56	**---**
Upper 95% Confidence Limit about Mean	107	23.31	**---**
Lower Quartile (25th percentile)	13.92	**3.53**	**-74.67%**
Median (50th percentile)	32.89	**7.55**	**-77.05%**
Upper Quartile (75th percentile)	77.75	**21.50**	**-72.35%**
Inter Quartile Range	63.83	**17.98**	**---**
Minimum Detected Value	**1.3**	**1**	**---**
Maximum Detected Value	**2086**	**189**	**---**
Minimum Reporting Limit	**0.7**	**0.03**	**---**
Maximum Reporting Limit	**0.8**	**0.03**	**---**
Regression Equation	ln(y) = 3.493 + 1.275*z	ln(y) = 2.161 + 1.240*z	**---**
Note:	3	3	2

Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

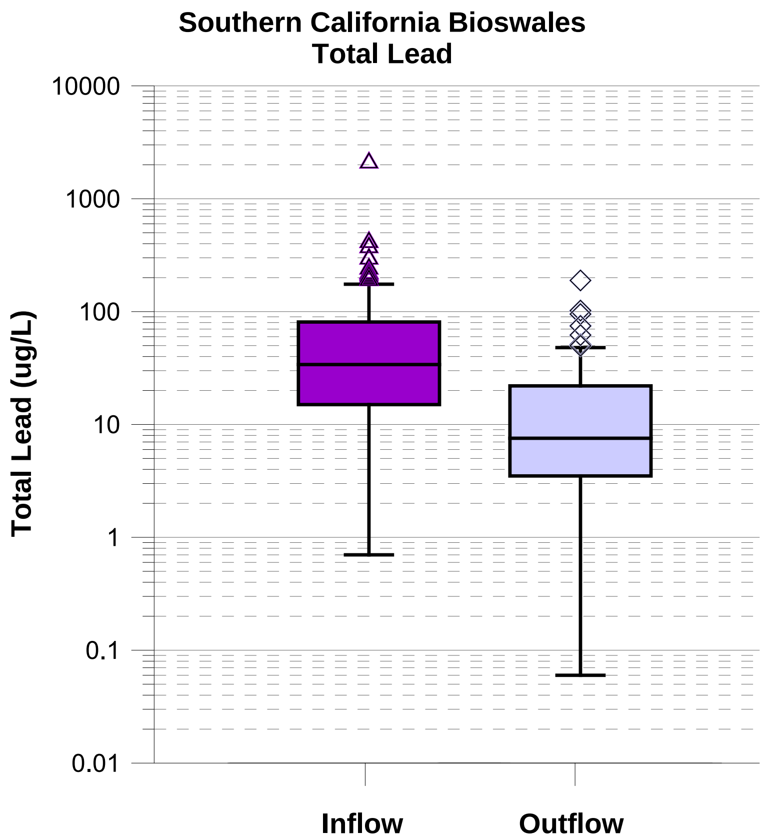

Table N-10 Bioswales – Zinc				
Run ID	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**150**	**100**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**275**	**71.4**	**-74.08%**
Standard Deviation	**225**	**78.7**	**---**
Coefficient of Variation	**0.82**	**1.10**	**---**
Lower 95% Confidence Limit about Mean	**239**	**56.0**	**---**
Upper 95% Confidence Limit about Mean	**311**	**86.8**	**---**
Lower Quartile (25th percentile)	**110**	**29.5**	**-73.20%**
Median (50th percentile)	**228**	**55.5**	**-75.66%**
Upper Quartile (75th percentile)	**360**	**82.5**	**-77.09%**
Inter Quartile Range	**250**	**53.0**	**---**
Minimum Detected Value	**13**	**4.2**	**---**
Maximum Detected Value	**1542**	**501**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 5.297 + 0.877*z	ln(y) = 3.932 + 0.819*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

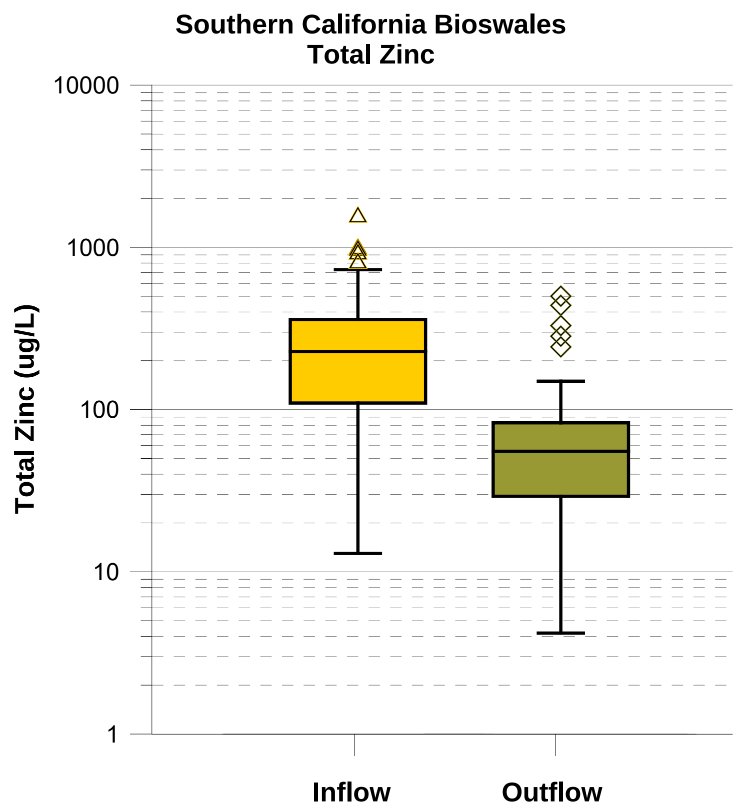

Table N-11 Flow Through BMPs – TSS

Run ID	Total suspended solids, Inflow (mg/L)	Total suspended solids, Outflow (mg/L)	Change, Total suspended solids, Inflow to Outflow
n	**230**	**218**	**---**
Percent detected	**98.3%**	**88.1%**	**---**
Mean	65.6	23.0	**-65.0%**
Standard Deviation	80.9	42.0	**---**
Coefficient of Variation	1.23	1.83	**---**
Lower 95% Confidence Limit about Mean	55.1	17.4	**---**
Upper 95% Confidence Limit about Mean	76.1	28.6	**---**
Lower Quartile (25th percentile)	**8.875**	**2.875**	**-67.61%**
Median (50th percentile)	**39.5**	**7.00**	**-82.28%**
Upper Quartile (75th percentile)	**89.25**	**22.25**	**-75.07%**
Inter Quartile Range	**80.375**	**19.375**	**---**
Minimum Detected Value	**2**	**1**	**---**
Maximum Detected Value	**629**	**280**	**---**
Minimum Reporting Limit	**1**	**1**	**---**
Maximum Reporting Limit	**1**	**1**	**---**
Regression Equation	ln(y) = 3.419 + 1.425*z	ln(y) = 1.959 + 1.657*z	**---**
Note:	3	3	2

Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

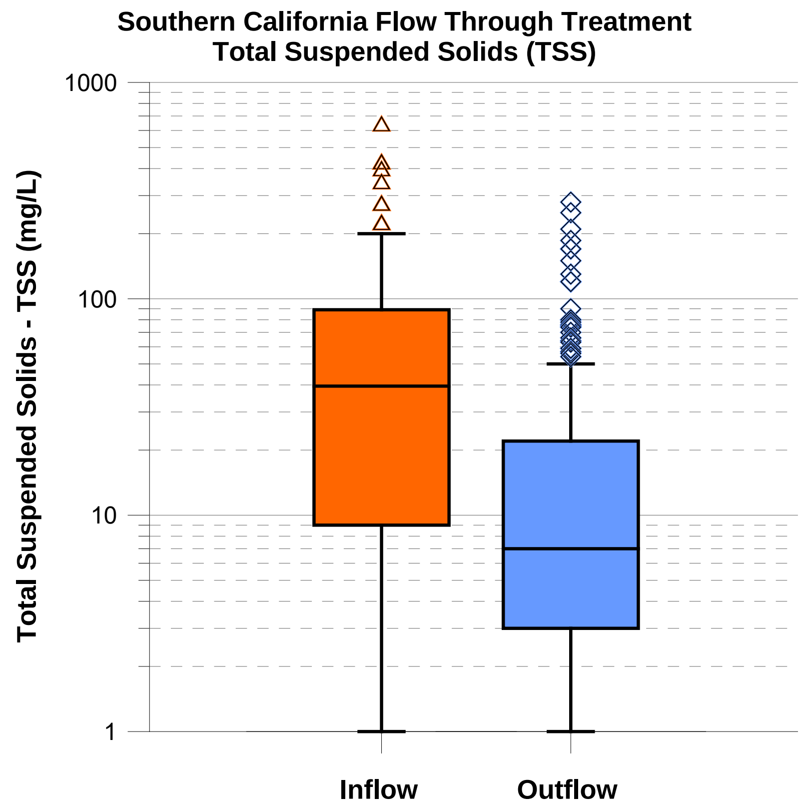

Table N-12 Flow Through BMPs – Fecal Coliform

Run ID	Fecal Coliform, Inflow (#/100mL)	Fecal Coliform, Outflow (#/100mL)	Change, Fecal Coliform, Inflow to Outflow
n	**172**	**152**	---
Percent detected	**100.0%**	**73.7%**	---
Mean	**6450**	4750	**-26.36%**
Standard Deviation	**19225**	21431	---
Coefficient of Variation	**2.98**	4.51	---
Lower 95% Confidence Limit about Mean	**3577**	1343	---
Upper 95% Confidence Limit about Mean	**9324**	8157	---
Lower Quartile (25th percentile)	**300**	7.47	**-97.51%**
Median (50th percentile)	**900**	77.1	**-91.43%**
Upper Quartile (75th percentile)	**3000**	797	**-73.44%**
Inter Quartile Range	**2700**	789	---
Minimum Detected Value	**8**	**2**	---
Maximum Detected Value	**160000**	**160000**	---
Minimum Reporting Limit	---	**2**	---
Maximum Reporting Limit	---	**10**	---
Regression Equation	ln(y) = 6.984 + 1.871*z	ln(y) = 4.345 + 3.463*z	---
Note:	1	3	---

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

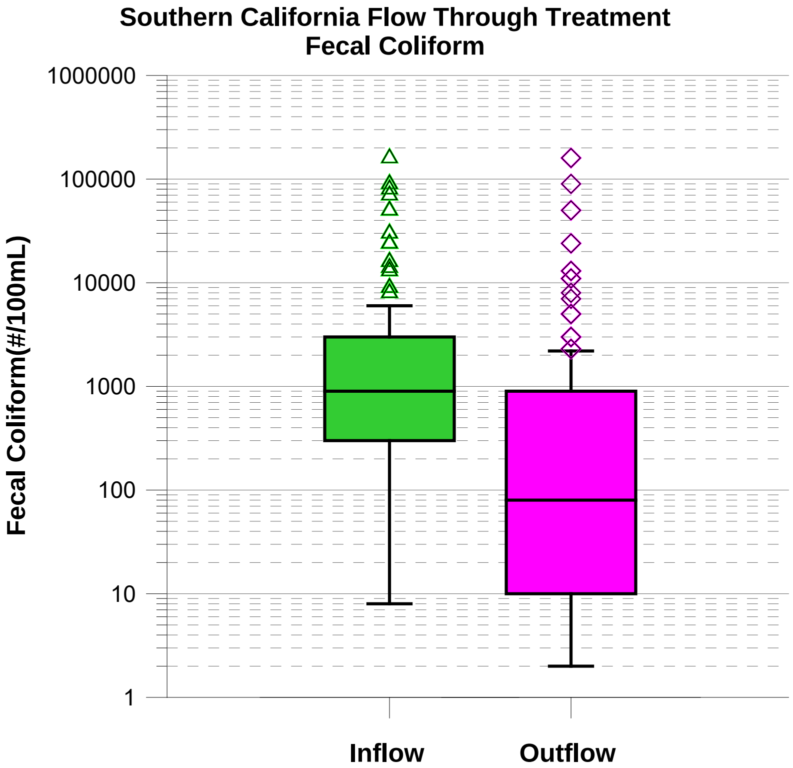

Table N-13 Flow Through BMPs – Copper

Run ID	Total Copper, Inflow (ug/L)	Total Copper, Outflow (ug/L)	Change, Total Copper, Inflow to Outflow
n	**150**	**146**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**41.89**	**18.84**	**-55.03%**
Standard Deviation	**144**	**21.81**	**---**
Coefficient of Variation	**3.43**	**1.16**	**---**
Lower 95% Confidence Limit about Mean	**18.89**	**15.30**	**---**
Upper 95% Confidence Limit about Mean	**64.88**	**22.38**	**---**
Lower Quartile (25th percentile)	**11.98**	**6.20**	**-48.27%**
Median (50th percentile)	**18.00**	**11.00**	**-38.89%**
Upper Quartile (75th percentile)	**33.00**	**21.25**	**-35.61%**
Inter Quartile Range	**21.03**	**15.06**	**---**
Minimum Detected Value	**2.7**	**1.56**	**---**
Maximum Detected Value	**1400**	**150**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 3.040 + 0.943*z	ln(y) = 2.477 + 0.965*z	**---**
Note:	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

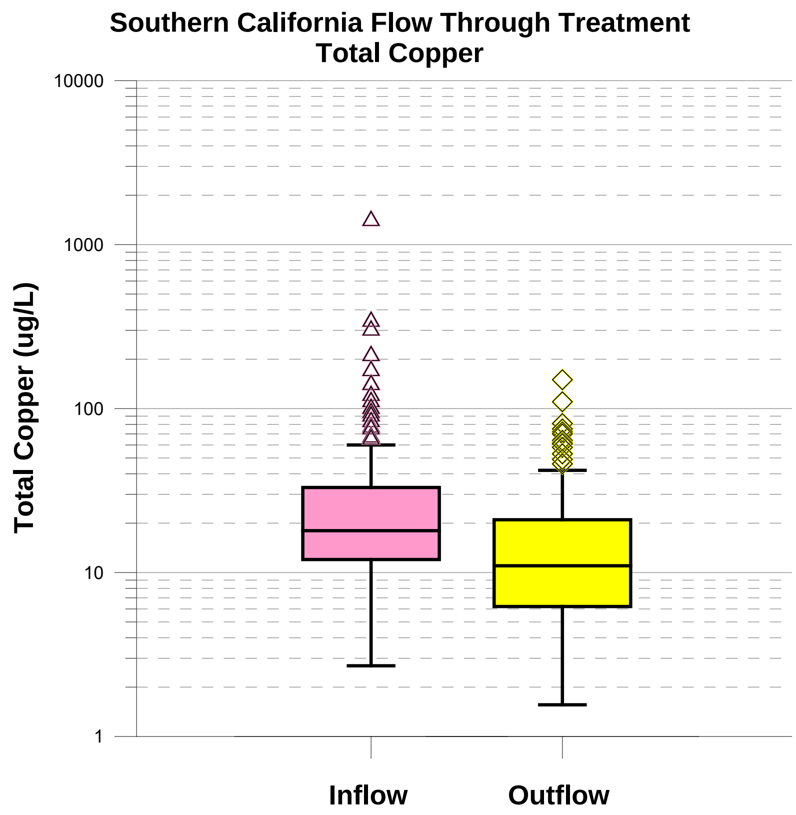

Table N-14 Flow Through BMPs – Lead			
Run ID	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**
n	**149**	**146**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**20.70**	**7.51**	**-63.71%**
Standard Deviation	**23.57**	**13.49**	**---**
Coefficient of Variation	**1.14**	**1.80**	**---**
Lower 95% Confidence Limit about Mean	**16.92**	**5.32**	**---**
Upper 95% Confidence Limit about Mean	**24.49**	**9.70**	**---**
Lower Quartile (25th percentile)	**6.50**	**1.00**	**-84.62%**
Median (50th percentile)	**13.00**	**3.10**	**-76.15%**
Upper Quartile (75th percentile)	**25.50**	**7.10**	**-72.16%**
Inter Quartile Range	**19.00**	**6.10**	**---**
Minimum Detected Value	**1**	**1**	**---**
Maximum Detected Value	**140**	**110**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 2.558 + 1.032*z	ln(y) = 1.253 + 1.128*z	**---**
Note:	1	1	**2**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

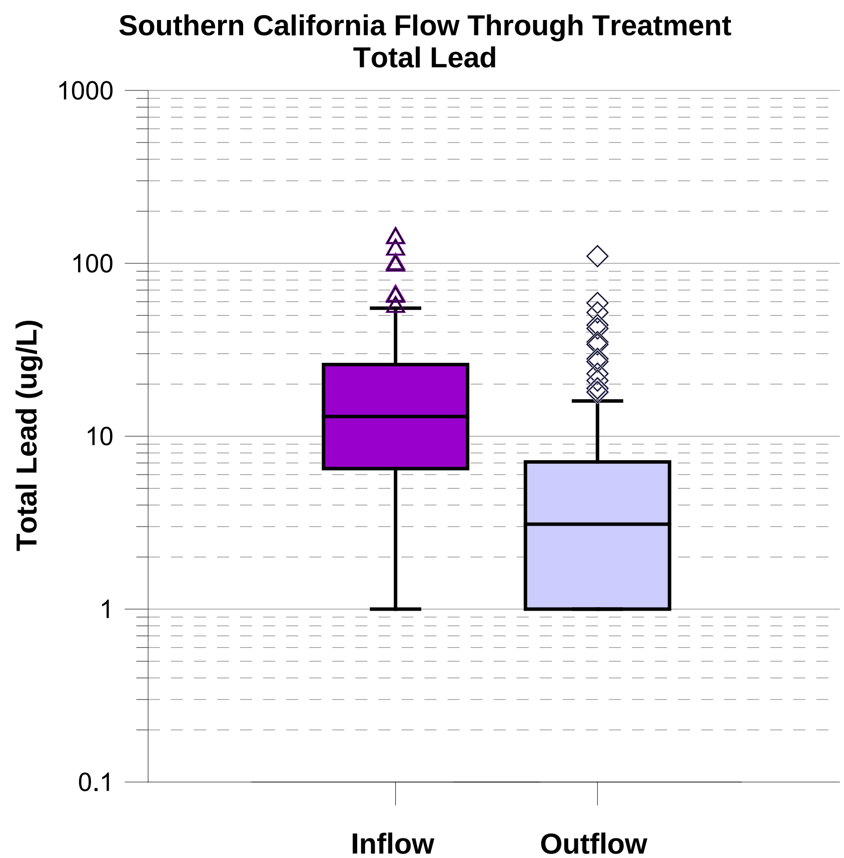

Table N-15 Flow Through BMPs – Zinc

Run ID	Total Zinc, Inflow (ug/L)	Total Zinc, Outflow (ug/L)	Change, Total Zinc, Inflow to Outflow
n	**150**	**146**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**311**	**117**	**-62.40%**
Standard Deviation	**309**	**183**	---
Coefficient of Variation	**0.99**	**1.57**	---
Lower 95% Confidence Limit about Mean	**262**	**87.3**	---
Upper 95% Confidence Limit about Mean	**361**	**147**	---
Lower Quartile (25th percentile)	**110**	**23.00**	**-79.09%**
Median (50th percentile)	**221**	**55.5**	**-74.89%**
Upper Quartile (75th percentile)	**400**	**131**	**-67.31%**
Inter Quartile Range	**290**	**108**	---
Minimum Detected Value	**15**	**1**	---
Maximum Detected Value	**1900**	**1400**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 5.361 + 0.903*z	ln(y) = 3.976 + 1.350*z	---
Note:	1	1	**2**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

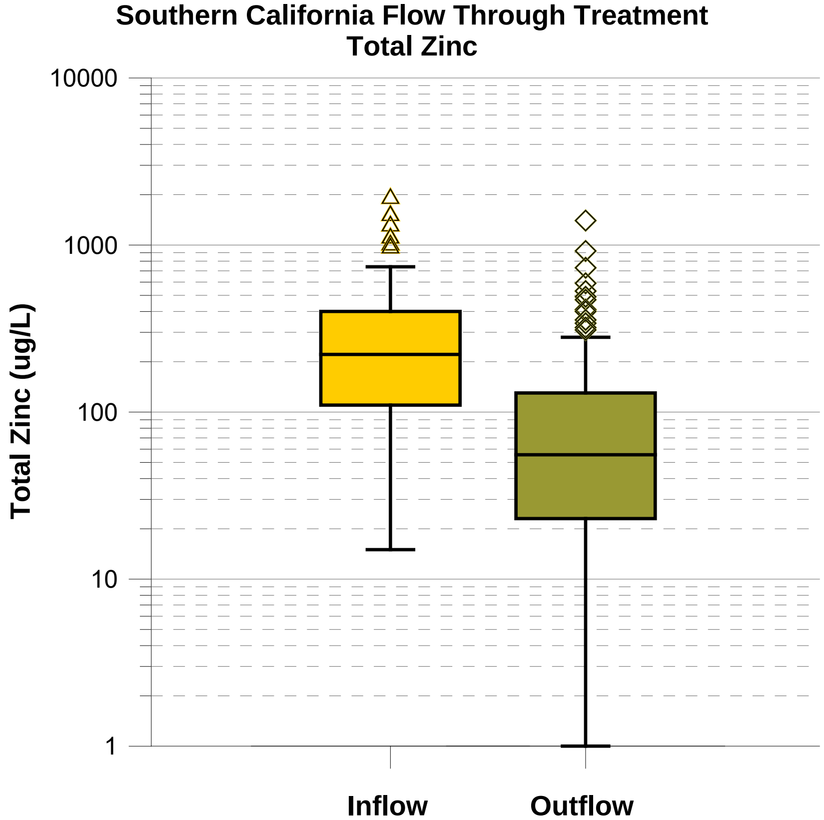

Table N-16 Catch Basin Inserts –TSS	
Run ID	**Total suspended solids, Outflow (mg/L)**
n	**88**
Percent detected	**100.0%**
Mean	**52.9**
Standard Deviation	**55.7**
Coefficient of Variation	**1.05**
Lower 95% Confidence Limit about Mean	**41.3**
Upper 95% Confidence Limit about Mean	**64.6**
Lower Quartile (25th percentile)	**20**
Median (50th percentile)	**37.5**
Upper Quartile (75th percentile)	**71**
Inter Quartile Range	**51**
Minimum Detected Value	**4**
Maximum Detected Value	**320**
Minimum Reporting Limit	**---**
Maximum Reporting Limit	**---**
Regression Equation	ln(y) = 3.552 + 0.972*z
Note:	1

Note 1: All data reported as detected. Bolded values are exact calculations.

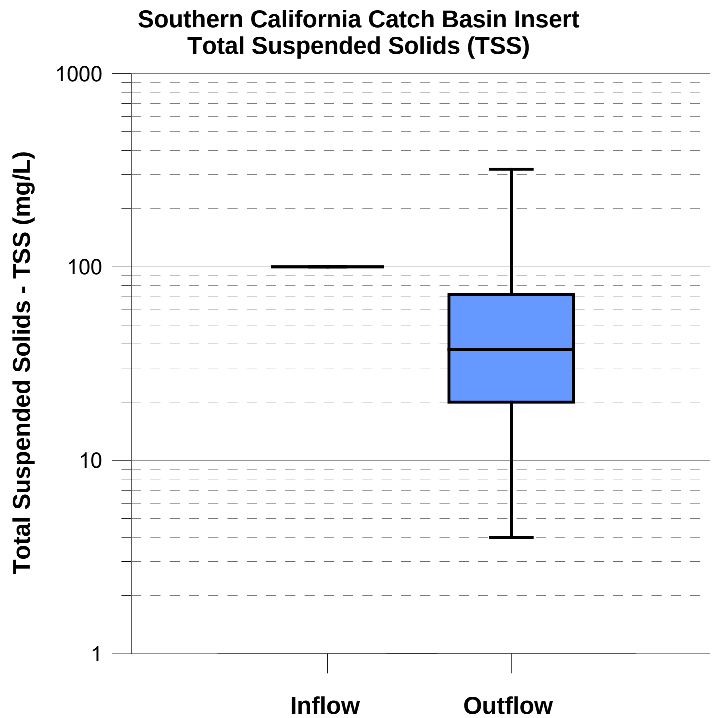

Table N-17 Catch Basin Inserts – Copper	
Run ID	**Total Copper, Outflow (ug/L)**
n	**88**
Percent detected	**100.0%**
Mean	**16.80**
Standard Deviation	**16.57**
Coefficient of Variation	**0.99**
Lower 95% Confidence Limit about Mean	**13.34**
Upper 95% Confidence Limit about Mean	**20.27**
Lower Quartile (25th percentile)	**5.95**
Median (50th percentile)	**13**
Upper Quartile (75th percentile)	**22**
Inter Quartile Range	**16.05**
Minimum Detected Value	**1.2**
Maximum Detected Value	**90**
Minimum Reporting Limit	
Maximum Reporting Limit	
Regression Equation	ln(y) = 2.387 + 1.041*z
Note:	1

Note 1: All data reported as detected. Bolded values are exact calculations.

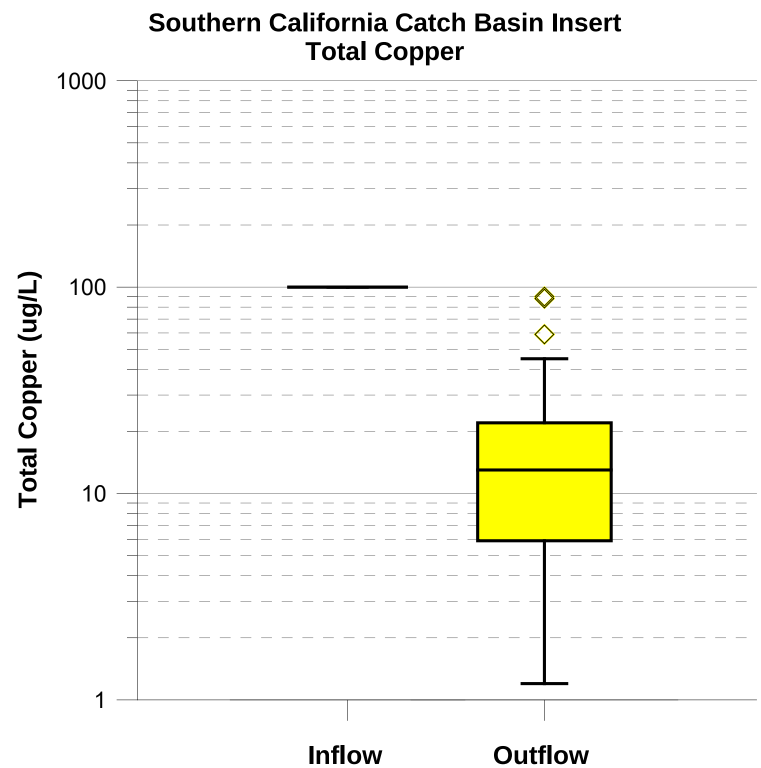

Table N-18 Catch Basin Inserts – Lead	
Run ID	**Total Lead, Outflow (ug/L)**
n	**88**
Percent detected	**100.0%**
Mean	**12.45**
Standard Deviation	**19.61**
Coefficient of Variation	**1.58**
Lower 95% Confidence Limit about Mean	**8.35**
Upper 95% Confidence Limit about Mean	**16.54**
Lower Quartile (25th percentile)	**2.3**
Median (50th percentile)	**6**
Upper Quartile (75th percentile)	**12.45**
Inter Quartile Range	**10.15**
Minimum Detected Value	**1**
Maximum Detected Value	**110**
Minimum Reporting Limit	
Maximum Reporting Limit	
Regression Equation	ln(y) = 1.798 + 1.223*z
Note:	1

Note 1: All data reported as detected. Bolded values are exact calculations.

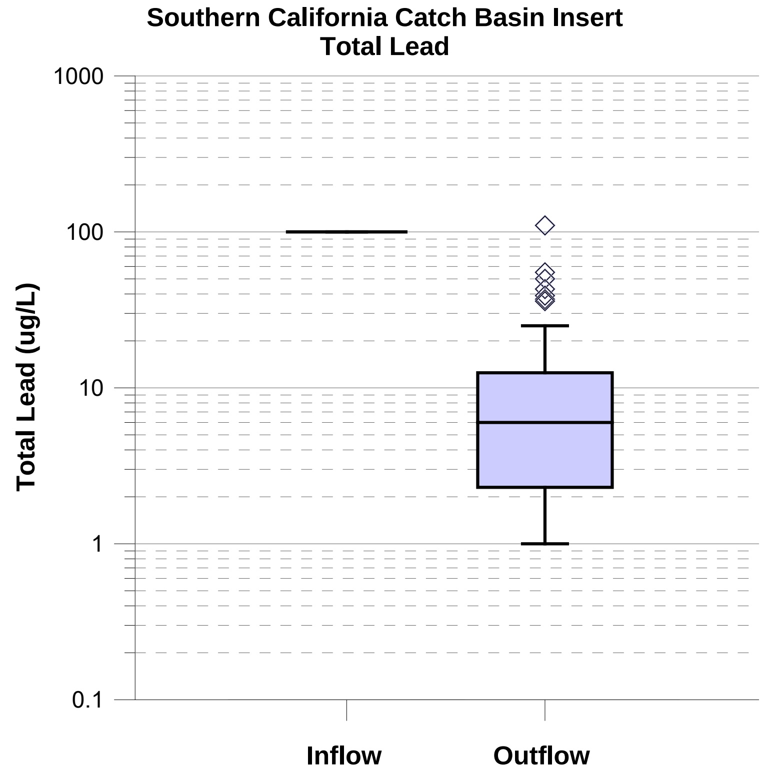

Table N-19 Catch Basin Inserts – Zinc	
Run ID	**Total Zinc, Outflow (ug/L)**
n	**88**
Percent detected	**100.0%**
Mean	**173**
Standard Deviation	**215**
Coefficient of Variation	**1.24**
Lower 95% Confidence Limit about Mean	**128**
Upper 95% Confidence Limit about Mean	**218**
Lower Quartile (25th percentile)	**50.5**
Median (50th percentile)	**107**
Upper Quartile (75th percentile)	**220**
Inter Quartile Range	**169**
Minimum Detected Value	**9.4**
Maximum Detected Value	**1250**
Minimum Reporting Limit	
Maximum Reporting Limit	
Regression Equation	ln(y) = 4.582 + 1.162*z
Note:	1

Note 1: All data reported as detected. Bolded values are exact calculations.

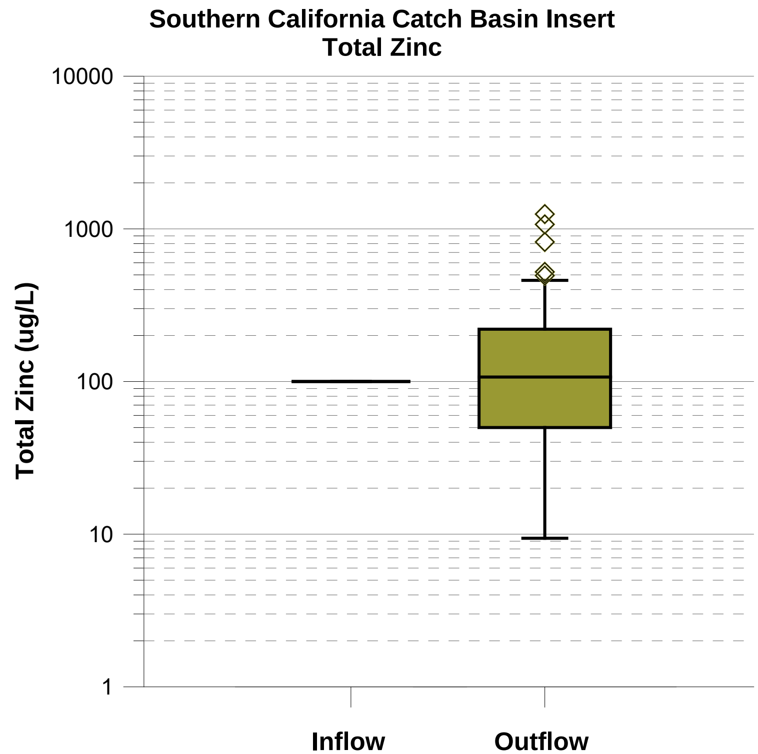

Table N-20 Constructed Wetlands – TSS

Run ID	Total suspended solids, Inflow (mg/L)	Total suspended solids, Outflow (mg/L)	Change, Total suspended solids, Inflow to Outflow
n	**13**	**14**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**203**	**11.1**	**-94.55%**
Standard Deviation	**88**	**8.9**	---
Coefficient of Variation	**0.43**	**0.81**	---
Lower 95% Confidence Limit about Mean	**155**	**6.38**	---
Upper 95% Confidence Limit about Mean	**251**	**15.7**	---
Lower Quartile (25th percentile)	**140**	**3.50**	**-97.50%**
Median (50th percentile)	**230**	**11.0**	**-95.22%**
Upper Quartile (75th percentile)	**255**	**13.5**	**-94.71%**
Inter Quartile Range	**115**	**10.0**	---
Minimum Detected Value	**60**	**1.00**	---
Maximum Detected Value	**350**	**28**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 5.197 + 0.595*z	ln(y) = 2.014 + 1.142*z	---
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

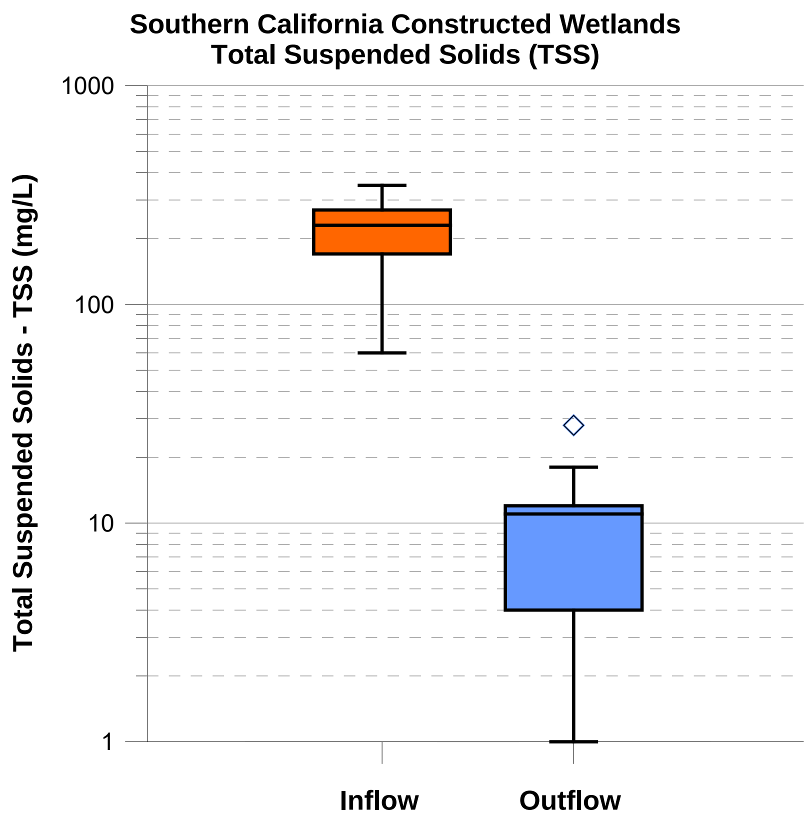

Table N-21 Constructed Wetlands – Fecal Coliform

Run ID	Fecal Coliform, Inflow (#/100mL)	Fecal Coliform, Outflow (#/100mL)	Change, Fecal Coliform, Inflow to Outflow
n	**13**	**14**	**---**
Percent detected	**92.3%**	**100.0%**	**---**
Mean	5407	**295**	**-94.54%**
Standard Deviation	18323	**795**	**---**
Coefficient of Variation	3.39	**2.69**	**---**
Lower 95% Confidence Limit about Mean	-4554	**-121**	**---**
Upper 95% Confidence Limit about Mean	15368	**712**	**---**
Lower Quartile (25th percentile)	**230**	**20.0**	**-91.30%**
Median (50th percentile)	**1300**	**95.0**	**-92.69%**
Upper Quartile (75th percentile)	**3800**	**255**	**-93.29%**
Inter Quartile Range	**3570**	**235**	**---**
Minimum Detected Value	**20**	**8**	**---**
Maximum Detected Value	**50000**	**2400**	**---**
Minimum Reporting Limit	**10**		**---**
Maximum Reporting Limit	**10**		**---**
Regression Equation	ln(y) = 6.794 + 2.447*z	ln(y) = 4.484 + 1.786*z	**---**
Note:	3	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

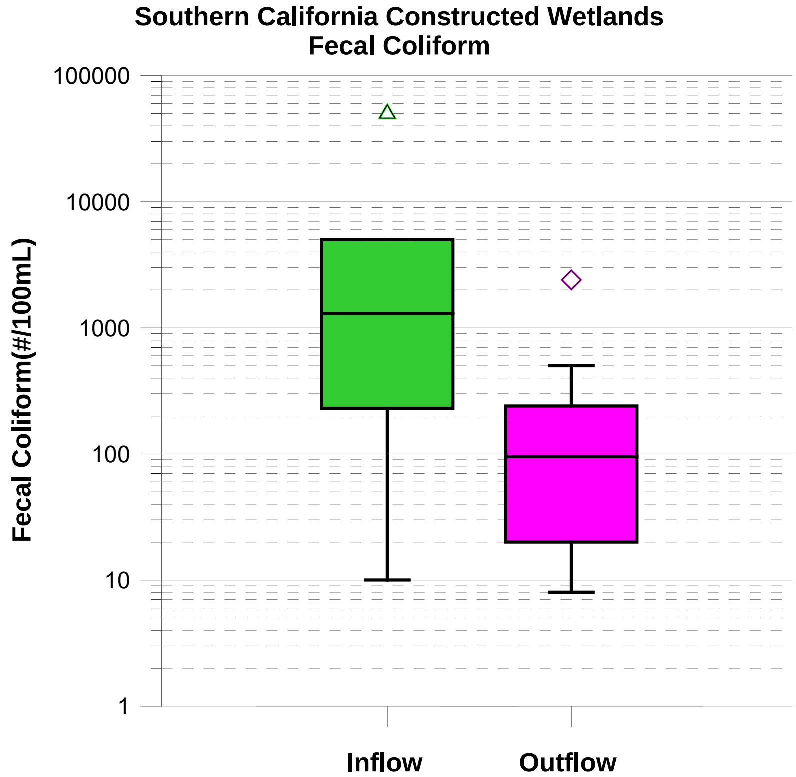

Table N-22 Constructed Wetlands – Total Copper			
Run ID	**Total Copper, Inflow (ug/L)**	**Total Copper, Outflow (ug/L)**	**Change, Total Copper, Inflow to Outflow**
n	**21**	**22**	**---**
Percent detected	**90.5%**	**95.5%**	**---**
Mean	543.94	10.78	**-98.02%**
Standard Deviation	2890.84	7.17	**---**
Coefficient of Variation	5.31	0.66	**---**
Lower 95% Confidence Limit about Mean	-692.50	7.79	**---**
Upper 95% Confidence Limit about Mean	1780.37	13.78	**---**
Lower Quartile (25th percentile)	**11.15**	**5.55**	**-50.22%**
Median (50th percentile)	**62.00**	**8.80**	**-85.81%**
Upper Quartile (75th percentile)	**110.00**	**14.75**	**-86.59%**
Inter Quartile Range	**98.85**	**9.20**	**---**
Minimum Detected Value	**3.23**	**3.4**	**---**
Maximum Detected Value	**9500**	**31**	**---**
Minimum Reporting Limit	**0.25**	**0.25**	**---**
Maximum Reporting Limit	**0.25**	**0.25**	**---**
Regression Equation	ln(y) = 3.738 + 2.215*z	ln(y) = 2.185 + 0.717*z	**---**
Note:	3	3	**---**

Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

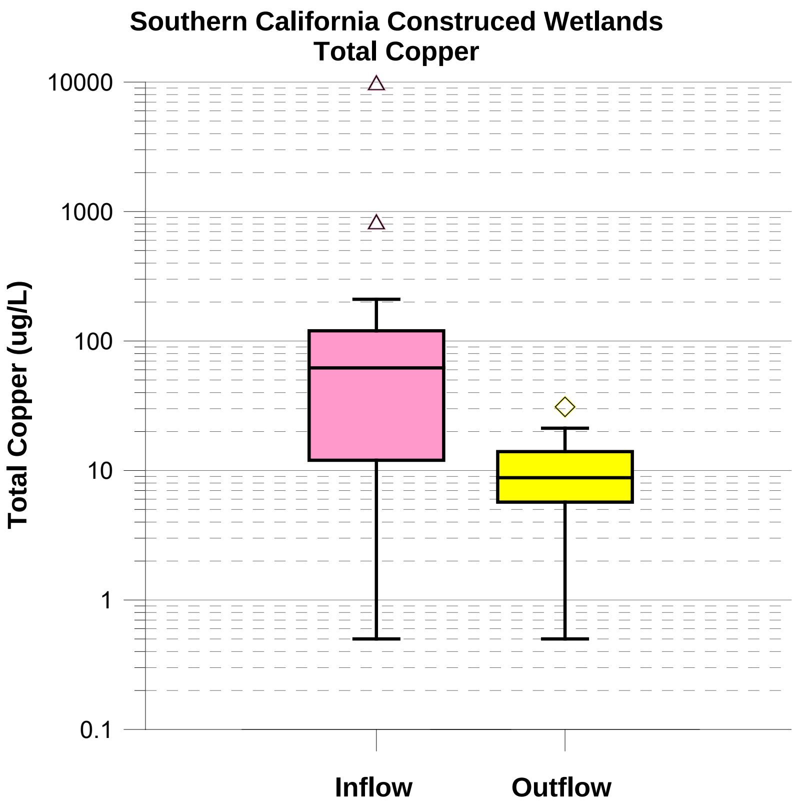

Table N-23 Constructed Wetlands – Total Lead			
Run ID	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**
n	**21**	**22**	**---**
Percent detected	**90.5%**	**95.5%**	**---**
Mean	277.65	5.23	**-98.11%**
Standard Deviation	593.03	3.50	**---**
Coefficient of Variation	2.14	0.67	**---**
Lower 95% Confidence Limit about Mean	24.01	3.77	**---**
Upper 95% Confidence Limit about Mean	531.30	6.69	**---**
Lower Quartile (25th percentile)	**3.32**	**2.70**	**-18.55%**
Median (50th percentile)	**170.00**	**4.40**	**-97.41%**
Upper Quartile (75th percentile)	**315.00**	**8.32**	**-97.36%**
Inter Quartile Range	**311.69**	**5.62**	**---**
Minimum Detected Value	**1.25**	**1**	**---**
Maximum Detected Value	**2300**	**14**	**---**
Minimum Reporting Limit	**0.25**	**0.25**	**---**
Maximum Reporting Limit	**0.25**	**0.25**	**---**
Regression Equation	ln(y) = 3.918 + 2.654*z	ln(y) = 1.426 + 0.804*z	**---**
Note:	3	3	---

Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

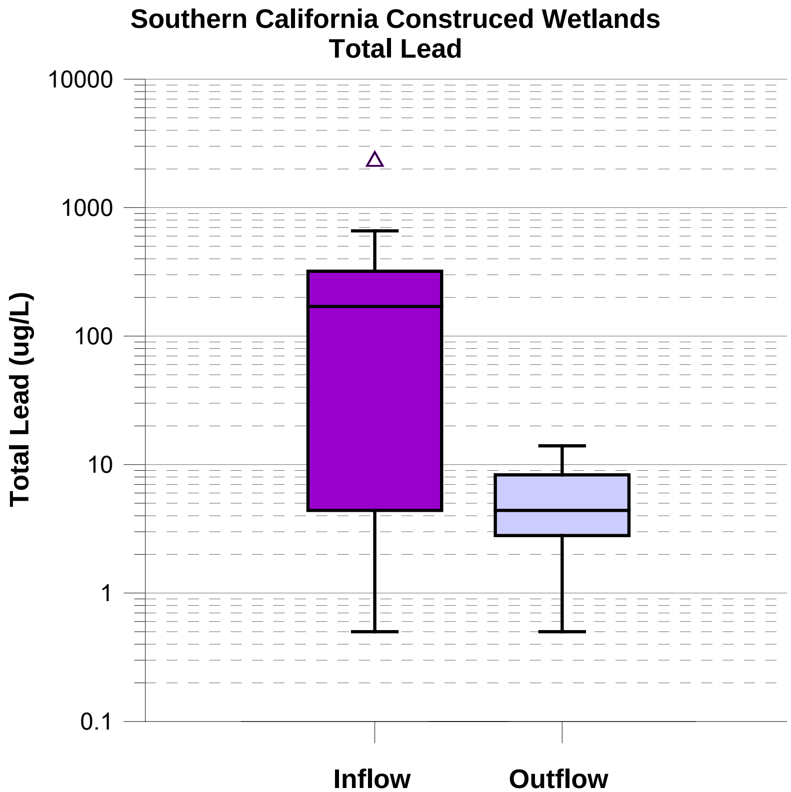

Table N-24 Constructed Wetlands – Total Zinc			
Run ID	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**21**	**22**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**363.79**	**56.46**	**-84.48%**
Standard Deviation	**483.79**	**43.15**	**---**
Coefficient of Variation	**1.33**	**0.76**	**---**
Lower 95% Confidence Limit about Mean	**156.87**	**38.43**	**---**
Upper 95% Confidence Limit about Mean	**570.71**	**74.50**	**---**
Lower Quartile (25th percentile)	**109.00**	**28.53**	**-73.83%**
Median (50th percentile)	**270.00**	**39.00**	**-85.56%**
Upper Quartile (75th percentile)	**450.00**	**84.35**	**-81.26%**
Inter Quartile Range	**341.00**	**55.83**	**---**
Minimum Detected Value	**35.7**	**18**	**---**
Maximum Detected Value	**2000**	**165**	**---**
Minimum Reporting Limit			**---**
Maximum Reporting Limit			**---**
Regression Equation	ln(y) = 5.403 + 1.142*z	ln(y) = 3.812 + 0.702*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

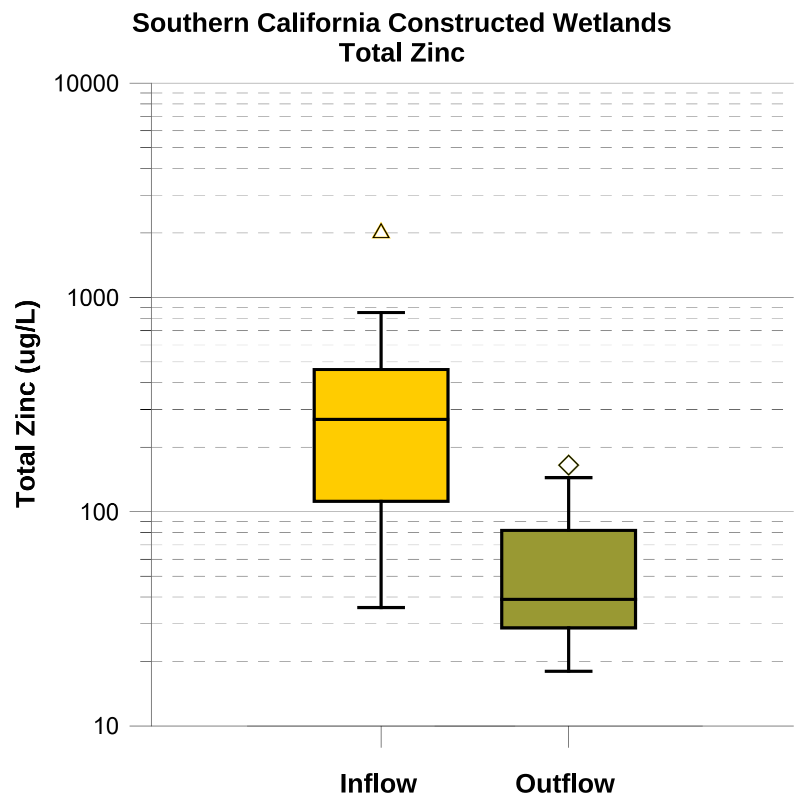

Table N-25 Non-Caltrans Bioswales –TSS

Run ID	Total suspended solids, Inflow (mg/L)	Total suspended solids, Outflow (mg/L)	Change, Total suspended solids, Inflow to Outflow
n	**104**	**71**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**102**	**39.5**	**-61.37%**
Standard Deviation	**85.8**	**35.6**	**---**
Coefficient of Variation	**0.84**	**0.90**	**---**
Lower 95% Confidence Limit about Mean	**85.9**	**31.3**	**---**
Upper 95% Confidence Limit about Mean	**119**	**47.8**	**---**
Lower Quartile (25th percentile)	**47.3**	**18.0**	**-61.90%**
Median (50th percentile)	**72.0**	**30.0**	**-58.33%**
Upper Quartile (75th percentile)	**134**	**50.0**	**-62.76%**
Inter Quartile Range	**87**	**32**	**---**
Minimum Detected Value	**2**	**1**	**---**
Maximum Detected Value	**474**	**191**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 4.319 + 0.853*z	ln(y) = 3.343 + 0.898*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

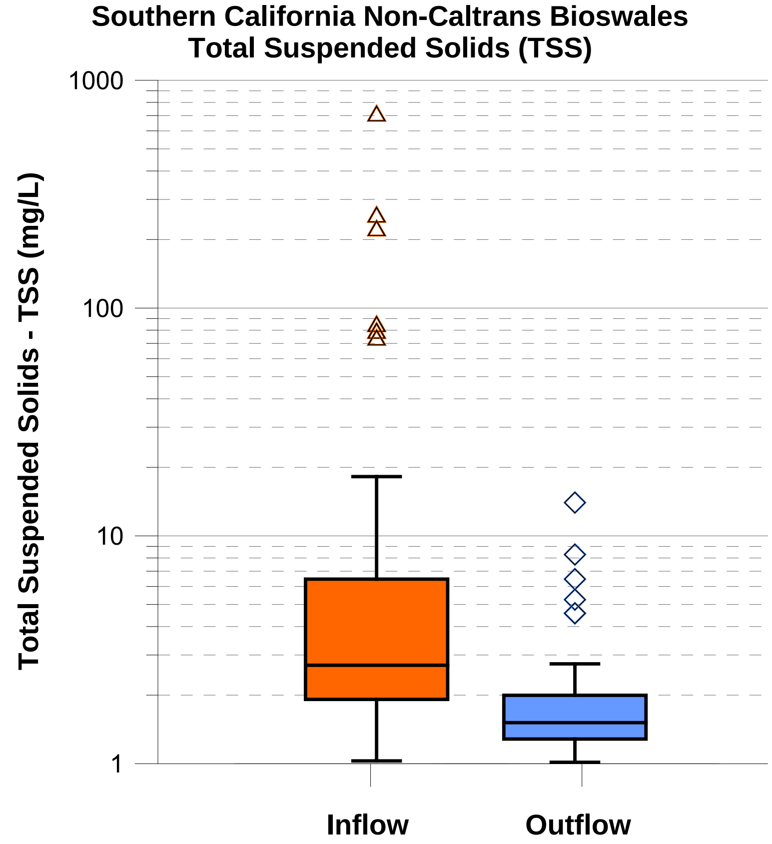

Table N-26 Non-Caltrans Bioswales –Fecal Coliform

Run ID	Fecal Coliform, Inflow (#/100mL)	Fecal Coliform, Outflow (#/100mL)	Change, Fecal Coliform, Inflow to Outflow
n	**33**	**19**	**---**
Percent detected	**97.0%**	**100.0%**	**---**
Mean	12725	**10982**	**-13.70%**
Standard Deviation	22363	**49927**	**---**
Coefficient of Variation	1.76	**4.55**	**---**
Lower 95% Confidence Limit about Mean	5095	**-11468**	**---**
Upper 95% Confidence Limit about Mean	20355	**33432**	**---**
Lower Quartile (25th percentile)	**500**	**130**	**-74.00%**
Median (50th percentile)	**5000**	**900**	**-82.00%**
Upper Quartile (75th percentile)	**16500**	**5000**	**-69.70%**
Inter Quartile Range	**16000**	**4870**	**---**
Minimum Detected Value	**17**	**17**	**---**
Maximum Detected Value	**90000**	**160000**	**---**
Minimum Reporting Limit	**1**	**---**	**---**
Maximum Reporting Limit	**1**	**---**	**---**
Regression Equation	ln(y) = 7.667 + 2.695*z	ln(y) = 6.585 + 2.773*z	**---**
Note:	3	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

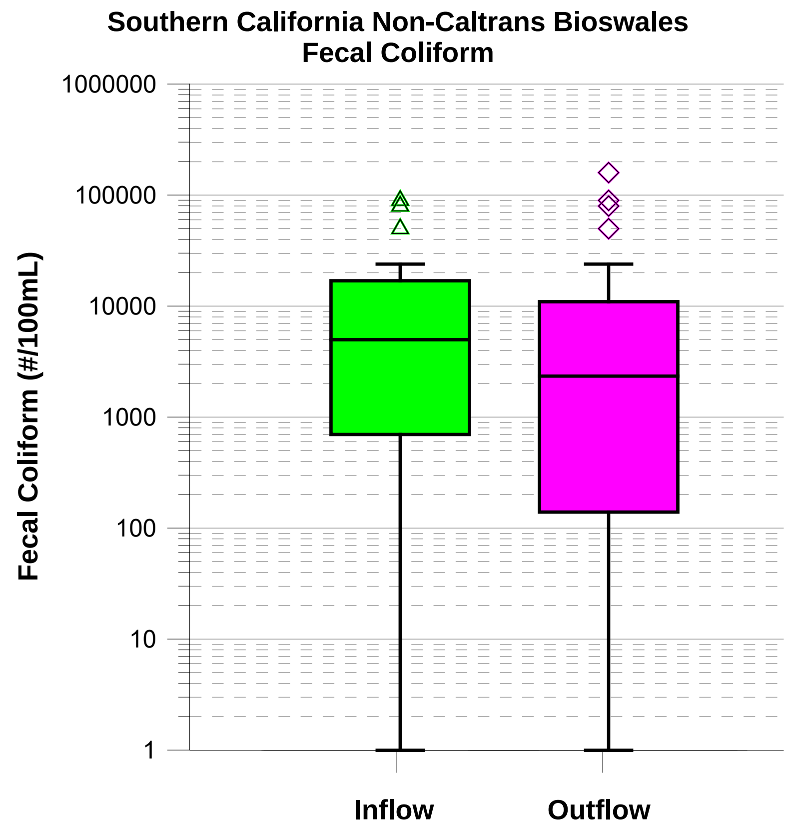

Table N-27 Non-Caltrans Bioswales – Copper

Run ID	Total Copper, Inflow (ug/L)	Total Copper, Outflow (ug/L)	Change, Total Copper, Inflow to Outflow
n	**131**	**99**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**41.20**	**12.20**	**-70.39%**
Standard Deviation	**40.59**	**10.35**	---
Coefficient of Variation	**0.99**	**0.85**	---
Lower 95% Confidence Limit about Mean	**34.25**	**10.16**	---
Upper 95% Confidence Limit about Mean	**48.15**	**14.24**	---
Lower Quartile (25th percentile)	**11.00**	**5.40**	**-50.91%**
Median (50th percentile)	**25.20**	**10.00**	**-60.32%**
Upper Quartile (75th percentile)	**64.0**	**16.0**	**-75.00%**
Inter Quartile Range	**53**	**10.6**	---
Minimum Detected Value	**1.1**	**1**	---
Maximum Detected Value	**232**	**73**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 3.205 + 1.128*z	ln(y) = 2.207 + 0.828*z	---
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

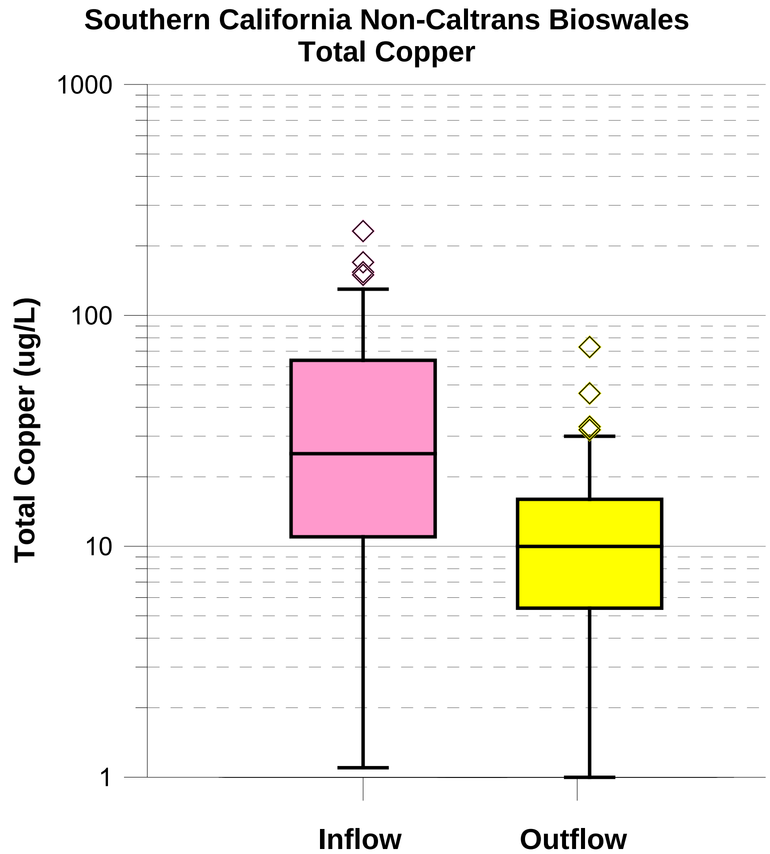

Table N-28 Non-Caltrans Bioswales – Lead

Run ID	Total Lead, Inflow (ug/L)	Total Lead, Outflow (ug/L)	Change, Total Lead, Inflow to Outflow
n	**131**	**99**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**66.47**	**15.88**	**-76.11%**
Standard Deviation	**229**	**26.28**	---
Coefficient of Variation	**3.45**	**1.65**	---
Lower 95% Confidence Limit about Mean	**27.20**	**10.70**	---
Upper 95% Confidence Limit about Mean	**106**	**21.06**	---
Lower Quartile (25th percentile)	**9.67**	**3.60**	**-62.78%**
Median (50th percentile)	**21.85**	**7.06**	**-67.68%**
Upper Quartile (75th percentile)	**73.0**	**18.26**	**-74.99%**
Inter Quartile Range	**63.3**	**14.66**	---
Minimum Detected Value	**0.55585**	**0.755025**	---
Maximum Detected Value	**2086**	**189**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 3.222 + 1.374*z	ln(y) = 2.085 + 1.168*z	---
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

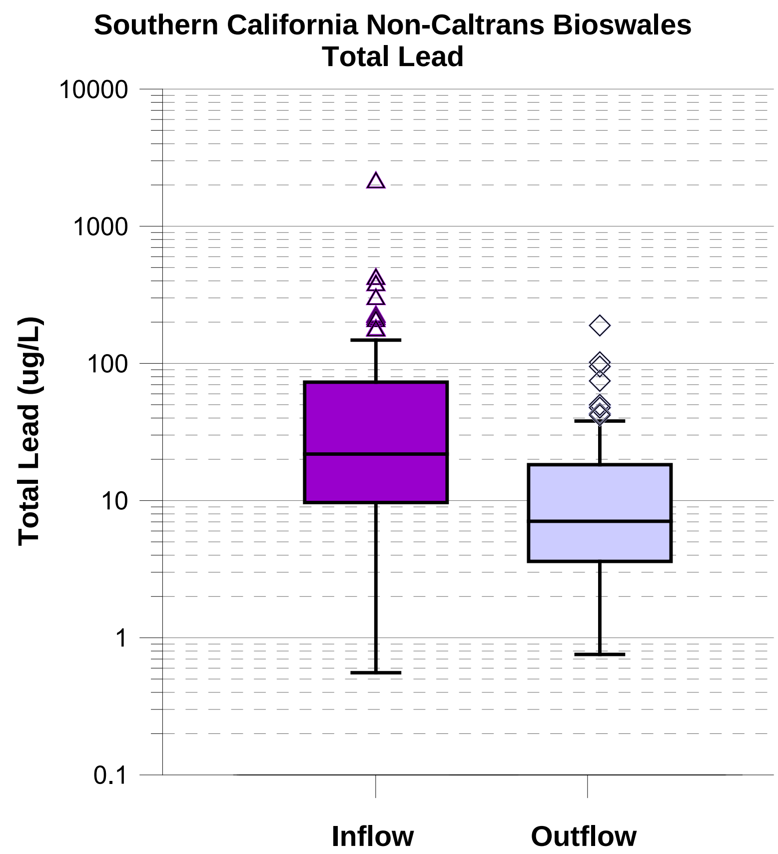

Table N-29 Non-Caltrans Bioswales – Zinc

Run ID	Total Zinc, Inflow (ug/L)	Total Zinc, Outflow (ug/L)	Change, Total Zinc, Inflow to Outflow
n	**131**	**99**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**228**	**65.07**	**-71.42%**
Standard Deviation	**223**	**66.77**	---
Coefficient of Variation	**0.98**	**1.03**	---
Lower 95% Confidence Limit about Mean	**190**	**51.92**	---
Upper 95% Confidence Limit about Mean	**266**	**78.23**	---
Lower Quartile (25th percentile)	**90.00**	**29.00**	**-67.78%**
Median (50th percentile)	**160**	**50.16**	**-68.65%**
Upper Quartile (75th percentile)	**313**	**76**	**-75.72%**
Inter Quartile Range	**223**	**47**	---
Minimum Detected Value	**13**	**4.2**	---
Maximum Detected Value	**1542**	**501**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 5.007 + 0.995*z	ln(y) = 3.866 + 0.811*z	---
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

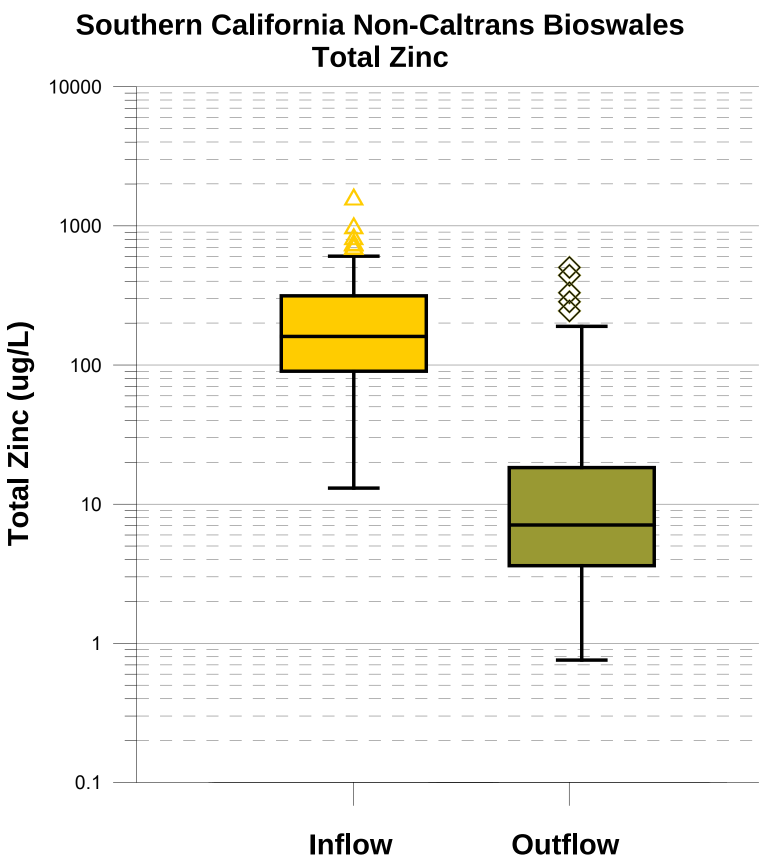

Table N-30 Caltrans Only Bioswales – TSS

Run ID	Total suspended solids, Inflow (mg/L)	Total suspended solids, Outflow (mg/L)	Change, Total suspended solids, Inflow to Outflow
n	**55**	**32**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**92.2**	**69.9**	**-24.21%**
Standard Deviation	**70.8**	**81.0**	---
Coefficient of Variation	**0.77**	**1.16**	---
Lower 95% Confidence Limit about Mean	**73.5**	**41.8**	---
Upper 95% Confidence Limit about Mean	**110.9**	**97.9**	---
Lower Quartile (25th percentile)	**39**	**20.5**	**-47.44%**
Median (50th percentile)	**78**	**38**	**-51.28%**
Upper Quartile (75th percentile)	**124**	**81.75**	**-34.07%**
Inter Quartile Range	**85**	**61.25**	---
Minimum Detected Value	**12**	**7**	---
Maximum Detected Value	**380**	**330**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 4.234 + 0.852*z	ln(y) = 3.758 + 1.056*z	---
Note:	1	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.

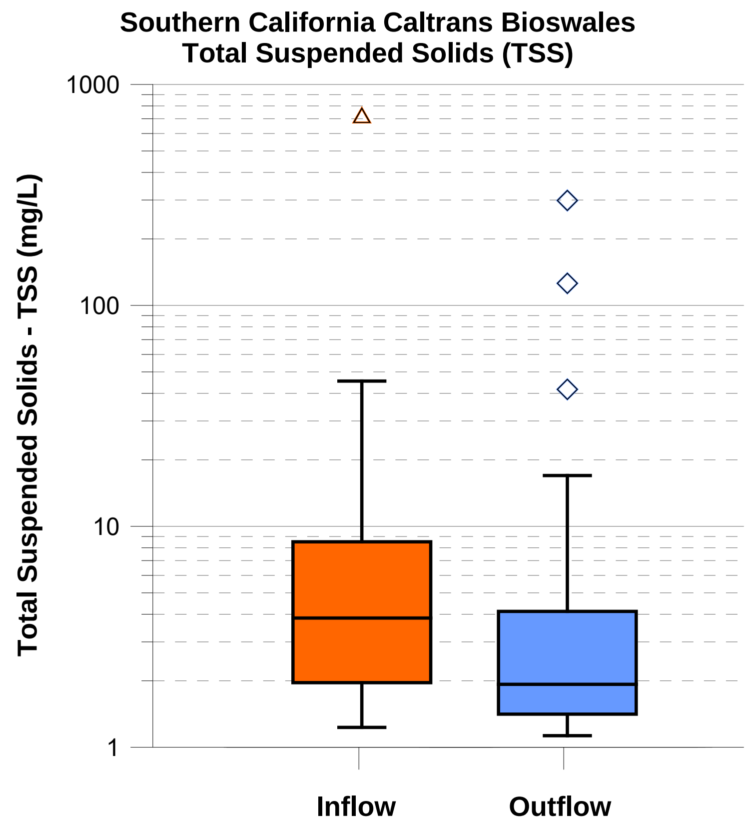

Table N-31 Caltrans Only Bioswales – Copper

Run ID	Total Copper, Inflow (ug/L)	Total Copper, Outflow (ug/L)	Change, Total Copper, Inflow to Outflow
n	**55**	**32**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**44.99**	**18.34**	**-59.24%**
Standard Deviation	**26.58**	**9.99**	---
Coefficient of Variation	**0.59**	**0.55**	---
Lower 95% Confidence Limit about Mean	**37.97**	**14.87**	---
Upper 95% Confidence Limit about Mean	**52.01**	**21.80**	---
Lower Quartile (25th percentile)	**24.00**	**9.95**	**-58.54%**
Median (50th percentile)	**41.00**	**16.00**	**-60.98%**
Upper Quartile (75th percentile)	**60.00**	**26.00**	**-56.67%**
Inter Quartile Range	**36.00**	**16.05**	---
Minimum Detected Value	**10**	**5**	---
Maximum Detected Value	**130**	**43**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 3.617 + 0.683*z	ln(y) = 2.762 + 0.606*z	---
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

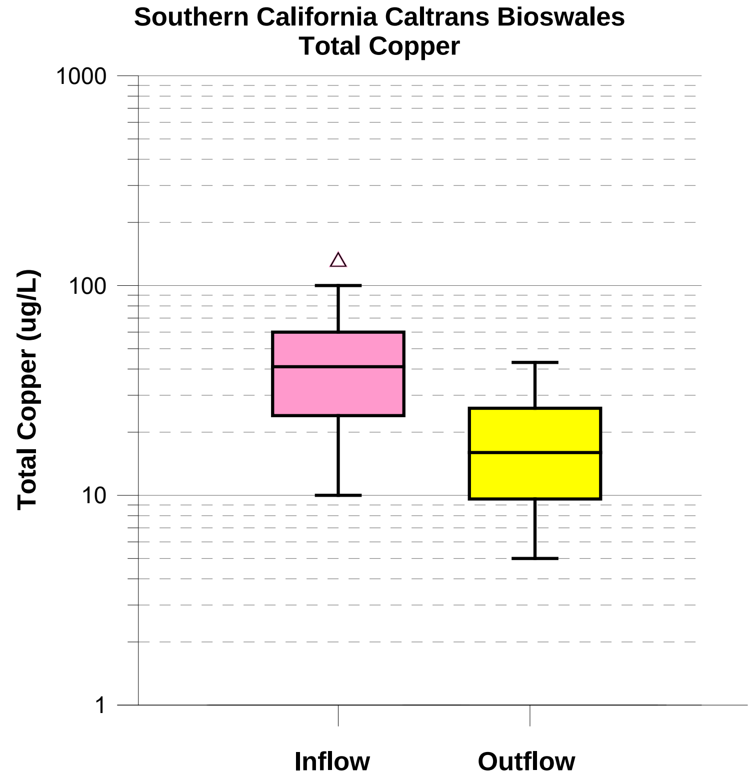

Table N-32 Caltrans Only Bioswales – Lead			
Run ID	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**
n	**55**	**32**	**---**
Percent detected	**96.4%**	**96.9%**	**---**
Mean	48.42	14.57	**-69.92%**
Standard Deviation	56.49	19.68	**---**
Coefficient of Variation	1.17	1.35	**---**
Lower 95% Confidence Limit about Mean	33.49	7.75	**---**
Upper 95% Confidence Limit about Mean	63.35	21.39	**---**
Lower Quartile (25th percentile)	11.16	**2.95**	**-73.56%**
Median (50th percentile)	26.02	**6.50**	**-75.02%**
Upper Quartile (75th percentile)	60.68	**15.00**	**-75.28%**
Inter Quartile Range	49.52	**12.05**	**---**
Minimum Detected Value	**2.9**	**1.8**	**---**
Maximum Detected Value	**240**	**75**	**---**
Minimum Reporting Limit	**0.7**	**0.03**	**---**
Maximum Reporting Limit	**0.8**	**0.03**	**---**
Regression Equation	ln(y) = 3.258 + 1.255*z	ln(y) = 1.986 + 1.252*z	**---**
Note:	3	3	2

Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

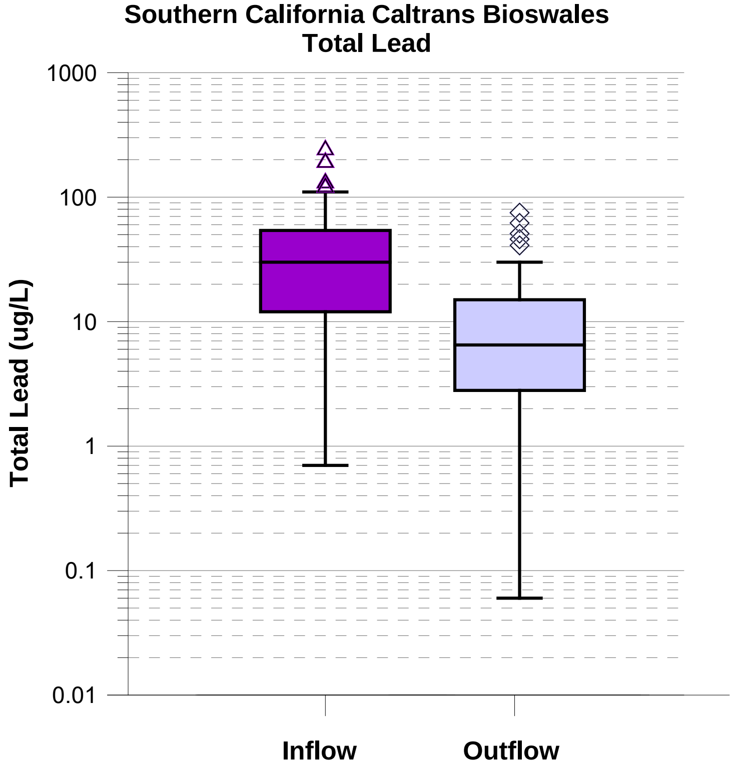

Table N-33 Caltrans Only Bioswales – Zinc			
Run ID	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**55**	**32**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**260**	**74**	**-71.53%**
Standard Deviation	**207**	**94**	**---**
Coefficient of Variation	**0.80**	**1.27**	**---**
Lower 95% Confidence Limit about Mean	**205**	**41.6**	**---**
Upper 95% Confidence Limit about Mean	**315**	**107**	**---**
Lower Quartile (25th percentile)	**110**	**24.75**	**-77.50%**
Median (50th percentile)	**220**	**52.50**	**-76.14%**
Upper Quartile (75th percentile)	**350**	**84.50**	**-75.86%**
Inter Quartile Range	**240**	**59.75**	**---**
Minimum Detected Value	**32**	**19**	**---**
Maximum Detected Value	**980**	**440**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 5.247 + 0.890*z	ln(y) = 3.947 + 0.805*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

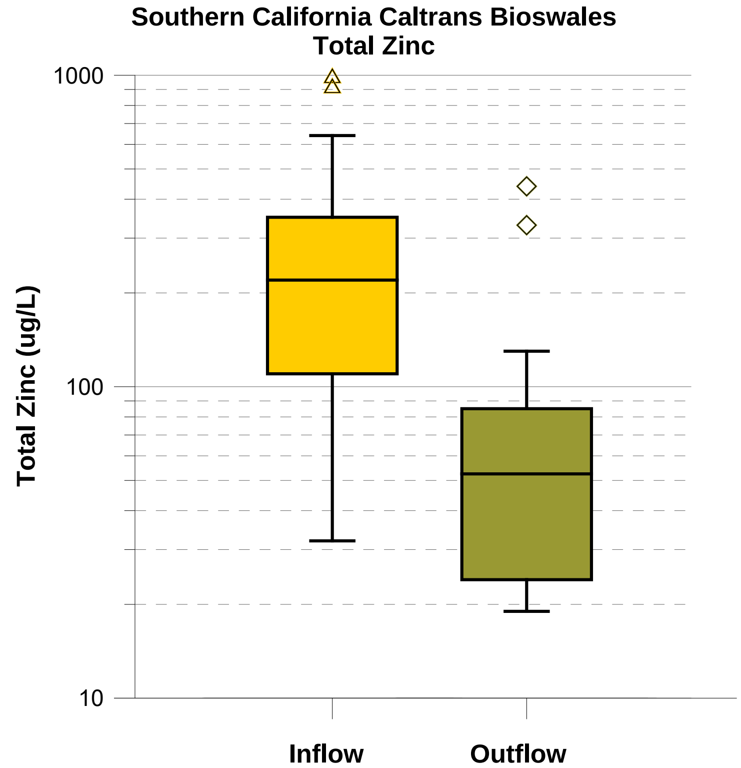

Table N-34 Site Scale Detention – Solids						
Run ID	**Total dissolved solids, Inflow (mg/L)**	**Total dissolved solids, Outflow (mg/L)**	**Change, Total dissolved solids, Inflow to Outflow**	**Total suspended solids, Inflow (mg/L)**	**Total suspended solids, Outflow (mg/L)**	**Change, Total suspended solids, Inflow to Outflow**
n	**49**	**37**	**---**	**76**	**69**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**100**	**100**	**-0.292%**	**133**	**50**	**-62.817%**
Standard Deviation	**47**	**57**	**---**	**94**	**46**	**---**
Coefficient of Variation	**0.47**	**0.57**	**---**	**0.71**	**0.94**	**---**
Lower 95% Confidence Limit about Mean	**87**	**82**	**---**	**112**	**39**	**---**
Upper 95% Confidence Limit about Mean	**114**	**118**	**---**	**154**	**60**	**---**
Lower Quartile (25th percentile)	**65**	**66**	**1.538%**	**75**	**23**	**-69.799%**
Median (50th percentile)	**88**	**88**	**0.000%**	**100**	**38**	**-62.000%**
Upper Quartile (75th percentile)	**135**	**120**	**-11.111%**	**169**	**59**	**-65.333%**
Inter Quartile Range	**70**	**54**	**---**	**94**	**36**	**---**
Minimum Detected Value	**22**	**23**	**---**	**19**	**9**	**---**
Maximum Detected Value	**208**	**286**	**---**	**500**	**260**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 4.497 + 0.517*z	ln(y) = 4.464 + 0.586*z	**---**	ln(y) = 4.686 + 0.667*z	ln(y) = 3.637 + 0.722*z	**---**
Note:	1	1	---	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-35 Site Scale Detention – Bacteria			
Run ID	**Fecal Coliform, Inflow (#/100mL)**	**Fecal Coliform, Outflow (#/100mL)**	**Change, Fecal Coliform, Inflow to Outflow**
n	**34**	**30**	---
Percent detected	**100.0%**	**100.0%**	---
Mean	**2504**	**4987**	**99.1%**
Standard Deviation	**6023**	**21843**	---
Coefficient of Variation	**2.4**	**4.4**	---
Lower 95% Confidence Limit about Mean	**479**	**-2830**	---
Upper 95% Confidence Limit about Mean	**4529**	**12803**	---
Lower Quartile (25th percentile)	**300**	**475**	**58.3%**
Median (50th percentile)	**600**	**850**	**41.7%**
Upper Quartile (75th percentile)	**1700**	**3075**	**80.9%**
Inter Quartile Range	**1400**	**2600**	---
Minimum Detected Value	**110**	**2**	---
Maximum Detected Value	**28000**	**90000**	---
Minimum Reporting Limit	---	---	---
Maximum Reporting Limit	---	---	---
Regression Equation	ln(y) = 6.703 + 1.447*z	ln(y) = 6.955 + 1.811*z	---
Note:	1	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-36 Site Scale Detention – Nutrients

Run ID	Kjeldahl nitrogen (TKN), Inflow (mg/L)	Kjeldahl nitrogen (TKN), Outflow (mg/L)	Change, Kjeldahl nitrogen (TKN), Inflow to Outflow	Nitrogen, Nitrate (NO3) as N, Inflow (mg/L)	Nitrogen, Nitrate (NO3) as N, Outflow (mg/L)	Change, Nitrogen, Nitrate (NO3) as N, Inflow to Outflow
n	**76**	**68**	---	**75**	**68**	---
Percent detected	**100.0%**	**100.0%**	---	**100.0%**	**100.0%**	---
Mean	**2.24**	**1.91**	**-14.86%**	**1.14**	**0.98**	**-13.89%**
Standard Deviation	**1.52**	**1.52**	---	**1.34**	**0.80**	---
Coefficient of Variation	**0.68**	**0.80**	---	**1.18**	**0.82**	---
Lower 95% Confidence Limit about Mean	**1.90**	**1.55**	---	**0.84**	**0.79**	---
Upper 95% Confidence Limit about Mean	**2.58**	**2.27**	---	**1.45**	**1.17**	---
Lower Quartile (25th percentile)	**1.33**	**1.10**	**-16.98%**	**0.52**	**0.51**	**-2.40%**
Median (50th percentile)	**1.88**	**1.50**	**-20.21%**	**0.85**	**0.76**	**-10.59%**
Upper Quartile (75th percentile)	**2.70**	**2.17**	**-19.72%**	**1.20**	**1.16**	**-3.33%**
Inter Quartile Range	**1.38**	**1.07**	---	**0.68**	**0.65**	---
Minimum Detected Value	**0.52**	**0.45**	---	**0.18**	**0.17**	---
Maximum Detected Value	**8.78**	**8.9**	---	**9.5**	**4.2**	---
Minimum Reporting Limit	---	---	---	---	---	---
Maximum Reporting Limit	---	---	---	---	---	---
Regression Equation	ln(y) = 0.634 + 0.604*Z	ln(y) = 0.436 + 0.654*Z	---	ln(y) = -0.150 + 0.711*Z	ln(y) = -0.262 + 0.727*Z	---
Note:	1	1	---	1	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-36 Site Scale Detention – Nutrients (cont.)						
Run ID	**Organic carbon, Dissolved, Inflow (mg/L)**	**Organic carbon, Dissolved, Outflow (mg/L)**	**Change, Organic carbon, Dissolved, Inflow to Outflow**	**Organic carbon, Total, Inflow (mg/L)**	**Organic carbon, Total, Outflow (mg/L)**	**Change, Organic carbon, Total, Inflow to Outflow**
n	**41**	**38**	**---**	**41**	**39**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**14.24**	**15.23**	**6.92%**	**16.62**	**16.73**	**0.68%**
Standard Deviation	**7.96**	**8.77**	**---**	**9.07**	**8.84**	**---**
Coefficient of Variation	**0.56**	**0.58**	**---**	**0.55**	**0.53**	**---**
Lower 95% Confidence Limit about Mean	**11.80**	**12.44**	**---**	**13.84**	**13.96**	**---**
Upper 95% Confidence Limit about Mean	**16.68**	**18.01**	**---**	**19.39**	**19.50**	**---**
Lower Quartile (25th percentile)	**9.55**	**8.65**	**-9.42%**	**10.00**	**10.00**	**0.00%**
Median (50th percentile)	**11.00**	**12.00**	**9.09%**	**13.20**	**14.00**	**6.06%**
Upper Quartile (75th percentile)	**20.50**	**19.75**	**-3.66%**	**23.50**	**20.00**	**-14.89%**
Inter Quartile Range	**10.95**	**11.10**	**---**	**13.50**	**10.00**	**---**
Minimum Detected Value	**3.1**	**4.4**	**---**	**4.1**	**6.5**	**---**
Maximum Detected Value	**37**	**35**	**---**	**38**	**39**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 2.505 + 0.597*Z	ln(y) = 2.572 + 0.588*Z	**---**	ln(y) = 2.670 + 0.571*Z	ln(y) = 2.697+ 0.516*Z	**---**
Note:	1	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-36 Site Scale Detention – Nutrients						
Run ID	**Phosphorus as P, Dissolved, Inflow (mg/L)**	**Phosphorus as P, Dissolved, Outflow (mg/L)**	**Change, Phosphorus as P, Dissolved, Inflow to Outflow**	**Phosphorus as P, Total, Inflow (mg/L)**	**Phosphorus as P, Total, Outflow (mg/L)**	**Change, Phosphorus as P, Total, Inflow to Outflow**
n	**41**	**39**	---	**74**	**69**	---
Percent detected	**100.0%**	**100.0%**	---	**100.0%**	**100.0%**	---
Mean	**0.14**	**0.14**	**-3.15%**	**0.51**	**0.33**	**-35.61%**
Standard Deviation	**0.17**	**0.11**	---	**0.44**	**0.21**	---
Coefficient of Variation	**1.21**	**0.79**	---	**0.86**	**0.63**	---
Lower 95% Confidence Limit about Mean	**0.09**	**0.11**	---	**0.41**	**0.28**	---
Upper 95% Confidence Limit about Mean	**0.20**	**0.17**	---	**0.61**	**0.38**	---
Lower Quartile (25th percentile)	**0.06**	**0.07**	**11.11%**	**0.24**	**0.20**	**-15.79%**
Median (50th percentile)	**0.09**	**0.11**	**22.22%**	**0.36**	**0.29**	**-19.44%**
Upper Quartile (75th percentile)	**0.17**	**0.18**	**9.09%**	**0.66**	**0.40**	**-39.39%**
Inter Quartile Range	**0.10**	**0.11**	---	**0.42**	**0.20**	---
Minimum Detected Value	**0.03**	**0.03**	---	**0.029**	**0.03**	---
Maximum Detected Value	**0.96**	**0.51**	---	**2.62**	**0.86**	---
Minimum Reporting Limit	---	---	---	---	---	---
Maximum Reporting Limit	---	---	---	---	---	---
Regression Equation	ln(y) = -2.262 + 0.785*Z	ln(y) = -2.220 + 0.767*Z	---	ln(y) = -0.943 + 0.741*Z	ln(y) = -1.322 + 0.700*Z	---
Note:	1	1	---	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-37 Site Scale Detention – Metals

Run ID	Total Arsenic, Inflow (ug/L)	Total Arsenic, Outflow (ug/L)	Change, Total Arsenic, Inflow to Outflow	Total Cadmium, Inflow (ug/L)	Total Cadmium, Outflow (ug/L)	Change, Total Cadmium, Inflow to Outflow
n	**41**	**39**	**---**	**41**	**39**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**97.4%**	**---**
Mean	**2.53**	**2.03**	**-19.56%**	**1.17**	0.54	**-53.72%**
Standard Deviation	**0.98**	**0.75**	**---**	**0.83**	0.33	**---**
Coefficient of Variation	**0.39**	**0.37**	**---**	**0.71**	0.61	**---**
Lower 95% Confidence Limit about Mean	**2.23**	**1.80**	**---**	**0.92**	0.44	**---**
Upper 95% Confidence Limit about Mean	**2.83**	**2.27**	**---**	**1.43**	0.65	**---**
Lower Quartile (25th percentile)	**1.80**	**1.50**	**-16.67%**	**0.58**	**0.30**	**-47.83%**
Median (50th percentile)	**2.50**	**1.90**	**-24.00%**	**0.89**	**0.45**	**-49.44%**
Upper Quartile (75th percentile)	**3.25**	**2.50**	**-23.08%**	**1.55**	**0.73**	**-52.90%**
Inter Quartile Range	**1.45**	**1.00**	**---**	**0.98**	**0.43**	**---**
Minimum Detected Value	**0.5**	**0.5**	**---**	**0.2**	**0.2**	**---**
Maximum Detected Value	**5.3**	**3.5**	**---**	**3**	**1.6**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**0.1**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**0.1**	**---**
Regression Equation	ln(y) = 0.846 + 0.445*z	ln(y) = 0.637 + 0.422*z	**---**	ln(y) = -0.102 + 0.809*z	ln(y) = -0.777 + 0.630*z	**---**
Note:	1	1	---	1	3	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-37 Site Scale Detention – Metals (cont.)						
Run ID	**Total Chromium, Inflow (ug/L)**	**Total Chromium, Outflow (ug/L)**	**Change, Total Chromium, Inflow to Outflow**	**Total Copper, Inflow (ug/L)**	**Total Copper, Outflow (ug/L)**	**Change, Total Copper, Inflow to Outflow**
n	**41**	**39**	**---**	**76**	**68**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**8.38**	**3.29**	**-60.67%**	**48.69**	**23.45**	**-51.83%**
Standard Deviation	**16.35**	**2.02**	**---**	**35.12**	**13.93**	**---**
Coefficient of Variation	**1.95**	**0.61**	**---**	**0.72**	**0.59**	**---**
Lower 95% Confidence Limit about Mean	**3.37**	**2.66**	**---**	**40.80**	**20.14**	**---**
Upper 95% Confidence Limit about Mean	**13.38**	**3.93**	**---**	**56.59**	**26.76**	**---**
Lower Quartile (25th percentile)	**3.65**	**1.80**	**-50.68%**	**26.25**	**15.00**	**-42.86%**
Median (50th percentile)	**6.20**	**3.10**	**-50.00%**	**39.45**	**20.50**	**-48.04%**
Upper Quartile (75th percentile)	**9.20**	**3.90**	**-57.61%**	**63.75**	**28.00**	**-56.08%**
Inter Quartile Range	**5.55**	**2.10**	**---**	**37.50**	**13.00**	**---**
Minimum Detected Value	**1.5**	**1**	**---**	**6.3**	**6.7**	**---**
Maximum Detected Value	**86**	**10**	**---**	**230**	**82**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 1.786 + 0.712*z	ln(y) = 1.042 + 0.578*z	**---**	ln(y) = 3.682 + 0.670*z	ln(y) = 3.014 + 0.549*z	**---**
Note:	1	1	---	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-37 Site Scale Detention – Metals (cont.)						
Run ID	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**	**Total Nickel, Inflow (ug/L)**	**Total Nickel, Outflow (ug/L)**	**Change, Total Nickel, Inflow to Outflow**
n	**76**	**69**	**---**	**41**	**39**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**97.4%**	**---**
Mean	**83.02**	**28.03**	**-66.23%**	**11.82**	4.43	**-62.53%**
Standard Deviation	**80.13**	**24.39**	**---**	**21.41**	2.46	**---**
Coefficient of Variation	**0.97**	**0.87**	**---**	**1.81**	0.56	**---**
Lower 95% Confidence Limit about Mean	**65.00**	**22.28**	**---**	**5.27**	3.66	**---**
Upper 95% Confidence Limit about Mean	**101.03**	**33.79**	**---**	**18.38**	5.20	**---**
Lower Quartile (25th percentile)	**34.40**	**13.00**	**-62.21%**	**4.75**	**2.70**	**-43.16%**
Median (50th percentile)	**54.00**	**22.00**	**-59.26%**	**7.30**	**4.00**	**-45.21%**
Upper Quartile (75th percentile)	**108.25**	**36.50**	**-66.28%**	**13.00**	**5.20**	**-60.00%**
Inter Quartile Range	**73.85**	**23.50**	**---**	**8.25**	**2.50**	**---**
Minimum Detected Value	**5.1**	**5.3**	**---**	**2**	**2**	**---**
Maximum Detected Value	**440**	**140**	**---**	**116**	**12**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**1**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**1**	**---**
Regression Equation	$\ln(y) = 4.066 + 0.886*z$	$\ln(y) = 3.061 + 0.766*z$	**---**	$\ln(y) = 2.066 + 0.816*z$	$\ln(y) = 1.362 + 0.537*z$	**---**
Note:	1	1	2	1	3	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-37 Site Scale Detention – Metals (cont.)			
Run ID	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**76**	**68**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**378.89**	**117.54**	**-68.98%**
Standard Deviation	**357.12**	**69.82**	**---**
Coefficient of Variation	**0.94**	**0.59**	**---**
Lower 95% Confidence Limit about Mean	**298.60**	**100.95**	**---**
Upper 95% Confidence Limit about Mean	**459.18**	**134.14**	**---**
Lower Quartile (25th percentile)	**152.75**	**68.25**	**-55.32%**
Median (50th percentile)	**280.00**	**99.00**	**-64.64%**
Upper Quartile (75th percentile)	**504.75**	**150.00**	**-70.28%**
Inter Quartile Range	**352.00**	**81.75**	**---**
Minimum Detected Value	**4.6**	**29**	**---**
Maximum Detected Value	**2100**	**390**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 5.591 + 0.904*z	ln(y) = 4.608 + 0.596*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-38 Bioswales – Solids

Run ID	Total dissolved solids, Inflow (mg/L)	Total dissolved solids, Outflow (mg/L)	Change, Total dissolved solids, Inflow to Outflow	Total suspended solids, Inflow (mg/L)	Total suspended solids, Outflow (mg/L)	Change, Total suspended solids, Inflow to Outflow
n	**126**	**77**	---	**159**	**103**	---
Percent detected	**100.0%**	**100.0%**	---	**100.0%**	**100.0%**	---
Mean	**99.5**	**95.8**	**-3.72%**	**98.9**	**49.0**	**-50.46%**
Standard Deviation	**70.1**	**49.8**	---	**80.5**	**55.1**	---
Coefficient of Variation	**0.70**	**0.52**	---	**0.81**	**1.12**	---
Lower 95% Confidence Limit about Mean	**87.2**	**84.7**	---	**86.3**	**38.3**	---
Upper 95% Confidence Limit about Mean	**111.7**	**106.9**	---	**111.4**	**59.6**	---
Lower Quartile (25th percentile)	**47.5**	**61.0**	**28.42%**	**45.0**	**18.0**	**-60.00%**
Median (50th percentile)	**82.0**	**88.0**	**7.32%**	**76.0**	**31.0**	**-59.21%**
Upper Quartile (75th percentile)	**126.75**	**120**	**-5.33%**	**130**	**54**	**-58.46%**
Inter Quartile Range	**79.25**	**59**	---	**85**	**36**	---
Minimum Detected Value	**1**	**1**	---	**2**	**1**	---
Maximum Detected Value	**350**	**264**	---	**474**	**330**	---
Minimum Reporting Limit	---	---	---	---	---	---
Maximum Reporting Limit	---	---	---	---	---	---
Regression Equation	ln(y) = 4.301 + 0.887*z	ln(y) = 4.386 + 0.670*z	---	ln(y) = 4.290 + 0.842*z	ln(y) = 3.472 + 0.948*z	---
Note:	1	1	---	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-38 Bioswales – Solids (cont.)			
Run ID	**Turbidity, Inflow (NTU)**	**Turbidity, Outflow (NTU)**	**Change, Turbidity, Inflow to Outflow**
n	**16**	**11**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**93.1**	**34.8**	**-62.65%**
Standard Deviation	**77.2**	**22.0**	**---**
Coefficient of Variation	**0.83**	**0.63**	**---**
Lower 95% Confidence Limit about Mean	**55.3**	**21.8**	**---**
Upper 95% Confidence Limit about Mean	**131.0**	**47.8**	**---**
Lower Quartile (25th percentile)	**29.0**	**18.0**	**-37.93%**
Median (50th percentile)	**75.0**	**37.0**	**-50.67%**
Upper Quartile (75th percentile)	**140**	**42**	**-70.00%**
Inter Quartile Range	**111**	**24**	**---**
Minimum Detected Value	**3.3**	**8.4**	**---**
Maximum Detected Value	**249**	**74**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 4.008 + 1.397*z	ln(y) = 3.341 + 0.835*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-39 Bioswales – Bacteria			
Run ID	**Fecal Coliform, Inflow (#/100mL)**	**Fecal Coliform, Outflow (#/100mL)**	**Change, Fecal Coliform, Inflow to Outflow**
n	**33**	**19**	**---**
Percent detected	**97.0%**	**100.0%**	**---**
Mean	12725	**10982**	**-13.70%**
Standard Deviation	22363	**49927**	**---**
Coefficient of Variation	1.76	**4.55**	**---**
Lower 95% Confidence Limit about Mean	5095	**-11468**	**---**
Upper 95% Confidence Limit about Mean	20355	**33432**	**---**
Lower Quartile (25th percentile)	**500**	**130**	**-74.00%**
Median (50th percentile)	**5000**	**900**	**-82.00%**
Upper Quartile (75th percentile)	**16500**	**5000**	**-69.70%**
Inter Quartile Range	**16000**	**4870**	**---**
Minimum Detected Value	**17**	**17**	**---**
Maximum Detected Value	**90000**	**160000**	**---**
Minimum Reporting Limit	**1**	**---**	**---**
Maximum Reporting Limit	**1**	**---**	**---**
Regression Equation	$\ln(y) = 7.667 + 2.695*z$	$\ln(y) = 6.585 + 2.773*z$	**---**
Note:	3	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-40 Bioswales – Nutrients						
Run ID	**Kjeldahl nitrogen (TKN), Inflow (mg/L)**	**Kjeldahl nitrogen (TKN), Outflow (mg/L)**	**Change, Kjeldahl nitrogen (TKN), Inflow to Outflow**	**Nitrogen, ammonia as N, Inflow (mg/L)**	**Nitrogen, ammonia as N, Outflow (mg/L)**	**Change, Nitrogen, ammonia as N, Inflow to Outflow**
n	**160**	**102**	**---**	**58**	**30**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**86.2%**	**76.7%**	**---**
Mean	**2.44**	**1.99**	**-18.52%**	0.57	0.66	**15.93%**
Standard Deviation	**2.07**	**1.88**	**---**	0.55	1.44	**---**
Coefficient of Variation	**0.85**	**0.94**	**---**	0.96	2.18	**---**
Lower 95% Confidence Limit about Mean	**2.12**	**1.63**	**---**	0.43	0.15	**---**
Upper 95% Confidence Limit about Mean	**2.76**	**2.35**	**---**	0.71	1.18	**---**
Lower Quartile (25th percentile)	**1.17**	**0.97**	**-17.31%**	0.20	0.12	**-41.73%**
Median (50th percentile)	**1.80**	**1.53**	**-15.00%**	0.38	0.29	**-25.50%**
Upper Quartile (75th percentile)	**2.98**	**2.22**	**-25.48%**	0.74	0.71	**-4.73%**
Inter Quartile Range	**1.81**	**1.26**	**---**	0.54	0.59	**---**
Minimum Detected Value	**0.11**	**0.08**	**---**	**0.11**	**0.12**	**---**
Maximum Detected Value	**11**	**13**	**---**	**2.8**	**6.6**	**---**
Minimum Reporting Limit			**---**	**0.04**	**0.05**	**---**
Maximum Reporting Limit			**---**	**0.07**	**0.055**	**---**
Regression Equation	ln(y) = 0.553 + 0.896*z	ln(y) = 0.375 + 0.841*z	**---**	ln(y) = -0.958 + 0.975*z	ln(y) = -1.252 + 1.339*z	**---**
Note:	1	1	**---**	3	3	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-40 Bioswales – Nutrients (cont.)						
Run ID	**Nitrogen, Nitrate (NO3) as N, Inflow (mg/L)**	**Nitrogen, Nitrate (NO3) as N, Outflow (mg/L)**	**Change, Nitrogen, Nitrate (NO3) as N, Inflow to Outflow**	**Nitrogen, Nitrite (NO2) as N, Inflow (mg/L)**	**Nitrogen, Nitrite (NO2) as N, Outflow (mg/L)**	**Change, Nitrogen, Nitrite (NO2) as N, Inflow to Outflow**
n	**159**	**103**	**---**	**16**	**11**	**---**
Percent detected	**98.7%**	**99.0%**	**---**	**25.0%**	**54.5%**	**---**
Mean	1.18	1.04	**-12.14%**	0.09	0.16	**89.01%**
Standard Deviation	1.18	2.05	**---**	0.13	0.32	**---**
Coefficient of Variation	1.00	1.98	**---**	1.50	1.93	**---**
Lower 95% Confidence Limit about Mean	0.99	0.64	**---**	0.023	-0.023	**---**
Upper 95% Confidence Limit about Mean	1.36	1.43	**---**	0.15	0.35	**---**
Lower Quartile (25th percentile)	0.42	**0.29**	**-30.98%**	0.03	0.03	**-0.69%**
Median (50th percentile)	0.79	**0.62**	**-21.25%**	0.06	0.07	**31.91%**
Upper Quartile (75th percentile)	1.48	**1.10**	**-25.44%**	0.12	0.20	**75.21%**
Inter Quartile Range	1.06	**0.81**	**---**	0.09	0.18	**---**
Minimum Detected Value	**0.01**	**0.01**	**---**	**0.1**	**0.1**	**---**
Maximum Detected Value	**5.62**	**16.9**	**---**	**0.28**	**0.89**	**---**
Minimum Reporting Limit	**0.05**	**0.025**	**---**	**0.005**	**0.005**	**---**
Maximum Reporting Limit	**0.09**	**0.025**	**---**	**0.09**	**0.08**	**---**
Regression Equation	ln(y) = -0.239 + 0.931*z	ln(y) = -0.555 + 1.100*z	**---**	ln(y) = -2.888 + 1.090*z	ln(y) = -2.611 + 1.511*z	**---**
Note:	3	3	**---**	3	3	**---**

Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-40 Bioswales – Nutrients (cont.)						
Run ID	**Nitrogen, unionized ammonia (NH3) as N, Inflow (mg/L)**	**Nitrogen, unionized ammonia (NH3) as N, Outflow (mg/L)**	**Change, Nitrogen, unionized ammonia (NH3) as N, Inflow to Outflow**	**Organic carbon, Dissolved, Inflow (mg/L)**	**Organic carbon, Dissolved, Outflow (mg/L)**	**Change, Organic carbon, Dissolved, Inflow to Outflow**
n	**10**	**1**	**---**	**113**	**74**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**1.05**		**-100.00%**	**18.22**	**16.22**	**-10.96%**
Standard Deviation	**0.78**		**---**	**16.13**	**10.65**	**---**
Coefficient of Variation	**0.74**		**---**	**0.89**	**0.66**	**---**
Lower 95% Confidence Limit about Mean	**0.57**		**---**	**15.24**	**13.80**	**---**
Upper 95% Confidence Limit about Mean	**1.53**		**---**	**21.19**	**18.65**	**---**
Lower Quartile (25th percentile)	**0.66**		**-100.00%**	**7.00**	**8.55**	**22.14%**
Median (50th percentile)	**0.89**		**-100.00%**	**12.00**	**12.90**	**7.50%**
Upper Quartile (75th percentile)	**1.15**		**-100.00%**	**23.50**	**22.00**	**-6.38%**
Inter Quartile Range	**0.49**		**---**	**16.50**	**13.45**	**---**
Minimum Detected Value	**0.46**	**100**	**---**	**2.5**	**3.5**	**---**
Maximum Detected Value	**2.8**	**100**	**---**	**75**	**49**	**---**
Minimum Reporting Limit			**---**			**---**
Maximum Reporting Limit			**---**			**---**
Regression Equation	ln(y) = -0.077 + 0.569*z	#VALUE!	**---**	ln(y) = 2.568 + 0.840*z	ln(y) = 2.591 + 0.657*z	**---**
Note:	1	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-40 Bioswales – Nutrients (cont.)

Run ID	Organic carbon, Total, Inflow (mg/L)	Organic carbon, Total, Outflow (mg/L)	Change, Organic carbon, Total, Inflow to Outflow	Phosphorus as P, Dissolved, Inflow (mg/L)	Phosphorus as P, Dissolved, Outflow (mg/L)	Change, Phosphorus as P, Dissolved, Inflow to Outflow
n	**114**	**74**	---	**58**	**41**	---
Percent detected	**100.0%**	**100.0%**	---	**96.6%**	**100.0%**	---
Mean	**21.22**	**18.43**	**-13.17%**	0.14	**0.51**	**263%**
Standard Deviation	**18.66**	**11.35**	---	0.22	**0.65**	---
Coefficient of Variation	**0.88**	**0.62**	---	1.59	**1.28**	---
Lower 95% Confidence Limit about Mean	**17.80**	**15.84**	---	0.08	**0.31**	---
Upper 95% Confidence Limit about Mean	**24.65**	**21.01**	---	0.20	**0.70**	---
Lower Quartile (25th percentile)	**7.98**	**11.00**	**37.93%**	**0.06**	**0.18**	**202%**
Median (50th percentile)	**15.00**	**15.00**	**0.00%**	**0.08**	**0.28**	**250%**
Upper Quartile (75th percentile)	**28.00**	**23.00**	**-17.86%**	**0.14**	**0.50**	**257%**
Inter Quartile Range	**20.03**	**12.00**	---	**0.08**	**0.33**	---
Minimum Detected Value	**3**	**3.5**	---	**0.014**	**0.06**	---
Maximum Detected Value	**90**	**53**	---	**1.39**	**2.98**	---
Minimum Reporting Limit			---	**0.03**		---
Maximum Reporting Limit			---	**0.03**		---
Regression Equation	ln(y) = 2.726 + 0.834*z	ln(y) = 2.743 + 0.615*z	---	ln(y) = -2.420 + 0.906*z	ln(y) = -1.123 + 0.901*z	---
Note:	1	1	---	3	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-40 Bioswales – Nutrients (cont.)						
Run ID	**Phosphorus as P, Total, Inflow (mg/L)**	**Phosphorus as P, Total, Outflow (mg/L)**	**Change, Phosphorus as P, Total, Inflow to Outflow**	**Phosphorus, orthophosphate as P, Inflow (mg/L)**	**Phosphorus, orthophosphate as P, Outflow (mg/L)**	**Change, Phosphorus, orthophos-phate as P, Inflow to Outflow**
n	**160**	**102**	**---**	**67**	**34**	**---**
Percent detected	**96.9%**	**99.0%**	**---**	**76.1%**	**97.1%**	**---**
Mean	0.28	0.63	**125%**	0.11	0.51	**369%**
Standard Deviation	0.25	0.66	**---**	0.13	0.55	**---**
Coefficient of Variation	0.90	1.05	**---**	1.16	1.07	**---**
Lower 95% Confidence Limit about Mean	0.24	0.50	**---**	0.08	0.33	**---**
Upper 95% Confidence Limit about Mean	0.32	0.76	**---**	0.14	0.70	**---**
Lower Quartile (25th percentile)	0.11	**0.25**	**123%**	0.03	**0.09**	**248%**
Median (50th percentile)	0.20	**0.40**	**100%**	0.06	**0.39**	**553%**
Upper Quartile (75th percentile)	0.36	**0.67**	**85.4%**	0.13	**0.67**	**401%**
Inter Quartile Range	0.25	**0.42**	**---**	0.11	**0.58**	**---**
Minimum Detected Value	**0.02**	**0.07**	**---**	**0.02**	**0.03**	**---**
Maximum Detected Value	**1.83**	**2.97**	**---**	**0.52**	**2.3**	**---**
Minimum Reporting Limit	**0.004**	**0.004**	**---**	**0.0015**	**0.0015**	**---**
Maximum Reporting Limit	**0.015**	**0.004**	**---**	**0.1**	**0.0015**	**---**
Regression Equation	ln(y) = -1.610 + 0.873*z	ln(y) = -0.847 + 0.873*z	**---**	ln(y) = -2.818 + 1.200*z	ln(y) = -1.301 + 1.372*z	**---**
Note:	3	3	**---**	3	3	**---**

Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-41 Bioswales – Metals						
Run ID	**Total Arsenic, Inflow (ug/L)**	**Total Arsenic, Outflow (ug/L)**	**Change, Total Arsenic, Inflow to Outflow**	**Total Cadmium, Inflow (ug/L)**	**Total Cadmium, Outflow (ug/L)**	**Change, Total Cadmium, Inflow to Outflow**
n	**118**	**76**	**---**	**119**	**76**	**---**
Percent detected	**93.2%**	**93.4%**	**---**	**93.3%**	**94.7%**	**---**
Mean	8.19	4.00	**-51.14%**	1.06	0.52	**-51.15%**
Standard Deviation	15.38	11.35	**---**	0.98	0.67	**---**
Coefficient of Variation	1.88	2.84	**---**	0.92	1.30	**---**
Lower 95% Confidence Limit about Mean	5.41	1.45	**---**	0.88	0.37	**---**
Upper 95% Confidence Limit about Mean	10.96	6.55	**---**	1.24	0.67	**---**
Lower Quartile (25th percentile)	1.14	1.16	**2.02%**	0.49	0.19	**-61.01%**
Median (50th percentile)	2.85	2.23	**-21.85%**	0.82	0.34	**-58.47%**
Upper Quartile (75th percentile)	7.15	4.28	**-40.13%**	1.35	0.60	**-55.77%**
Inter Quartile Range	6.01	3.12	**---**	0.85	0.40	**---**
Minimum Detected Value	**0.6**	**0.5**	**---**	**0.2**	**0.1**	**---**
Maximum Detected Value	**66**	**79**	**---**	**8.3**	**3.9**	**---**
Minimum Reporting Limit	**0.3**	**0.03**	**---**	**0.005**	**0.005**	**---**
Maximum Reporting Limit	**0.61**	**0.98**	**---**	**0.14**	**0.11**	**---**
Regression Equation	ln(y) = 1.047 + 1.363*z	ln(y) = 0.801 + 0.967*z	**---**	ln(y) = -0.202 + 0.742*z	ln(y) = -1.081 + 0.835*z	**---**
Note:	3	3	**---**	3	3	2

Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-41 Bioswales – Metals (cont.)						
Run ID	**Total Chromium, Inflow (ug/L)**	**Total Chromium, Outflow (ug/L)**	**Change, Total Chromium, Inflow to Outflow**	**Total Copper, Inflow (ug/L)**	**Total Copper, Outflow (ug/L)**	**Change, Total Copper, Inflow to Outflow**
n	**119**	**76**	**---**	**150**	**100**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**7.43**	**5.59**	**-24.85%**	**49.82**	**15.43**	**-69.02%**
Standard Deviation	**5.18**	**13.07**	**---**	**37.27**	**11.07**	**---**
Coefficient of Variation	**0.70**	**2.34**	**---**	**0.75**	**0.72**	**---**
Lower 95% Confidence Limit about Mean	**6.50**	**2.65**	**---**	**43.86**	**13.26**	**---**
Upper 95% Confidence Limit about Mean	**8.36**	**8.52**	**---**	**55.79**	**17.60**	**---**
Lower Quartile (25th percentile)	**3.50**	**1.73**	**-50.71%**	**22.00**	**8.23**	**-62.61%**
Median (50th percentile)	**6.90**	**4.00**	**-42.03%**	**41.00**	**13.00**	**-68.29%**
Upper Quartile (75th percentile)	**9.60**	**6.20**	**-35.42%**	**70.50**	**19.90**	**-71.77%**
Inter Quartile Range	**6.10**	**4.48**	**---**	**48.50**	**11.68**	**---**
Minimum Detected Value	**1**	**1**	**---**	**1.1**	**1**	**---**
Maximum Detected Value	**39**	**92**	**---**	**232**	**73**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 1.783 + 0.717*z	ln(y) = 1.276 + 0.839*z	**---**	ln(y) = 3.593 + 0.894*z	ln(y) = 2.484 + 0.786*z	**---**
Note:	1	1	**---**	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-41 Bioswales – Metals (cont.)						
Run ID	**Total Iron, Inflow (ug/L)**	**Total Iron, Outflow (ug/L)**	**Change, Total Iron, Inflow to Outflow**	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**
n	**9**	**7**	**---**	**150**	**100**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**98.7%**	**99.0%**	**---**
Mean	**2416**	**1031**	**-57.30%**	73.08	17.93	**-75.46%**
Standard Deviation	**1672**	**491**	**---**	213	27.42	**---**
Coefficient of Variation	**0.69**	**0.48**	**---**	2.91	1.53	**---**
Lower 95% Confidence Limit about Mean	**1323**	**667**	**---**	39.00	12.56	**---**
Upper 95% Confidence Limit about Mean	**3508**	**1395**	**---**	107	23.31	**---**
Lower Quartile (25th percentile)	**1060**	**690**	**-34.91%**	13.92	**3.53**	**-74.67%**
Median (50th percentile)	**2500**	**970**	**-61.20%**	32.89	**7.55**	**-77.05%**
Upper Quartile (75th percentile)	**3400**	**1500**	**-55.88%**	77.75	**21.50**	**-72.35%**
Inter Quartile Range	**2340**	**810**	**---**	63.83	**17.98**	**---**
Minimum Detected Value	**920**	**420**	**---**	**1.3**	**1**	**---**
Maximum Detected Value	**5700**	**1800**	**---**	**2086**	**189**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**0.7**	**0.03**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**0.8**	**0.03**	**---**
Regression Equation	ln(y) = 7.598 + 0.775*z	ln(y) = 6.843 + 0.599*z	**---**	ln(y) = 3.493 + 1.275*z	ln(y) = 2.161 + 1.240*z	**---**
Note:	1	1	**---**	3	3	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-41 Bioswales – Metals (cont.)						
Run ID	**Total Nickel, Inflow (ug/L)**	**Total Nickel, Outflow (ug/L)**	**Change, Total Nickel, Inflow to Outflow**	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**119**	**76**	**---**	**150**	**100**	**---**
Percent detected	**99.2%**	**98.7%**	**---**	**100.0%**	**100.0%**	**---**
Mean	10.94	4.48	**-59.02%**	**275**	**71.4**	**-74.08%**
Standard Deviation	11.87	5.62	**---**	**225**	**78.7**	**---**
Coefficient of Variation	1.08	1.25	**---**	**0.82**	**1.10**	**---**
Lower 95% Confidence Limit about Mean	8.80	3.22	**---**	**239**	**56.0**	**---**
Upper 95% Confidence Limit about Mean	13.07	5.74	**---**	**311**	**86.8**	**---**
Lower Quartile (25th percentile)	**4.50**	**2.10**	**-53.33%**	**110**	**29.5**	**-73.20%**
Median (50th percentile)	**8.00**	**2.85**	**-64.38%**	**228**	**55.5**	**-75.66%**
Upper Quartile (75th percentile)	**13.00**	**5.08**	**-60.96%**	**360**	**82.5**	**-77.09%**
Inter Quartile Range	**8.50**	**2.98**	**---**	**250**	**53.0**	**---**
Minimum Detected Value	**2**	**1.8**	**---**	**13**	**4.2**	**---**
Maximum Detected Value	**89**	**40**	**---**	**1542**	**501**	**---**
Minimum Reporting Limit	**1.5**	**1.59**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**1.5**	**1.59**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 2.072 + 0.789*z	ln(y) = 1.238 + 0.606*z	**---**	ln(y) = 5.297 + 0.877*z	ln(y) = 3.932 + 0.819*z	**---**
Note:	3	3	2	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-42 Flow Through Treatment BMPs – Solids						
Run ID	**Total dissolved solids, Inflow (mg/L)**	**Total dissolved solids, Outflow (mg/L)**	**Change, Total dissolved solids, Inflow to Outflow**	**Total suspended solids, Inflow (mg/L)**	**Total suspended solids, Outflow (mg/L)**	**Change, Total suspended solids, Inflow to Outflow**
n	**85**	**90**	**---**	**230**	**218**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**98.3%**	**88.1%**	**---**
Mean	**74.5**	**83.6**	**12.12%**	65.6	23.0	**-65.0%**
Standard Deviation	**73.6**	**74.1**	**---**	80.9	42.0	**---**
Coefficient of Variation	**0.99**	**0.89**	**---**	1.23	1.83	**---**
Lower 95% Confidence Limit about Mean	**58.9**	**68.3**	**---**	55.1	17.4	**---**
Upper 95% Confidence Limit about Mean	**90.2**	**98.9**	**---**	76.1	28.6	**---**
Lower Quartile (25th percentile)	**32.0**	**44.0**	**37.50%**	**8.875**	**2.875**	**-67.61%**
Median (50th percentile)	**48.0**	**56.0**	**16.67%**	**39.5**	**7.00**	**-82.28%**
Upper Quartile (75th percentile)	**96.0**	**98.25**	**2.34%**	**89.25**	**22.25**	**-75.07%**
Inter Quartile Range	**64.0**	**54.25**	**---**	**80.375**	**19.375**	**---**
Minimum Detected Value	**1**	**1**	**---**	**2**	**1**	**---**
Maximum Detected Value	**400**	**390**	**---**	**629**	**280**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**1**	**1**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**1**	**1**	**---**
Regression Equation	ln(y) = 3.900 + 1.004*z	ln(y) = 4.121 + 0.811*z	**---**	ln(y) = 3.419 + 1.425*z	ln(y) = 1.959 + 1.657*z	**---**
Note:	1	1	**---**	3	3	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-42 Flow Through Treatment BMPs – Solids (cont.)			
Run ID	**Turbidity, Inflow (NTU)**	**Turbidity, Outflow (NTU)**	**Change, Total suspended solids, Inflow to Outflow**
n	**3**	**3**	---
Percent detected	**33.3%**	**100.0%**	---
Mean	**---**	**5.09**	---
Standard Deviation	**---**	**2.84**	---
Coefficient of Variation	**---**	**0.56**	---
Lower 95% Confidence Limit about Mean	**---**	**1.88**	---
Upper 95% Confidence Limit about Mean	**---**	**8.31**	---
Lower Quartile (25th percentile)	**---**	**2.69**	---
Median (50th percentile)	**---**	**6.29**	---
Upper Quartile (75th percentile)	**---**	**6.30**	---
Inter Quartile Range	**---**	**3.61**	---
Minimum Detected Value	**8.64**	**2.69**	---
Maximum Detected Value	**8.64**	**6.3**	---
Minimum Reporting Limit	**1.65**	**---**	---
Maximum Reporting Limit	**1**	**---**	---
Regression Equation	**---**	ln(y) = 1.556 + 0.631*z	---
Note:	3	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-43 Flow Through Treatment BMPs – Bacteria						
Run ID	**Fecal Coliform, Inflow (#/100mL)**	**Fecal Coliform, Outflow (#/100mL)**	**Change, Fecal Coliform, Inflow to Outflow**	**Total Coliform, Inflow (#/100mL)**	**Total Coliform, Outflow (#/100mL)**	**Change, Total Coliform, Inflow to Outflow**
n	**172**	**152**	**---**	**64**	**64**	**---**
Percent detected	**100.0%**	**73.7%**	**---**	**100.0%**	**53.1%**	**---**
Mean	**6450**	4750	**-26.36%**	**59854**	53.6	**-99.91%**
Standard Deviation	**19225**	21431	**---**	**77332**	108	**---**
Coefficient of Variation	**2.98**	4.51	**---**	**1.29**	2.01	**---**
Lower 95% Confidence Limit about Mean	**3577**	1343	**---**	**40908**	27	**---**
Upper 95% Confidence Limit about Mean	**9324**	8157	**---**	**78800**	80	**---**
Lower Quartile (25th percentile)	**300**	7.47	**-97.51%**	**5000**	3.86	**-99.92%**
Median (50th percentile)	**900**	77.1	**-91.43%**	**20000**	**20.0**	**-99.90%**
Upper Quartile (75th percentile)	**3000**	797	**-73.44%**	**90000**	**40.0**	**-99.96%**
Inter Quartile Range	**2700**	789	**---**	**85000**	36.1	**---**
Minimum Detected Value	**8**	**2**	**---**	**230**	**20**	**---**
Maximum Detected Value	**160000**	**160000**	**---**	**240000**	**500**	**---**
Minimum Reporting Limit	**---**	**2**	**---**	**---**	**10**	**---**
Maximum Reporting Limit	**---**	**10**	**---**	**---**	**10**	**---**
Regression Equation	ln(y) = 6.984 + 1.871*z	ln(y) = 4.345 + 3.463*z	**---**	ln(y) = 9.744 + 1.915*z	ln(y) = 2.583 + 1.830*z	**---**
Note:	1	3	**---**	1	3	**2**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-44 Flow Through Treatment BMPs – Nutrients						
Run ID	**Kjeldahl nitrogen (TKN), Inflow (mg/L)**	**Kjeldahl nitrogen (TKN), Outflow (mg/L)**	**Change, Kjeldahl nitrogen (TKN), Inflow to Outflow**	**Nitrogen, ammonia as N, Inflow (mg/L)**	**Nitrogen, ammonia as N, Outflow (mg/L)**	**Change, Nitrogen, ammonia as N, Inflow to Outflow**
n	**149**	**146**	---	**8**	**9**	---
Percent detected	**100.0%**	**100.0%**	---	**100.0%**	**100.0%**	---
Mean	**2.58**	**1.96**	**-24.22%**	**1.45**	**1.86**	**28.35%**
Standard Deviation	**2.55**	**2.42**	---	**2.16**	**1.70**	---
Coefficient of Variation	**0.99**	**1.24**	---	**1.49**	**0.91**	---
Lower 95% Confidence Limit about Mean	**2.18**	**1.57**	---	**-0.046**	**0.75**	---
Upper 95% Confidence Limit about Mean	**2.99**	**2.35**	---	**2.95**	**2.97**	---
Lower Quartile (25th percentile)	**1.2**	**0.6675**	**-44.38%**	**0.2**	**0.575**	**187.50%**
Median (50th percentile)	**1.76**	**1.215**	**-30.97%**	**0.8**	**1.2**	**50.00%**
Upper Quartile (75th percentile)	**2.8**	**2.415**	**-13.75%**	**2**	**3.45**	**72.50%**
Inter Quartile Range	**1.6**	**1.7475**	---	**1.8**	**2.875**	---
Minimum Detected Value	**0.01**	**0.01**	---	**0.1**	**0.4**	---
Maximum Detected Value	**17.7**	**21**	---	**5.7**	**4.9**	---
Minimum Reporting Limit	---	---	---	---	---	---
Maximum Reporting Limit	---	---	---	---	---	---
Regression Equation	ln(y) = 0.577 + 0.922*z	ln(y) = 0.218 + 1.009*z	---	ln(y) = -0.431 + 1.723*z	ln(y) = 0.251 + 1.094*z	---
Note:	1	1	---	1	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-44 Flow Through Treatment BMPs – Nutrients (cont.)						
Run ID	**Nitrogen, Nitrate (NO3) as N, Inflow (mg/L)**	**Nitrogen, Nitrate (NO3) as N, Outflow (mg/L)**	**Change, Nitrogen, Nitrate (NO3) as N, Inflow to Outflow**	**Nitrogen, unionized ammonia (NH3) as N, Inflow (mg/L)**	**Nitrogen, unionized ammonia (NH3) as N, Outflow (mg/L)**	**Change, Nitrogen, unionized ammonia (NH3) as N, Inflow to Outflow**
n	**150**	**145**	**---**	**57**	**45**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**0.82**	**1.01**	**24.13%**	**1.09**	**0.48**	**-56.11%**
Standard Deviation	**1.25**	**1.23**	**---**	**0.98**	**0.49**	**---**
Coefficient of Variation	**1.53**	**1.21**	**---**	**0.90**	**1.03**	**---**
Lower 95% Confidence Limit about Mean	**0.62**	**0.81**	**---**	**0.84**	**0.33**	**---**
Upper 95% Confidence Limit about Mean	**1.02**	**1.21**	**---**	**1.34**	**0.62**	**---**
Lower Quartile (25th percentile)	**0.29**	**0.45**	**55.17%**	**0.5**	**0.155**	**-69.00%**
Median (50th percentile)	**0.495**	**0.7**	**41.41%**	**0.8**	**0.3**	**-62.50%**
Upper Quartile (75th percentile)	**0.8075**	**1.105**	**36.84%**	**1.2**	**0.575**	**-52.08%**
Inter Quartile Range	**0.5175**	**0.655**	**---**	**0.7**	**0.42**	**---**
Minimum Detected Value	**0.01**	**0.01**	**---**	**0.1**	**0.1**	**---**
Maximum Detected Value	**11**	**9.82**	**---**	**4.9**	**2.1**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = -0.702 + 0.996*z	ln(y) = -0.370 + 0.916*z	**---**	ln(y) = -0.191 + 0.761*z	ln(y) = -1.142 + 0.926*z	**---**
Note:	1	1	**---**	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-44 Flow Through Treatment BMPs – Nutrients (cont.)						
Run ID	**Organic carbon, Dissolved, Inflow (mg/L)**	**Organic carbon, Dissolved, Outflow (mg/L)**	**Change, Organic carbon, Dissolved, Inflow to Outflow**	**Organic carbon, Total, Inflow (mg/L)**	**Organic carbon, Total, Outflow (mg/L)**	**Change, Organic carbon, Total, Inflow to Outflow**
n	**95**	**91**	**---**	**95**	**91**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**22.14**	**21.83**	**-1.43%**	**25.65**	**24.42**	**-4.78%**
Standard Deviation	**22.75**	**23.95**	**---**	**24.83**	**24.38**	**---**
Coefficient of Variation	**1.03**	**1.10**	**---**	**0.97**	**1.00**	**---**
Lower 95% Confidence Limit about Mean	**17.57**	**16.91**	**---**	**20.65**	**19.41**	**---**
Upper 95% Confidence Limit about Mean	**26.72**	**26.75**	**---**	**30.64**	**29.43**	**---**
Lower Quartile (25th percentile)	**8.4**	**8.7**	**3.57%**	**11**	**10**	**-9.09%**
Median (50th percentile)	**14**	**13**	**-7.14%**	**17.2**	**15**	**-12.79%**
Upper Quartile (75th percentile)	**26**	**24**	**-7.69%**	**31**	**26**	**-16.13%**
Inter Quartile Range	**17.6**	**15.3**	**---**	**20**	**16**	**---**
Minimum Detected Value	**2.2**	**3.4**	**---**	**4**	**3.9**	**---**
Maximum Detected Value	**113**	**128**	**---**	**122**	**134**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 2.720 + 0.874*z	ln(y) = 2.712 + 0.824*z	**---**	ln(y) = 2.909 + 0.821*z	ln(y) = 2.875 + 0.776*z	**---**
Note:	1	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-44 Flow Through Treatment BMPs – Nutrients (cont.)							
Run ID	**Phosphorus as P, Dissolved, Inflow (mg/L)**	**Phosphorus as P, Dissolved, Outflow (mg/L)**	**Change, Phosphorus as P, Dissolved, Inflow to Outflow**	**Phosphorus as P, Total, Inflow (mg/L)**	**Phosphorus as P, Total, Outflow (mg/L)**	**Change, Phosphorus as P, Total, Inflow to Outflow**	**Phosphorus, orthophosphate as P, Inflow (mg/L)**
n	**85**	**91**	**---**	**147**	**146**	**---**	**20**
Percent detected	**97.6%**	**94.5%**	**---**	**100.0%**	**100.0%**	**---**	**100.0%**
Mean	0.14	0.13	**-7.14%**	**0.36**	**0.24**	**-34.10%**	**0.23**
Standard Deviation	0.17	0.19	**---**	**0.35**	**0.20**	**---**	**0.34**
Coefficient of Variation	1.24	1.45	**---**	**0.97**	**0.84**	**---**	**1.47**
Lower 95% Confidence Limit about Mean	0.10	0.09	**---**	**0.30**	**0.20**	**---**	**0.08**
Upper 95% Confidence Limit about Mean	0.18	0.17	**---**	**0.42**	**0.27**	**---**	**0.38**
Lower Quartile (25th percentile)	**-0.03**	**-0.03**	**0.00%**	**0.17**	**0.1**	**-41.18%**	**0.049**
Median (50th percentile)	**0.09**	**0.08**	**-11.11%**	**0.24**	**0.18**	**-25.00%**	**0.07**
Upper Quartile (75th percentile)	**0.155**	**0.14**	**-9.68%**	**0.42**	**0.28**	**-33.33%**	**0.315**
Inter Quartile Range	**0.185**	**0.17**	**---**	**0.25**	**0.18**	**---**	**0.266**
Minimum Detected Value	**0.03**	**0.03**	**---**	**0.02**	**0.002**	**---**	**0.016**
Maximum Detected Value	**0.95**	**1.3**	**---**	**2.3**	**1.3**	**---**	**1.3**
Minimum Reporting Limit	**0.03**	**0.03**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**0.03**	**0.03**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = -2.470 + 0.988*z	ln(y) = -2.572 + 1.016*z	**---**	ln(y) = -1.331 + 0.786*z	ln(y) = -1.735 + 0.818*z	**---**	ln(y) = -2.169 + 1.320*z
Note:	3	3	**---**	1	1	2	1

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-45 Flow Through Treatment BMPs – Metals

Run ID	Total Arsenic, Inflow (ug/L)	Total Arsenic, Outflow (ug/L)	Change, Total Arsenic, Inflow to Outflow	Total Cadmium, Inflow (ug/L)	Total Cadmium, Outflow (ug/L)	Change, Total Cadmium, Inflow to Outflow
n	**94**	**91**	---	**95**	**91**	---
Percent detected	**100.0%**	**100.0%**	---	**100.0%**	**100.0%**	---
Mean	**8.00**	**7.08**	**-11.57%**	**0.71**	**0.72**	**1.22%**
Standard Deviation	**19.82**	**16.52**	---	**0.57**	**3.52**	---
Coefficient of Variation	**2.48**	**2.33**	---	**0.80**	**4.88**	---
Lower 95% Confidence Limit about Mean	**4.00**	**3.68**	---	**0.60**	**0.00**	---
Upper 95% Confidence Limit about Mean	**12.01**	**10.47**	---	**0.83**	**1.45**	---
Lower Quartile (25th percentile)	**0.90**	**0.78**	**-13.33%**	**0.30**	**0.20**	**-33.33%**
Median (50th percentile)	**1.35**	**1.10**	**-18.52%**	**0.50**	**0.26**	**-48.00%**
Upper Quartile (75th percentile)	**3.05**	**2.50**	**-18.03%**	**0.90**	**0.60**	**-33.33%**
Inter Quartile Range	**2.15**	**1.72**	---	**0.60**	**0.40**	---
Minimum Detected Value	**0.5**	**0.5**	---	**0.2**	**0.2**	---
Maximum Detected Value	**91**	**78**	---	**2.7**	**25**	---
Minimum Reporting Limit	---	---	---	---	---	---
Maximum Reporting Limit	---	---	---	---	---	---
Regression Equation	ln(y) = 0.679 + 1.281*z	ln(y) = 0.605 + 1.255*z	---	ln(y) = -0.596 + 0.724*z	ln(y) = -1.014 + 0.718*z	---
Note:	1	1	---	1	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-45 Flow Through Treatment BMPs – Metals (cont.)						
Run ID	**Total Chromium, Inflow (ug/L)**	**Total Chromium, Outflow (ug/L)**	**Change, Total Chromium, Inflow to Outflow**	**Total Copper, Inflow (ug/L)**	**Total Copper, Outflow (ug/L)**	**Change, Total Copper, Inflow to Outflow**
n	**95**	**91**	**---**	**150**	**146**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**3.50**	**2.27**	**-35.10%**	**41.89**	**18.84**	**-55.03%**
Standard Deviation	**3.51**	**1.73**	**---**	**144**	**21.81**	**---**
Coefficient of Variation	**1.00**	**0.76**	**---**	**3.43**	**1.16**	**---**
Lower 95% Confidence Limit about Mean	**2.79**	**1.92**	**---**	**18.89**	**15.30**	**---**
Upper 95% Confidence Limit about Mean	**4.21**	**2.63**	**---**	**64.88**	**22.38**	**---**
Lower Quartile (25th percentile)	**1.50**	**1.00**	**-33.33%**	**11.98**	**6.20**	**-48.27%**
Median (50th percentile)	**2.70**	**1.70**	**-37.04%**	**18.00**	**11.00**	**-38.89%**
Upper Quartile (75th percentile)	**4.00**	**2.90**	**-27.50%**	**33.00**	**21.25**	**-35.61%**
Inter Quartile Range	**2.50**	**1.90**	**---**	**21.03**	**15.06**	**---**
Minimum Detected Value	**1**	**1**	**---**	**2.7**	**1.56**	**---**
Maximum Detected Value	**27**	**9.6**	**---**	**1400**	**150**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 0.990 + 0.699*z	ln(y) = 0.601 + 0.612*z	**---**	ln(y) = 3.040 + 0.943*z	ln(y) = 2.477 + 0.965*z	**---**
Note:	1	1	**2**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-45 Flow Through Treatment BMPs – Metals (cont.)						
Run ID	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**	**Total Nickel, Inflow (ug/L)**	**Total Nickel, Outflow (ug/L)**	**Change, Total Nickel, Inflow to Outflow**
n	**149**	**146**	**---**	**95**	**91**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**20.70**	**7.51**	**-63.71%**	**7.11**	**5.61**	**-21.04%**
Standard Deviation	**23.57**	**13.49**	**---**	**6.28**	**5.34**	**---**
Coefficient of Variation	**1.14**	**1.80**	**---**	**0.88**	**0.95**	**---**
Lower 95% Confidence Limit about Mean	**16.92**	**5.32**	**---**	**5.85**	**4.52**	**---**
Upper 95% Confidence Limit about Mean	**24.49**	**9.70**	**---**	**8.37**	**6.71**	**---**
Lower Quartile (25th percentile)	**6.50**	**1.00**	**-84.62%**	**2.90**	**2.00**	**-31.03%**
Median (50th percentile)	**13.00**	**3.10**	**-76.15%**	**4.90**	**3.50**	**-28.57%**
Upper Quartile (75th percentile)	**25.50**	**7.10**	**-72.16%**	**8.50**	**6.40**	**-24.71%**
Inter Quartile Range	**19.00**	**6.10**	**---**	**5.60**	**4.40**	**---**
Minimum Detected Value	**1**	**1**	**---**	**2**	**2**	**---**
Maximum Detected Value	**140**	**110**	**---**	**29**	**24**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 2.558 + 1.032*z	ln(y) = 1.253 + 1.128*z	**---**	ln(y) = 1.679 + 0.731*z	ln(y) = 1.417 + 0.715*z	**---**
Note:	1	1	**2**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-45 Flow Through Treatment BMPs – Metals (cont.)			
Run ID	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**150**	**146**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**311**	**117**	**-62.40%**
Standard Deviation	**309**	**183**	**---**
Coefficient of Variation	**0.99**	**1.57**	**---**
Lower 95% Confidence Limit about Mean	**262**	**87.3**	**---**
Upper 95% Confidence Limit about Mean	**361**	**147**	**---**
Lower Quartile (25th percentile)	**110**	**23.00**	**-79.09%**
Median (50th percentile)	**221**	**55.5**	**-74.89%**
Upper Quartile (75th percentile)	**400**	**131**	**-67.31%**
Inter Quartile Range	**290**	**108**	**---**
Minimum Detected Value	**15**	**1**	**---**
Maximum Detected Value	**1900**	**1400**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 5.361 + 0.903*z	ln(y) = 3.976 + 1.350*z	**---**
Note:	1	1	**2**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-46 Catch Basin Inlets – Solids		
Run ID	**Total dissolved solids, Outflow (mg/L)**	**Total suspended solids, Outflow (mg/L)**
n	**27**	**88**
Percent detected	**100.0%**	**100.0%**
Mean	**60.8**	**52.9**
Standard Deviation	**30.0**	**55.7**
Coefficient of Variation	**0.49**	**1.05**
Lower 95% Confidence Limit about Mean	**49.5**	**41.3**
Upper 95% Confidence Limit about Mean	**72.1**	**64.6**
Lower Quartile (25th percentile)	**38**	**20**
Median (50th percentile)	**58**	**37.5**
Upper Quartile (75th percentile)	**76**	**71**
Inter Quartile Range	**38**	**51**
Minimum Detected Value	**14**	**4**
Maximum Detected Value	**134**	**320**
Minimum Reporting Limit	**---**	**---**
Maximum Reporting Limit	**---**	**---**
Regression Equation	ln(y) = 3.979 + 0.587*z	ln(y) = 3.552 + 0.972*z
Note:	1	1

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-47 Catch Basin Inlets – Nutrients

Run ID	Kjeldahl nitrogen (TKN), Outflow (mg/L)	Nitrogen, Nitrate (NO3) as N, Outflow (mg/L)	Organic carbon, Dissolved, Outflow (mg/L)	Organic carbon, Total, Outflow (mg/L)	Phosphorus as P, Dissolved, Outflow (mg/L)	Phosphorus as P, Total, Outflow (mg/L)
n	**78**	**78**	**27**	**27**	**27**	**77**
Percent detected	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**92.6%**	**100.0%**
Mean	**2.26**	**1.07**	**18.2**	**21.7**	0.08	**0.14**
Standard Deviation	**2.47**	**1.28**	**17.0**	**17.6**	0.07	**0.12**
Coefficient of Variation	**1.09**	**1.20**	**0.94**	**0.81**	0.83	**0.85**
Lower 95% Confidence Limit about Mean	**1.71**	**0.78**	**11.7**	**15.1**	0.06	**0.11**
Upper 95% Confidence Limit about Mean	**2.81**	**1.35**	**24.6**	**28.4**	0.11	**0.16**
Lower Quartile (25th percentile)	**1.37**	**0.43**	**8.3**	**8.8**	**-0.03**	**0.07**
Median (50th percentile)	**1.70**	**0.67**	**14.1**	**19.0**	**0.07**	**0.10**
Upper Quartile (75th percentile)	**2.39**	**1.148**	**23.0**	**31.0**	**0.1**	**0.18**
Inter Quartile Range	**1.02**	**0.723**	**14.7**	**22.2**	**0.13**	**0.11**
Minimum Detected Value	**0.24**	**0.03**	**2.3**	**3.4**	**0.03**	**0.002**
Maximum Detected Value	**18.2**	**7.02**	**79**	**84**	**0.26**	**0.66**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**0.03**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**0.03**	**---**
Regression Equation	ln(y) = 0.594 + 0.601*z	ln(y) = -0.313 + 0.849*z	ln(y) = 2.587 + 0.887*z	ln(y) = 2.813 + 0.833*z	ln(y) = -2.788 + 0.856*z	ln(y) = -2.455 + 1.174*z
Note:	1	1	1	1	3	1

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-48 Catch Basin Inlets – Metals

Run ID	Total Arsenic, Outflow (ug/L)	Total Cadmium, Outflow (ug/L)	Total Chromium, Outflow (ug/L)	Total Copper, Outflow (ug/L)	Total Lead, Outflow (ug/L)	Total Nickel, Outflow (ug/L)	Total Zinc, Outflow (ug/L)
n	**27**	**27**	**27**	**88**	**88**	**27**	**88**
Percent detected	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Mean	**4.48**	**0.80**	**4.24**	**16.80**	**12.45**	**7.44**	**173**
Standard Deviation	**3.39**	**0.87**	**2.96**	**16.57**	**19.61**	**7.69**	**215**
Coefficient of Variation	**0.76**	**1.09**	**0.70**	**0.99**	**1.58**	**1.03**	**1.24**
Lower 95% Confidence Limit about Mean	**3.20**	**0.47**	**3.13**	**13.34**	**8.35**	**4.54**	**128**
Upper 95% Confidence Limit about Mean	**5.76**	**1.12**	**5.36**	**20.27**	**16.54**	**10.35**	**218**
Lower Quartile (25th percentile)	**2.2**	**0.3**	**2.1**	**5.95**	**2.3**	**3**	**50.5**
Median (50th percentile)	**3.05**	**0.6**	**3.5**	**13**	**6**	**4.7**	**107**
Upper Quartile (75th percentile)	**5.8**	**0.8**	**5.3**	**22**	**12.45**	**9.8**	**220**
Inter Quartile Range	**3.6**	**0.5**	**3.2**	**16.05**	**10.15**	**6.8**	**169**
Minimum Detected Value	**1**	**0.2**	**1**	**1.2**	**1**	**2**	**9.4**
Maximum Detected Value	**14.1**	**4.1**	**13.6**	**90**	**110**	**35**	**1250**
Minimum Reporting Limit							
Maximum Reporting Limit							
Regression Equation	ln(y) = 1.259 + 0.773*z	ln(y) = -0.542 + 0.826*z	ln(y) = 1.246 + 0.706*z	ln(y) = 2.387 + 1.041*z	ln(y) = 1.798 + 1.223*z	ln(y) = 1.725 + 0.746*z	ln(y) = 4.582 + 1.162*z
Note:	1	1	1	1	1	1	1

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-49 Constructed Wetlands – Solids						
Run ID	**Total dissolved solids, Inflow (mg/L)**	**Total dissolved solids, Outflow (mg/L)**	**Change, Total dissolved solids, Inflow to Outflow**	**Total suspended solids, Inflow (mg/L)**	**Total suspended solids, Outflow (mg/L)**	**Change, Total suspended solids, Inflow to Outflow**
n	**8**	**9**	**---**	**13**	**14**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**111**	**1412**	**1169%**	**203**	**11.1**	**-94.55%**
Standard Deviation	**58.9**	**534**	**---**	**88**	**8.9**	**---**
Coefficient of Variation	**0.53**	**0.38**	**---**	**0.43**	**0.81**	**---**
Lower 95% Confidence Limit about Mean	**70**	**1063**	**---**	**155**	**6.38**	**---**
Upper 95% Confidence Limit about Mean	**152**	**1761**	**---**	**251**	**15.7**	**---**
Lower Quartile (25th percentile)	**63**	**940**	**1404%**	**140**	**3.50**	**-97.50%**
Median (50th percentile)	**87**	**1600**	**1739%**	**230**	**11.0**	**-95.22%**
Upper Quartile (75th percentile)	**178**	**1850**	**942%**	**255**	**13.5**	**-94.71%**
Inter Quartile Range	**115**	**910**	**---**	**115**	**10.0**	**---**
Minimum Detected Value	**60**	**530**	**---**	**60**	**1.00**	**---**
Maximum Detected Value	**200**	**1900**	**---**	**350**	**28**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	$\ln(y) = 4.599 + 0.584*z$	$\ln(y) = 7.169 + 0.519*z$	**---**	$\ln(y) = 5.197 + 0.595*z$	$\ln(y) = 2.014 + 1.142*z$	**---**
Note:	1	1	**2**	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-50 Constructed Wetlands – Bacteria						
Run ID	**Fecal Coliform, Inflow (#/100mL)**	**Fecal Coliform, Outflow (#/100mL)**	**Change, Fecal Coliform, Inflow to Outflow**	**Total Coliform, Inflow (#/100mL)**	**Total Coliform, Outflow (#/100mL)**	**Change, Total Coliform, Inflow to Outflow**
n	**13**	**14**	**---**	**8**	**8**	**---**
Percent detected	**92.3%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	5407	**295**	**-94.54%**	**25350**	**25305**	**-0.18%**
Standard Deviation	18323	**795**	**---**	**35414**	**71666**	**---**
Coefficient of Variation	3.39	**2.69**	**---**	**1.40**	**2.83**	**---**
Lower 95% Confidence Limit about Mean	-4554	**-121**	**---**	**810**	**-24357**	**---**
Upper 95% Confidence Limit about Mean	15368	**712**	**---**	**49890**	**74967**	**---**
Lower Quartile (25th percentile)	**230**	**20.0**	**-91.30%**	**1875**	**278**	**-85.20%**
Median (50th percentile)	**1300**	**95.0**	**-92.69%**	**3700**	**1370**	**-62.97%**
Upper Quartile (75th percentile)	**3800**	**255**	**-93.29%**	**50000**	**24750**	**-50.50%**
Inter Quartile Range	**3570**	**235**	**---**	**48125**	**24473**	**---**
Minimum Detected Value	**20**	**8**	**---**	**1300**	**130**	**---**
Maximum Detected Value	**50000**	**2400**	**---**	**90000**	**160000**	**---**
Minimum Reporting Limit	**10**		**---**			**---**
Maximum Reporting Limit	**10**		**---**			**---**
Regression Equation	ln(y) = 6.794 + 2.447*z	ln(y) = 4.484 + 1.786*z	**---**	ln(y) = 8.967 + 2.010*z	ln(y) = 7.647 + 3.076*z	**---**
Note:	3	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-51 Constructed Wetlands – Nutrients						
Run ID	**Kjeldahl nitrogen (TKN), Inflow (mg/L)**	**Kjeldahl nitrogen (TKN), Outflow (mg/L)**	**Change, Kjeldahl nitrogen (TKN), Inflow to Outflow**	**Nitrogen, ammonia as N, Inflow (mg/L)**	**Nitrogen, ammonia as N, Outflow (mg/L)**	**Change, Nitrogen, ammonia as N, Inflow to Outflow**
n	**21**	**22**	---	**13**	**21**	---
Percent detected	**100.0%**	**100.0%**	---	**84.6%**	**66.7%**	---
Mean	**2.56**	**1.97**	**-22.91%**	0.52	0.20	**-61.86%**
Standard Deviation	**1.93**	**0.88**	---	0.78	0.39	---
Coefficient of Variation	**0.75**	**0.45**	---	1.48	1.94	---
Lower 95% Confidence Limit about Mean	**1.74**	**1.61**	---	0.10	0.034	---
Upper 95% Confidence Limit about Mean	**3.39**	**2.34**	---	0.95	0.37	---
Lower Quartile (25th percentile)	**1.15**	**1.48**	**28.82%**	**0.13**	0.052	**-59.75%**
Median (50th percentile)	**1.80**	**1.95**	**8.33%**	**0.28**	**0.12**	**-57.14%**
Upper Quartile (75th percentile)	**3.86**	**2.36**	**-38.99%**	**0.47**	**0.20**	**-56.99%**
Inter Quartile Range	**2.72**	**0.88**	---	**0.34**	0.15	---
Minimum Detected Value	**0.83**	**0.52**	---	**0.13**	**0.1**	---
Maximum Detected Value	**8.1**	**4.1**	---	**2.34**	**1.5**	---
Minimum Reporting Limit	---	---	---	**0.05**	**0.05**	---
Maximum Reporting Limit	---	---	---	**0.05**	**0.05**	---
Regression Equation	ln(y) = 0.721 + 0.726*z	ln(y) = 0.572 + 0.542*z	---	ln(y) = -1.375 + 1.400*z	ln(y) = -2.190 + 1.126*z	---
Note:	1	1	---	3	3	---

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-51 Constructed Wetlands – Nutrients (cont.)						
Run ID	**Nitrogen, Nitrate (NO3) as N, Inflow (mg/L)**	**Nitrogen, Nitrate (NO3) as N, Outflow (mg/L)**	**Change, Nitrogen, Nitrate (NO3) as N, Inflow to Outflow**	**Nitrogen, Nitrite (NO2) as N, Inflow (mg/L)**	**Nitrogen, Nitrite (NO2) as N, Outflow (mg/L)**	**Change, Nitrogen, Nitrite (NO2) as N, Inflow to Outflow**
n	**26**	**24**	**---**	**8**	**8**	**---**
Percent detected	**100.0%**	**66.7%**	**---**	**62.5%**	**12.5%**	**---**
Mean	**2.54**	0.84	**-66.90%**	0.07		**-100.00%**
Standard Deviation	**2.64**	2.00	**---**	0.081		**---**
Coefficient of Variation	**1.04**	2.39	**---**	1.10		**---**
Lower 95% Confidence Limit about Mean	**1.52**	0.038	**---**	0.018		**---**
Upper 95% Confidence Limit about Mean	**3.55**	1.64	**---**	0.13		**---**
Lower Quartile (25th percentile)	**0.75**	0.057	**-92.38%**	0.017		**-100.00%**
Median (50th percentile)	**1.74**	0.21	**-87.87%**	**0.05**		**-100.00%**
Upper Quartile (75th percentile)	**3.00**	0.78	**-74.12%**	**0.16**		**-100.00%**
Inter Quartile Range	**2.25**	0.72	**---**	0.14		**---**
Minimum Detected Value	**0.011**	**0.01**	**---**	**0.04**	**0.0419**	**---**
Maximum Detected Value	**11.4**	**8.2**	**---**	**0.209**	**0.0419**	**---**
Minimum Reporting Limit	**---**	**0.25**	**---**	**0.015**	**0.015**	**---**
Maximum Reporting Limit	**---**	**0.5**	**---**	**0.015**	**0.015**	**---**
Regression Equation	ln(y) = 0.424 + 1.260*z	ln(y) = -1.558 + 1.933*z	**---**	ln(y) = -3.172 + 1.378*z	**---**	**---**
Note:	1	3	**---**	3	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-51 Constructed Wetlands – Nutrients (cont.)							
Run ID	**Nitrogen, unionized ammonia (NH3) as N, Inflow (mg/L)**	**Organic carbon, Dissolved, Inflow (mg/L)**	**Organic carbon, Dissolved, Outflow (mg/L)**	**Change, Organic carbon, Dissolved, Inflow to Outflow**	**Organic carbon, Total, Inflow (mg/L)**	**Organic carbon, Total, Outflow (mg/L)**	**Change, Organic carbon, Total, Inflow to Outflow**
n	**8**	**7**	**9**	**---**	**7**	**9**	**---**
Percent detected	**100.0%**	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**1.08**	**20.69**	**13.96**	**-32.54%**	**21.17**	**16.11**	**-23.90%**
Standard Deviation	**1.46**	**12.77**	**6.42**	**---**	**14.87**	**5.92**	**---**
Coefficient of Variation	**1.35**	**0.62**	**0.46**	**---**	**0.70**	**0.37**	**---**
Lower 95% Confidence Limit about Mean	**0.07**	**11.23**	**9.76**	**---**	**10.16**	**12.25**	**---**
Upper 95% Confidence Limit about Mean	**2.09**	**30.14**	**18.15**	**---**	**32.18**	**19.98**	**---**
Lower Quartile (25th percentile)	**0.46**	**10.00**	**10.00**	**0.00%**	**11.00**	**12.00**	**9.09%**
Median (50th percentile)	**0.61**	**22.00**	**13.00**	**-40.91%**	**15.00**	**14.00**	**-6.67%**
Upper Quartile (75th percentile)	**1.18**	**30.00**	**16.50**	**-45.00%**	**33.00**	**20.50**	**-37.88%**
Inter Quartile Range	**0.72**	**20.00**	**6.50**	**---**	**22.00**	**8.50**	**---**
Minimum Detected Value	**0.33**	**6.8**	**7.6**	**---**	**7.2**	**11**	**---**
Maximum Detected Value	**3.9**	**41**	**27**	**---**	**46**	**27**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = -0.256 + 0.915*z	ln(y) = 2.857 + 0.813*z	ln(y) = 2.567 + 0.439*z	**---**	ln(y) = 2.860 + 0.834*z	ln(y) = 2.731 + 0.368*z	**---**
Note:	1	1	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-51 Constructed Wetlands – Nutrients (cont.)						
Run ID	**Phosphorus as P, Dissolved, Inflow (mg/L)**	**Phosphorus as P, Dissolved, Outflow (mg/L)**	**Change, Phosphorus as P, Dissolved, Inflow to Outflow**	**Phosphorus as P, Total, Inflow (mg/L)**	**Phosphorus as P, Total, Outflow (mg/L)**	**Change, Phosphorus as P, Total, Inflow to Outflow**
n	**8**	**8**	**---**	**20**	**21**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**0.12**	**0.33**	**186.92%**	**0.78**	**0.63**	**-19.33%**
Standard Deviation	**0.06**	**0.61**	**---**	**0.79**	**0.50**	**---**
Coefficient of Variation	**0.52**	**1.83**	**---**	**1.02**	**0.80**	**---**
Lower 95% Confidence Limit about Mean	**0.074**	**-0.089**	**---**	**0.43**	**0.41**	**---**
Upper 95% Confidence Limit about Mean	**0.16**	**0.75**	**---**	**1.13**	**0.84**	**---**
Lower Quartile (25th percentile)	**0.071**	**0.075**	**5.61%**	**0.28**	**0.26**	**-7.27%**
Median (50th percentile)	**0.08**	**0.16**	**90.18%**	**0.46**	**0.39**	**-14.29%**
Upper Quartile (75th percentile)	**0.18**	**0.36**	**97.22%**	**0.76**	**1.10**	**45.70%**
Inter Quartile Range	**0.11**	**0.28**	**---**	**0.48**	**0.85**	**---**
Minimum Detected Value	**0.067**	**0.011**	**---**	**0.16**	**0.16**	**---**
Maximum Detected Value	**0.21**	**1.5**	**---**	**2.6**	**1.9**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = -2.260 + 0.539*z	ln(y) = -1.892 + 1.717*z	**---**	ln(y) = -0.619 + 0.911*z	ln(y) = -0.737 + 0.802*z	**---**
Note:	1	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-52 Constructed Wetlands – Metals						
Run ID	**Total Arsenic, Inflow (ug/L)**	**Total Arsenic, Outflow (ug/L)**	**Change, Total Arsenic, Inflow to Outflow**	**Total Cadmium, Inflow (ug/L)**	**Total Cadmium, Outflow (ug/L)**	**Change, Total Cadmium, Inflow to Outflow**
n	**8**	**9**	**---**	**16**	**17**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**68.8%**	**52.9%**	**---**
Mean	**2.10**	**0.75**	**-64.23%**	0.72	0.18	**-74.50%**
Standard Deviation	**1.01**	**0.37**	**---**	0.64	0.06	**---**
Coefficient of Variation	**0.48**	**0.49**	**---**	0.89	0.35	**---**
Lower 95% Confidence Limit about Mean	**1.40**	**0.51**	**---**	0.41	0.15	**---**
Upper 95% Confidence Limit about Mean	**2.80**	**0.99**	**---**	1.04	0.22	**---**
Lower Quartile (25th percentile)	**1.28**	**0.50**	**-60.78%**	0.22	0.15	**-33.95%**
Median (50th percentile)	**1.80**	**0.63**	**-65.00%**	0.47	0.18	**-62.40%**
Upper Quartile (75th percentile)	**2.93**	**1.03**	**-64.96%**	1.00	0.21	**-78.60%**
Inter Quartile Range	**1.65**	**0.53**	**---**	0.78	0.07	**---**
Minimum Detected Value	**1**	**0.5**	**---**	**0.28**	**0.2**	**---**
Maximum Detected Value	**3.8**	**1.4**	**---**	**1.9**	**0.35**	**---**
Minimum Reporting Limit			**---**	**0.125**	**0.1**	**---**
Maximum Reporting Limit			**---**	**0.21**	**0.17**	**---**
Regression Equation	ln(y) = 0.647 + 0.573*z	ln(y) = -0.367 + 0.448*z	**---**	ln(y) = -0.750 + 1.114*z	ln(y) = -1.728 + 0.278*z	**---**
Note:	1	1	2	3	3	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-52 Constructed Wetlands – Metals (cont.)						
Run ID	**Total Chromium, Inflow (ug/L)**	**Total Chromium, Outflow (ug/L)**	**Change, Total Chromium, Inflow to Outflow**	**Total Copper, Inflow (ug/L)**	**Total Copper, Outflow (ug/L)**	**Change, Total Copper, Inflow to Outflow**
n	**8**	**9**	**---**	**21**	**22**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**90.5%**	**95.5%**	**---**
Mean	**7.53**	**1.39**	**-81.54%**	543.94	10.78	**-98.02%**
Standard Deviation	**3.34**	**0.91**	**---**	2890.84	7.17	**---**
Coefficient of Variation	**0.44**	**0.65**	**---**	5.31	0.66	**---**
Lower 95% Confidence Limit about Mean	**5.21**	**0.80**	**---**	-692.50	7.79	**---**
Upper 95% Confidence Limit about Mean	**9.84**	**1.98**	**---**	1780.37	13.78	**---**
Lower Quartile (25th percentile)	**3.78**	**1.00**	**-73.51%**	**11.15**	**5.55**	**-50.22%**
Median (50th percentile)	**8.55**	**1.00**	**-88.30%**	**62.00**	**8.80**	**-85.81%**
Upper Quartile (75th percentile)	**9.93**	**1.60**	**-83.88%**	**110.00**	**14.75**	**-86.59%**
Inter Quartile Range	**6.15**	**0.60**	**---**	**98.85**	**9.20**	**---**
Minimum Detected Value	**3.7**	**1**	**---**	**3.23**	**3.4**	**---**
Maximum Detected Value	**12**	**3.3**	**---**	**9500**	**31**	**---**
Minimum Reporting Limit			**---**	**0.25**	**0.25**	**---**
Maximum Reporting Limit			**---**	**0.25**	**0.25**	**---**
Regression Equation	ln(y) = 1.917 + 0.572*z	ln(y) = 0.225 + 0.409*z	**---**	ln(y) = 3.738 + 2.215*z	ln(y) = 2.185 + 0.717*z	**---**
Note:	1	1	2	3	3	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-52 Constructed Wetlands – Metals (cont.)						
Run ID	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**	**Total Nickel, Inflow (ug/L)**	**Total Nickel, Outflow (ug/L)**	**Change, Total Nickel, Inflow to Outflow**
n	**21**	**22**	**---**	**8**	**9**	**---**
Percent detected	**90.5%**	**95.5%**	**---**	**100.0%**	**100.0%**	**---**
Mean	277.65	5.23	**-98.11%**	**10.81**	**5.61**	**-48.11%**
Standard Deviation	593.03	3.50	**---**	**6.04**	**2.68**	**---**
Coefficient of Variation	2.14	0.67	**---**	**0.56**	**0.48**	**---**
Lower 95% Confidence Limit about Mean	24.01	3.77	**---**	**6.63**	**3.86**	**---**
Upper 95% Confidence Limit about Mean	531.30	6.69	**---**	**15.00**	**7.36**	**---**
Lower Quartile (25th percentile)	**3.32**	**2.70**	**-18.55%**	**5.90**	**3.70**	**-37.29%**
Median (50th percentile)	**170.00**	**4.40**	**-97.41%**	**8.70**	**5.50**	**-36.78%**
Upper Quartile (75th percentile)	**315.00**	**8.32**	**-97.36%**	**16.50**	**6.65**	**-59.70%**
Inter Quartile Range	**311.69**	**5.62**	**---**	**10.60**	**2.95**	**---**
Minimum Detected Value	**1.25**	**1**	**---**	**5.1**	**2.5**	**---**
Maximum Detected Value	**2300**	**14**	**---**	**21**	**11**	**---**
Minimum Reporting Limit	**0.25**	**0.25**	**---**			**---**
Maximum Reporting Limit	**0.25**	**0.25**	**---**			**---**
Regression Equation	ln(y) = 3.918 + 2.654*z	ln(y) = 1.426 + 0.804*z	**---**	ln(y) = 2.259 + 0.630*z	ln(y) = 1.639 + 0.525*z	**---**
Note:	3	3	---	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-52 Constructed Wetlands – Metals (cont.)			
Run ID	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**21**	**22**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**363.79**	**56.46**	**-84.48%**
Standard Deviation	**483.79**	**43.15**	**---**
Coefficient of Variation	**1.33**	**0.76**	**---**
Lower 95% Confidence Limit about Mean	**156.87**	**38.43**	**---**
Upper 95% Confidence Limit about Mean	**570.71**	**74.50**	**---**
Lower Quartile (25th percentile)	**109.00**	**28.53**	**-73.83%**
Median (50th percentile)	**270.00**	**39.00**	**-85.56%**
Upper Quartile (75th percentile)	**450.00**	**84.35**	**-81.26%**
Inter Quartile Range	**341.00**	**55.83**	**---**
Minimum Detected Value	**35.7**	**18**	**---**
Maximum Detected Value	**2000**	**165**	**---**
Minimum Reporting Limit			**---**
Maximum Reporting Limit			**---**
Regression Equation	ln(y) = 5.403 + 1.142*z	ln(y) = 3.812 + 0.702*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-53 Non-Caltrans Bioswales – Solids						
Run ID	**Total dissolved solids, Inflow (mg/L)**	**Total dissolved solids, Outflow (mg/L)**	**Change, Total dissolved solids, Inflow to Outflow**	**Total suspended solids, Inflow (mg/L)**	**Total suspended solids, Outflow (mg/L)**	**Change, Total suspended solids, Inflow to Outflow**
n	**71**	**45**	**---**	**104**	**71**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**105**	**87.1**	**-17.36%**	**102**	**39.5**	**-61.37%**
Standard Deviation	**82.0**	**44.9**	**---**	**85.8**	**35.6**	**---**
Coefficient of Variation	**0.78**	**0.51**	**---**	**0.84**	**0.90**	**---**
Lower 95% Confidence Limit about Mean	**86.3**	**74.0**	**---**	**85.9**	**31.3**	**---**
Upper 95% Confidence Limit about Mean	**124**	**100**	**---**	**119**	**47.8**	**---**
Lower Quartile (25th percentile)	**42.0**	**57.0**	**35.71%**	**47.3**	**18.0**	**-61.90%**
Median (50th percentile)	**80.0**	**78.0**	**-2.50%**	**72.0**	**30.0**	**-58.33%**
Upper Quartile (75th percentile)	**154**	**120**	**-22.08%**	**134**	**50.0**	**-62.76%**
Inter Quartile Range	**112**	**63**	**---**	**87**	**32**	**---**
Minimum Detected Value	**1**	**1**	**---**	**2**	**1**	**---**
Maximum Detected Value	**350**	**200**	**---**	**474**	**191**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 4.260 + 1.075*z	ln(y) = 4.272 + 0.729*z	**---**	ln(y) = 4.319 + 0.853*z	ln(y) = 3.343 + 0.898*z	**---**
Note:	1	1	---	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-54 Non-Caltrans Bioswales – Bacteria			
Run ID	**Fecal Coliform, Inflow (#/100mL)**	**Fecal Coliform, Outflow (#/100mL)**	**Change, Fecal Coliform, Inflow to Outflow**
n	**33**	**19**	**---**
Percent detected	**97.0%**	**100.0%**	**---**
Mean	12725	**10982**	**-13.70%**
Standard Deviation	22363	**49927**	**---**
Coefficient of Variation	1.76	**4.55**	**---**
Lower 95% Confidence Limit about Mean	5095	**-11468**	**---**
Upper 95% Confidence Limit about Mean	20355	**33432**	**---**
Lower Quartile (25th percentile)	**500**	**130**	**-74.00%**
Median (50th percentile)	**5000**	**900**	**-82.00%**
Upper Quartile (75th percentile)	**16500**	**5000**	**-69.70%**
Inter Quartile Range	**16000**	**4870**	**---**
Minimum Detected Value	**17**	**17**	**---**
Maximum Detected Value	**90000**	**160000**	**---**
Minimum Reporting Limit	**1**	**---**	**---**
Maximum Reporting Limit	**1**	**---**	**---**
Regression Equation	ln(y) = 7.667 + 2.695*z	ln(y) = 6.585 + 2.773*z	**---**
Note:	3	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-55 Non-Caltrans Bioswales – Nutrients							
Run ID	**Kjeldahl nitrogen (TKN), Inflow (mg/L)**	**Kjeldahl nitrogen (TKN), Outflow (mg/L)**	**Change, Kjeldahl nitrogen (TKN), Inflow to Outflow**	**Nitrogen, ammonia as N, Inflow (mg/L)**	**Nitrogen, Nitrate (NO3) as N, Inflow (mg/L)**	**Nitrogen, Nitrate (NO3) as N, Outflow (mg/L)**	**Change, Nitrogen, Nitrate (NO3) as N, Inflow to Outflow**
n	**105**	**72**	---	**10**	**104**	**71**	---
Percent detected	**100.0%**	**100.0%**	---	**100.0%**	**100.0%**	**100.0%**	---
Mean	**2.91**	**1.99**	**-31.7%**	**1.05**	**1.26**	**0.98**	**-22.5%**
Standard Deviation	**2.27**	**1.61**	---	**0.78**	**1.37**	**2.47**	---
Coefficient of Variation	**0.78**	**0.81**	---	**0.74**	**1.08**	**2.53**	---
Lower 95% Confidence Limit about Mean	**2.48**	**1.62**	---	**0.57**	**1.00**	**0.40**	---
Upper 95% Confidence Limit about Mean	**3.35**	**2.36**	---	**1.53**	**1.52**	**1.55**	---
Lower Quartile (25th percentile)	**1.43**	**1.04**	**-27.6%**	**0.65**	**0.435**	**0.30**	**-31.0%**
Median (50th percentile)	**2.1**	**1.57**	**-25.2%**	**0.91**	**0.73**	**0.56**	**-23.3%**
Upper Quartile (75th percentile)	**3.39**	**2.34**	**-30.9%**	**1.15**	**1.375**	**0.9**	**-34.5%**
Inter Quartile Range	**1.96**	**1.31**	---	**0.5**	**0.94**	**0.6**	---
Minimum Detected Value	**0.11**	**0.08**	---	**0.45**	**0.01**	**0.01**	---
Maximum Detected Value	**11**	**9.58**	---	**2.8**	**5.62**	**16.9**	---
Minimum Reporting Limit	---	---	---	---	---	---	---
Maximum Reporting Limit	---	---	---	---	---	---	---
Regression Equation	ln(y) = 0.756 + 0.874*z	ln(y) = 0.393 + 0.850*z	---	ln(y) = -8.324 + 0.584*z	ln(y) = -0.231 + 0.983*z	ln(y) = -0.630 + 1.058*z	---
Note:	1	1	2	1	1	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-55 Non-Caltrans Bioswales – Nutrients (cont.)							
Run ID	**Nitrogen, unionized ammonia (NH3) as N, Inflow (mg/L)**	**Organic carbon, Dissolved, Inflow (mg/L)**	**Organic carbon, Dissolved, Outflow (mg/L)**	**Change, Organic carbon, Dissolved, Inflow to Outflow**	**Organic carbon, Total, Inflow (mg/L)**	**Organic carbon, Total, Outflow (mg/L)**	**Change, Organic carbon, Total, Inflow to Outflow**
n	**10**	**58**	**42**	**---**	**59**	**42**	**---**
Percent detected	**100.0%**	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**1.05**	**21.84**	**15.67**	**-28.3%**	**25.79**	**18.13**	**-29.7%**
Standard Deviation	**0.78**	**18.86**	**9.68**	**---**	**21.28**	**10.18**	**---**
Coefficient of Variation	**0.74**	**0.86**	**0.62**	**---**	**0.83**	**0.56**	**---**
Lower 95% Confidence Limit about Mean	**0.57**	**16.99**	**12.74**	**---**	**20.36**	**15.05**	**---**
Upper 95% Confidence Limit about Mean	**1.53**	**26.70**	**18.60**	**---**	**31.23**	**21.21**	**---**
Lower Quartile (25th percentile)	**0.66**	**9.875**	**8.15**	**-17.5%**	**12**	**11**	**-8.3%**
Median (50th percentile)	**0.89**	**14.5**	**12.45**	**-14.1%**	**18**	**17**	**-5.6%**
Upper Quartile (75th percentile)	**1.15**	**31.5**	**22**	**-30.2%**	**33**	**23.25**	**-29.5%**
Inter Quartile Range	**0.49**	**21.63**	**13.85**	**---**	**21**	**12.25**	**---**
Minimum Detected Value	**0.46**	**2.5**	**3.5**	**---**	**3**	**3.5**	**---**
Maximum Detected Value	**2.8**	**75**	**44**	**---**	**90**	**48**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = -0.077 + 0.569*z	ln(y) = 2.732 + 0.912*z	ln(y) = 2.559 + 0.688*z	**---**	ln(y) = 2.917 + 0.901*z	ln(y) = 2.736 + 0.636*z	**---**
Note:	1	1	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-55 Non-Caltrans Bioswales – Nutrients (cont.)

Run ID	Phosphorus as P, Dissolved, Inflow (mg/L)	Phosphorus as P, Dissolved, Outflow (mg/L)	Change, Phosphorus as P, Dissolved, Inflow to Outflow	Phosphorus as P, Total, Inflow (mg/L)	Phosphorus as P, Total, Outflow (mg/L)	Change, Phosphorus as P, Total, Inflow to Outflow
n	**58**	**41**	---	**105**	**72**	---
Percent detected	**96.6%**	**100.0%**	---	**100.0%**	**100.0%**	---
Mean	0.14	**0.51**	**263%**	**0.31**	**0.61**	**92.9%**
Standard Deviation	0.22	**0.65**	---	**0.28**	**0.66**	---
Coefficient of Variation	1.59	**1.28**	---	**0.90**	**1.08**	---
Lower 95% Confidence Limit about Mean	0.082	**0.31**	---	**0.26**	**0.45**	---
Upper 95% Confidence Limit about Mean	0.20	**0.70**	---	**0.37**	**0.76**	---
Lower Quartile (25th percentile)	**0.058**	**0.175**	**202%**	**0.12**	**0.26**	**116.7%**
Median (50th percentile)	**0.08**	**0.28**	**250%**	**0.22**	**0.37**	**68.2%**
Upper Quartile (75th percentile)	**0.14**	**0.5**	**257%**	**0.4**	**0.58**	**45.6%**
Inter Quartile Range	**0.082**	**0.325**	---	**0.28**	**0.32**	---
Minimum Detected Value	**0.014**	**0.06**	---	**0.002**	**0.15**	---
Maximum Detected Value	**1.39**	**2.98**	---	**1.83**	**2.97**	---
Minimum Reporting Limit	**0.03**	---	---	---	---	---
Maximum Reporting Limit	**0.03**	---	---	---	---	---
Regression Equation	ln(y) = -2.420 + 0.906*z	ln(y) = -1.123 + 0.901*z	---	ln(y) = -1.497 + 0.895*z	ln(y) = -0.840 + 0.737*z	---
Note:	3	1	---	1	1	---

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-55 Non-Caltrans Bioswales – Nutrients (cont.)			
Run ID	**Phosphorus, orthophosphate as P, Inflow (mg/L)**	**Phosphorus, orthophosphate as P, Outflow (mg/L)**	**Change, Phosphorus, orthophosphate as P, Inflow to Outflow**
n	**12**	**4**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**0.22**	**0.35**	**59.1%**
Standard Deviation	**0.15**	**0.33**	**---**
Coefficient of Variation	**0.67**	**0.95**	**---**
Lower 95% Confidence Limit about Mean	**0.14**	**0.02**	**---**
Upper 95% Confidence Limit about Mean	**0.30**	**0.68**	**---**
Lower Quartile (25th percentile)	**0.073**	**0.09**	**24.1%**
Median (50th percentile)	**0.235**	**0.31**	**31.9%**
Upper Quartile (75th percentile)	**0.333**	**0.65**	**95.5%**
Inter Quartile Range	**0.26**	**0.56**	**---**
Minimum Detected Value	**0.03**	**0.03**	**---**
Maximum Detected Value	**0.49**	**0.75**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = -1.837 + 1.066*z	ln(y) = -1.538 + 1.796*z	**---**
Note:	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-56 Non-Caltrans Bioswales – Metals						
Run ID	**Total Arsenic, Inflow (ug/L)**	**Total Arsenic, Outflow (ug/L)**	**Change, Total Arsenic, Inflow to Outflow**	**Total Cadmium, Inflow (ug/L)**	**Total Cadmium, Outflow (ug/L)**	**Change, Total Cadmium, Inflow to Outflow**
n	**63**	**44**	**---**	**100**	**75**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**94.7%**	**---**
Mean	**11.94**	**3.47**	**-70.90%**	**0.88**	0.28	**-68.14%**
Standard Deviation	**17.53**	**3.42**	**---**	**1.10**	0.28	**---**
Coefficient of Variation	**1.47**	**0.98**	**---**	**1.24**	0.99	**---**
Lower 95% Confidence Limit about Mean	**7.61**	**2.46**	**---**	**0.67**	0.22	**---**
Upper 95% Confidence Limit about Mean	**16.27**	**4.48**	**---**	**1.10**	0.34	**---**
Lower Quartile (25th percentile)	**1.60**	**1.10**	**-31.25%**	**0.24**	0.10	**-59.48%**
Median (50th percentile)	**4.30**	**2.40**	**-44.19%**	**0.56**	0.19	**-66.32%**
Upper Quartile (75th percentile)	**11**	**4.65**	**-57.73%**	**1.30**	0.36	**-72.08%**
Inter Quartile Range	**9.4**	**3.55**	**---**	**1.06**	0.26	**---**
Minimum Detected Value	**0.6**	**0.5**	**---**	**0.015626**	**0.025377**	**---**
Maximum Detected Value	**66**	**15**	**---**	**8.3**	**1.4**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**0.011498**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**0.019875**	**---**
Regression Equation	ln(y) = 1.577 + 1.371*z	ln(y) = 0.849 + 0.965*z	**---**	ln(y) = -0.699 + 1.219*z	ln(y) = -1.668 + 0.970*z	**---**
Note:	1	1	2	1	3	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-56 Non-Caltrans Bioswales – Metals (cont.)

Run ID	Total Chromium, Inflow (ug/L)	Total Chromium, Outflow (ug/L)	Change, Total Chromium, Inflow to Outflow	Total Copper, Inflow (ug/L)	Total Copper, Outflow (ug/L)	Change, Total Copper, Inflow to Outflow
n	**64**	**44**	**---**	**131**	**99**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**7.18**	**5.21**	**-27.37%**	**41.20**	**12.20**	**-70.39%**
Standard Deviation	**6.34**	**18.06**	**---**	**40.59**	**10.35**	**---**
Coefficient of Variation	**0.88**	**3.47**	**---**	**0.99**	**0.85**	**---**
Lower 95% Confidence Limit about Mean	**5.62**	**-0.12**	**---**	**34.25**	**10.16**	**---**
Upper 95% Confidence Limit about Mean	**8.73**	**10.55**	**---**	**48.15**	**14.24**	**---**
Lower Quartile (25th percentile)	**2.83**	**1.40**	**-50.44%**	**11.00**	**5.40**	**-50.91%**
Median (50th percentile)	**5.65**	**2.20**	**-61.06%**	**25.20**	**10.00**	**-60.32%**
Upper Quartile (75th percentile)	**9.95**	**4.55**	**-54.27%**	**64.0**	**16.0**	**-75.00%**
Inter Quartile Range	**7.125**	**3.15**	**---**	**53**	**10.6**	**---**
Minimum Detected Value	**1**	**1**	**---**	**1.1**	**1**	**---**
Maximum Detected Value	**39**	**92**	**---**	**232**	**73**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 1.651 + 0.858*z	ln(y) = 0.975 + 0.887*z	**---**	ln(y) = 3.205 + 1.128*z	ln(y) = 2.207 + 0.828*z	**---**
Note:	1	1	**---**	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-56 Non-Caltrans Bioswales – Metals (cont.)							
Run ID	**Total Iron, Inflow (ug/L)**	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**	**Total Nickel, Inflow (ug/L)**	**Total Nickel, Outflow (ug/L)**	**Change, Total Nickel, Inflow to Outflow**
n	**1**	**131**	**99**	**---**	**64**	**44**	**---**
Percent detected	**100.0%**	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**---**	**66.47**	**15.88**	**-76.11%**	**12.32**	**3.76**	**-69.50%**
Standard Deviation	**---**	**229**	**26.28**	**---**	**11.44**	**4.07**	**---**
Coefficient of Variation	**---**	**3.45**	**1.65**	**---**	**0.93**	**1.08**	**---**
Lower 95% Confidence Limit about Mean	**---**	**27.20**	**10.70**	**---**	**9.52**	**2.56**	**---**
Upper 95% Confidence Limit about Mean	**---**	**106**	**21.06**	**---**	**15.13**	**4.96**	**---**
Lower Quartile (25th percentile)	**---**	**9.67**	**3.60**	**-62.78%**	**4.43**	**2.00**	**-54.80%**
Median (50th percentile)	**---**	**21.85**	**7.06**	**-67.68%**	**9.25**	**2.50**	**-72.97%**
Upper Quartile (75th percentile)	**---**	**73.0**	**18.26**	**-74.99%**	**15.75**	**4.15**	**-73.65%**
Inter Quartile Range	**---**	**63.3**	**14.66**	**---**	**11.325**	**2.15**	**---**
Minimum Detected Value	**5700**	**0.55585**	**0.755025**	**---**	**2**	**1.8**	**---**
Maximum Detected Value	**5700**	**2086**	**189**	**---**	**69**	**23**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	**---**	ln(y) = 3.222 + 1.374*z	ln(y) = 2.085 + 1.168*z	**---**	ln(y) = 2.190 + 0.842*z	ln(y) = 1.108 + 0.518*z	**---**
Note:	1	1	1	2	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-56 Non-Caltrans Bioswales – Metals (cont.)			
Run ID	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**131**	**99**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**228**	**65.07**	**-71.42%**
Standard Deviation	**223**	**66.77**	**---**
Coefficient of Variation	**0.98**	**1.03**	**---**
Lower 95% Confidence Limit about Mean	**190**	**51.92**	**---**
Upper 95% Confidence Limit about Mean	**266**	**78.23**	**---**
Lower Quartile (25th percentile)	**90.00**	**29.00**	**-67.78%**
Median (50th percentile)	**160**	**50.16**	**-68.65%**
Upper Quartile (75th percentile)	**313**	**76**	**-75.72%**
Inter Quartile Range	**223**	**47**	**---**
Minimum Detected Value	**13**	**4.2**	**---**
Maximum Detected Value	**1542**	**501**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 5.007 + 0.995*z	ln(y) = 3.866 + 0.811*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-57 Caltrans Only Bioswales – Solids						
Run ID	**Total dissolved solids, Inflow (mg/L)**	**Total dissolved solids, Outflow (mg/L)**	**Change, Total dissolved solids, Inflow to Outflow**	**Total suspended solids, Inflow (mg/L)**	**Total suspended solids, Outflow (mg/L)**	**Change, Total suspended solids, Inflow to Outflow**
n	**55**	**32**	**---**	**55**	**32**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**91.9**	**108.0**	**17.58%**	**92.2**	**69.9**	**-24.21%**
Standard Deviation	**51.0**	**54.9**	**---**	**70.8**	**81.0**	**---**
Coefficient of Variation	**0.55**	**0.51**	**---**	**0.77**	**1.16**	**---**
Lower 95% Confidence Limit about Mean	**78.4**	**89.0**	**---**	**73.5**	**41.8**	**---**
Upper 95% Confidence Limit about Mean	**105.3**	**127.0**	**---**	**110.9**	**97.9**	**---**
Lower Quartile (25th percentile)	**56**	**77.5**	**38.39%**	**39**	**20.5**	**-47.44%**
Median (50th percentile)	**89**	**100**	**12.36%**	**78**	**38**	**-51.28%**
Upper Quartile (75th percentile)	**112**	**128.5**	**14.73%**	**124**	**81.75**	**-34.07%**
Inter Quartile Range	**56**	**51**	**---**	**85**	**61.25**	**---**
Minimum Detected Value	**16**	**14**	**---**	**12**	**7**	**---**
Maximum Detected Value	**260**	**264**	**---**	**380**	**330**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 4.355 + 0.639*z	ln(y) = 4.548 + 0.587*z	**---**	ln(y) = 4.234 + 0.852*z	ln(y) = 3.758 + 1.056*z	**---**
Note:	1	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-57 Caltrans Only Bioswales – Solids (cont.)			
Run ID	**Turbidity, Inflow (NTU)**	**Turbidity, Outflow (NTU)**	**Change, Turbidity, Inflow to Outflow**
n	**16**	**11**	**---**
Percent detected	**100.0%**	**100.0%**	**---**
Mean	**93.1**	**34.8**	**-62.65%**
Standard Deviation	**77.2**	**22.0**	**---**
Coefficient of Variation	**0.83**	**0.63**	**---**
Lower 95% Confidence Limit about Mean	**55.3**	**21.8**	**---**
Upper 95% Confidence Limit about Mean	**131.0**	**47.8**	**---**
Lower Quartile (25th percentile)	**29**	**18**	**-37.93%**
Median (50th percentile)	**75**	**37**	**-50.67%**
Upper Quartile (75th percentile)	**140**	**42**	**-70.00%**
Inter Quartile Range	**111**	**24**	**---**
Minimum Detected Value	**3.3**	**8.4**	**---**
Maximum Detected Value	**249**	**74**	**---**
Minimum Reporting Limit	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**
Regression Equation	ln(y) = 4.008 + 1.397*z	ln(y) = 3.341 + 0.835*z	**---**
Note:	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-58 Caltrans Only Bioswales – Nutrients						
Run ID	**Kjeldahl nitrogen (TKN), Inflow (mg/L)**	**Kjeldahl nitrogen (TKN), Outflow (mg/L)**	**Change, Kjeldahl nitrogen (TKN), Inflow to Outflow**	**Nitrogen, ammonia as N, Inflow (mg/L)**	**Nitrogen, ammonia as N, Outflow (mg/L)**	**Change, Nitrogen, ammonia as N, Inflow to Outflow**
n	**55**	**30**	**---**	**48**	**30**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**83.3%**	**76.7%**	**---**
Mean	**1.55**	**2.00**	**29.02%**	0.47	0.66	**40.91%**
Standard Deviation	**1.23**	**2.67**	**---**	0.46	1.44	**---**
Coefficient of Variation	**0.79**	**1.34**	**---**	0.98	2.18	**---**
Lower 95% Confidence Limit about Mean	**1.22**	**1.04**	**---**	0.34	0.15	**---**
Upper 95% Confidence Limit about Mean	**1.87**	**2.95**	**---**	0.60	1.18	**---**
Lower Quartile (25th percentile)	**0.79**	**0.80**	**0.63%**	0.16	0.12	**-28.92%**
Median (50th percentile)	**1.20**	**1.40**	**16.67%**	0.31	0.29	**-9.04%**
Upper Quartile (75th percentile)	**2.00**	**2.22**	**11.13%**	0.61	0.71	**16.41%**
Inter Quartile Range	**1.21**	**1.43**	**---**	0.44	0.59	**---**
Minimum Detected Value	**0.25**	**0.19**	**---**	**0.11**	**0.12**	**---**
Maximum Detected Value	**5.9**	**13**	**---**	**2.1**	**6.6**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**0.04**	**0.05**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**0.07**	**0.055**	**---**
Regression Equation	ln(y) = 0.166 + 0.794*z	ln(y) = 0.332 + 0.861*z	**---**	ln(y) = -1.157 + 0.973*z	ln(y) = -1.252 + 1.339*z	**---**
Note:	1	1	**---**	3	3	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-58 Caltrans Only Bioswales – Nutrients (cont.)						
Run ID	**Nitrogen, Nitrate (NO3) as N, Inflow (mg/L)**	**Nitrogen, Nitrate (NO3) as N, Outflow (mg/L)**	**Change, Nitrogen, Nitrate (NO3) as N, Inflow to Outflow**	**Nitrogen, Nitrite (NO2) as N, Inflow (mg/L)**	**Nitrogen, Nitrite (NO2) as N, Outflow (mg/L)**	**Change, Nitrogen, Nitrite (NO2) as N, Inflow to Outflow**
n	**55**	**32**	---	**16**	**11**	---
Percent detected	**96.4%**	**96.9%**	---	**25.0%**	**54.5%**	---
Mean	1.02	1.17	**13.77%**	0.09	0.16	**89.01%**
Standard Deviation	0.71	1.19	---	0.13	0.32	---
Coefficient of Variation	0.69	1.02	---	1.50	1.93	---
Lower 95% Confidence Limit about Mean	0.84	0.75	---	0.02	-0.02	---
Upper 95% Confidence Limit about Mean	1.21	1.58	---	0.15	0.35	---
Lower Quartile (25th percentile)	0.46	**0.24**	**-47.10%**	0.03	0.03	**-0.69%**
Median (50th percentile)	0.79	**0.78**	**-1.31%**	0.06	0.07	**31.91%**
Upper Quartile (75th percentile)	1.36	**1.75**	**28.42%**	0.12	0.20	**75.21%**
Inter Quartile Range	0.90	**1.51**	---	0.09	0.18	---
Minimum Detected Value	**0.17**	**0.13**	---	**0.1**	**0.1**	---
Maximum Detected Value	**3.2**	**4.4**	---	**0.28**	**0.89**	---
Minimum Reporting Limit	**0.05**	**0.025**	---	**0.005**	**0.005**	---
Maximum Reporting Limit	**0.09**	**0.025**	---	**0.09**	**0.08**	---
Regression Equation	ln(y) = -0.235 + 0.808*z	ln(y) = -0.392 + 1.221*z	---	ln(y) = -2.888 + 1.090*z	ln(y) = -2.611 + 1.511*z	---
Note:	3	3	---	3	3	---

Note 3. Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-58 Caltrans Only Bioswales – Nutrients (cont.)						
Run ID	**Organic carbon, Dissolved, Inflow (mg/L)**	**Organic carbon, Dissolved, Outflow (mg/L)**	**Change, Organic carbon, Dissolved, Inflow to Outflow**	**Organic carbon, Total, Inflow (mg/L)**	**Organic carbon, Total, Outflow (mg/L)**	**Change, Organic carbon, Total, Inflow to Outflow**
n	**55**	**32**	**---**	**55**	**32**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**100.0%**	**100.0%**	**---**
Mean	**14.40**	**16.95**	**17.74%**	**16.32**	**18.82**	**15.30%**
Standard Deviation	**11.74**	**12.05**	**---**	**14.16**	**13.03**	**---**
Coefficient of Variation	**0.82**	**0.71**	**---**	**0.87**	**0.69**	**---**
Lower 95% Confidence Limit about Mean	**11.29**	**12.77**	**---**	**12.58**	**14.30**	**---**
Upper 95% Confidence Limit about Mean	**17.50**	**21.13**	**---**	**20.06**	**23.33**	**---**
Lower Quartile (25th percentile)	**6.20**	**8.68**	**39.92%**	**7.40**	**10.25**	**38.51%**
Median (50th percentile)	**9.70**	**13.00**	**34.02%**	**11.00**	**13.00**	**18.18%**
Upper Quartile (75th percentile)	**19.00**	**21.75**	**14.47%**	**21.00**	**23.00**	**9.52%**
Inter Quartile Range	**12.80**	**13.08**	**---**	**13.6**	**12.75**	**---**
Minimum Detected Value	**2.7**	**5.6**	**---**	**3.8**	**5.8**	**---**
Maximum Detected Value	**54**	**49**	**---**	**72**	**53**	**---**
Minimum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**---**	**---**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 2.394 + 0.752*z	ln(y) = 2.633 + 0.657*z	**---**	ln(y) = 2.522 + 0.739*z	ln(y) = 2.753 + 0.622*z	**---**
Note:	1	1	**---**	1	1	**---**

Note 1: All data reported as detected. Bolded values are exact calculations.

Table N-58 Caltrans Only Bioswales – Nutrients (cont.)

Run ID	Phosphorus as P, Total, Inflow (mg/L)	Phosphorus as P, Total, Outflow (mg/L)	Change, Phosphorus as P, Total, Inflow to Outflow	Phosphorus, orthophosphate as P, Inflow (mg/L)	Phosphorus, orthophosphate as P, Outflow (mg/L)	Change, Phosphorus, orthophosphate as P, Inflow to Outflow
n	**55**	**30**	**---**	**55**	**30**	**---**
Percent detected	**90.9%**	**96.7%**	**---**	**72.7%**	**96.7%**	**---**
Mean	0.21	0.68	**219%**	0.08	0.53	**531%**
Standard Deviation	0.16	0.68	**---**	0.11	0.57	**---**
Coefficient of Variation	0.77	1.00	**---**	1.31	1.08	**---**
Lower 95% Confidence Limit about Mean	0.17	0.44	**---**	0.06	0.33	**---**
Upper 95% Confidence Limit about Mean	0.26	0.93	**---**	0.11	0.74	**---**
Lower Quartile (25th percentile)	0.08	**0.18**	**112%**	0.02	**0.09**	**334%**
Median (50th percentile)	0.15	**0.57**	**269%**	0.05	**0.42**	**795%**
Upper Quartile (75th percentile)	0.29	**0.92**	**221%**	0.10	**0.67**	**551%**
Inter Quartile Range	0.202	**0.738**	**---**	0.082	**0.58**	**---**
Minimum Detected Value	**0.02**	**0.07**	**---**	**0.02**	**0.03**	**---**
Maximum Detected Value	**0.81**	**2.8**	**---**	**0.52**	**2.3**	**---**
Minimum Reporting Limit	**0.004**	**0.004**	**---**	**0.0015**	**0.0015**	**---**
Maximum Reporting Limit	**0.015**	**0.004**	**---**	**0.02**	**0.0015**	**---**
Regression Equation	ln(y) = -1.868 + 0.910*z	ln(y) = -0.870 + 1.168*z	**---**	ln(y) = -3.059 + 1.170*z	ln(y) = -1.267 + 1.392*z	**---**
Note:	3	3	**---**	3	3	**---**

Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-59 Caltrans Only Bioswales – Metals						
Run ID	**Total Arsenic, Inflow (ug/L)**	**Total Arsenic, Outflow (ug/L)**	**Change, Total Arsenic, Inflow to Outflow**	**Total Cadmium, Inflow (ug/L)**	**Total Cadmium, Outflow (ug/L)**	**Change, Total Cadmium, Inflow to Outflow**
n	**55**	**32**	**---**	**55**	**32**	**---**
Percent detected	**81.8%**	**84.4%**	**---**	**90.9%**	**78.1%**	**---**
Mean	3.92	4.75	**21.19%**	0.82	0.69	**-15.99%**
Standard Deviation	11.90	19.07	**---**	0.54	0.96	**---**
Coefficient of Variation	3.03	4.01	**---**	0.66	1.40	**---**
Lower 95% Confidence Limit about Mean	0.78	-1.85	**---**	0.68	0.35	**---**
Upper 95% Confidence Limit about Mean	7.07	11.36	**---**	0.96	1.02	**---**
Lower Quartile (25th percentile)	0.92	1.21	**32.01%**	0.41	0.14	**-66.63%**
Median (50th percentile)	1.71	2.22	**29.33%**	0.66	0.33	**-49.52%**
Upper Quartile (75th percentile)	3.19	4.04	**26.71%**	1.07	0.82	**-23.66%**
Inter Quartile Range	2.27	2.83	**---**	0.66	0.68	**---**
Minimum Detected Value	**1**	**1.2**	**---**	**0.2**	**0.2**	**---**
Maximum Detected Value	**61**	**79**	**---**	**3**	**3.9**	**---**
Minimum Reporting Limit	**0.03**	**0.03**	**---**	**0.005**	**0.005**	**---**
Maximum Reporting Limit	**0.61**	**0.98**	**---**	**0.14**	**0.11**	**---**
Regression Equation	ln(y) = 0.538 + 0.921*z	ln(y) = 0.795 + 0.891*z	**---**	ln(y) = -0.410 + 0.710*z	ln(y) = -1.094 + 1.324*z	**---**
Note:	3	3	**---**	3	3	**---**

Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-59 Caltrans Only Bioswales – Metals (cont.)						
Run ID	**Total Chromium, Inflow (ug/L)**	**Total Chromium, Outflow (ug/L)**	**Change, Total Chromium, Inflow to Outflow**	**Total Copper, Inflow (ug/L)**	**Total Copper, Outflow (ug/L)**	**Change, Total Copper, Inflow to Outflow**
n	**55**	**32**	---	**55**	**32**	---
Percent detected	**100.0%**	**100.0%**	---	**100.0%**	**100.0%**	---
Mean	**7.73**	**6.10**	**-21.11%**	**44.99**	**18.34**	**-59.24%**
Standard Deviation	**3.55**	**3.31**	---	**26.58**	**9.99**	---
Coefficient of Variation	**0.46**	**0.54**	---	**0.59**	**0.55**	---
Lower 95% Confidence Limit about Mean	**6.79**	**4.95**	---	**37.97**	**14.87**	---
Upper 95% Confidence Limit about Mean	**8.67**	**7.25**	---	**52.01**	**21.80**	---
Lower Quartile (25th percentile)	**5.70**	**3.78**	**-33.77%**	**24.00**	**9.95**	**-58.54%**
Median (50th percentile)	**7.40**	**5.30**	**-28.38%**	**41.00**	**16.00**	**-60.98%**
Upper Quartile (75th percentile)	**9.20**	**7.13**	**-22.55%**	**60.00**	**26.00**	**-56.67%**
Inter Quartile Range	**3.50**	**3.35**	---	**36.00**	**16.05**	---
Minimum Detected Value	**1.1**	**1.8**	---	**10**	**5**	---
Maximum Detected Value	**19**	**16**	---	**130**	**43**	---
Minimum Reporting Limit	---	---	---	---	---	---
Maximum Reporting Limit	---	---	---	---	---	---
Regression Equation	ln(y) = 1.937 + 0.508*z	ln(y) = 1.689 + 0.527*z	---	ln(y) = 3.617 + 0.683*z	ln(y) = 2.762 + 0.606*z	---
Note:	1	1	---	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.

Table N-59 Caltrans Only Bioswales – Metals (cont.)						
Run ID	**Total Iron, Inflow (ug/L)**	**Total Iron, Outflow (ug/L)**	**Change, Total Iron, Inflow to Outflow**	**Total Lead, Inflow (ug/L)**	**Total Lead, Outflow (ug/L)**	**Change, Total Lead, Inflow to Outflow**
n	**8**	**7**	**---**	**55**	**32**	**---**
Percent detected	**100.0%**	**100.0%**	**---**	**96.4%**	**96.9%**	**---**
Mean	**2005**	**1031**	**-48.56%**	48.42	14.57	**-69.92%**
Standard Deviation	**1082**	**491**	**---**	56.49	19.68	**---**
Coefficient of Variation	**0.54**	**0.48**	**---**	1.17	1.35	**---**
Lower 95% Confidence Limit about Mean	**1255**	**667**	**---**	33.49	7.75	**---**
Upper 95% Confidence Limit about Mean	**2755**	**1395**	**---**	63.35	21.39	**---**
Lower Quartile (25th percentile)	**990**	**690**	**-30.30%**	11.16	**2.95**	**-73.56%**
Median (50th percentile)	**1850**	**970**	**-47.57%**	26.02	**6.50**	**-75.02%**
Upper Quartile (75th percentile)	**3175**	**1500**	**-52.76%**	60.68	**15.00**	**-75.28%**
Inter Quartile Range	**2185**	**810**	**---**	49.52	**12.05**	**---**
Minimum Detected Value	**920**	**420**	**---**	**2.9**	**1.8**	**---**
Maximum Detected Value	**3400**	**1800**	**---**	**240**	**75**	**---**
Minimum Reporting Limit	**---**		**---**	**0.7**	**0.03**	**---**
Maximum Reporting Limit	**---**		**---**	**0.8**	**0.03**	**---**
Regression Equation	ln(y) = 7.467 + 0.660*z	ln(y) = 6.843 + 0.599*z	**---**	ln(y) = 3.258 + 1.255*z	ln(y) = 1.986 + 1.252*z	**---**
Note:	1	1	**---**	3	3	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

Table N-59 Caltrans Only Bioswales – Metals (cont.)						
Run ID	**Total Nickel, Inflow (ug/L)**	**Total Nickel, Outflow (ug/L)**	**Change, Total Nickel, Inflow to Outflow**	**Total Zinc, Inflow (ug/L)**	**Total Zinc, Outflow (ug/L)**	**Change, Total Zinc, Inflow to Outflow**
n	**55**	**32**	**---**	**55**	**32**	**---**
Percent detected	**98.2%**	**96.9%**	**---**	**100.0%**	**100.0%**	**---**
Mean	9.33	5.48	**-41.24%**	**260**	**74**	**-71.53%**
Standard Deviation	14.06	8.16	**---**	**207**	**94**	**---**
Coefficient of Variation	1.51	1.49	**---**	**0.80**	**1.27**	**---**
Lower 95% Confidence Limit about Mean	5.61	2.65	**---**	**205**	**41.6**	**---**
Upper 95% Confidence Limit about Mean	13.04	8.31	**---**	**315**	**107**	**---**
Lower Quartile (25th percentile)	**4.50**	**2.53**	**-43.89%**	**110**	**24.75**	**-77.50%**
Median (50th percentile)	**7.30**	**3.90**	**-46.58%**	**220**	**52.50**	**-76.14%**
Upper Quartile (75th percentile)	**10.00**	**6.40**	**-36.00%**	**350**	**84.50**	**-75.86%**
Inter Quartile Range	**5.50**	**3.88**	**---**	**240**	**59.75**	**---**
Minimum Detected Value	**2.1**	**2**	**---**	**32**	**19**	**---**
Maximum Detected Value	**89**	**40**	**---**	**980**	**440**	**---**
Minimum Reporting Limit	**1.5**	**1.59**	**---**	**---**	**---**	**---**
Maximum Reporting Limit	**1.5**	**1.59**	**---**	**---**	**---**	**---**
Regression Equation	ln(y) = 1.940 + 0.713*z	ln(y) = 1.425 + 0.667*z	**---**	ln(y) = 5.247 + 0.890*z	ln(y) = 3.947 + 0.805*z	**---**
Note:	3	3	**---**	1	1	2

Note 1: All data reported as detected. Bolded values are exact calculations.
Note 2: Statistically different inflow and outflow concentrations based on 95% confidence intervals.
Note 3: Bolded values are exact calculations. Unbolded values are estimated using regression on ordered statistics (ROS).

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Attachment O

Current MCM Implementation based on Unified Annual Stormwater Reports

This attachment includes tables summarizing the existing Minimum Control Measures (MCMs) implemented by the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG), corresponding with **Section 3.3.2** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP).

Attachment O List of Tables

Table O-1 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2010-2011

Program Tasks and Milestones	2001 MS4 Permit Part	Due Date	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	Los Angeles County[1]
General Permit Requirements									
Prohibit non-stormwater discharges into the MS4 and watercourses	1	Feb-02	NA	NA	NA	I	NA	NA	NA
Comply with Receiving Water Limitations (RWL) requirements	2	Feb-02	NA	NA	NA	I	NA	NA	I
Implement the Stormwater Quality Management Plan (SQMP)	3.A.1	Feb-02	NA	NA	NA	I	NA	NA	NA
Revise the SQMP	3.A.4	Aug-02	NA	NA	NA	NA	NA	NA	NA
Implement the most effective combination of BMPs for storm water/ urban runoff pollution	3.B	Feb-02	NA	NA	NA	D	NA	NA	I
Prepare and submit Annual Budget Summary as part of the annual report to the RWQCB	3.E.5	Oct-02	NA	NA	NA	NA	NA	NA	NA
Conduct quarterly watershed management committee meetings	3.F.3.g	Mar-02	NA	NA	NA	NA	NA	NA	I
Amend and adopt county ordinance to enforce all requirements of the permit, if needed	3.G.3	Nov-02	NA	NA	NA	**	NA	NA	NA
Submit to RWQCB a legal statement demonstrating the necessary legal authority	3.G.4	Dec-02	NA	NA	NA	NA	NA	NA	NA
Prepare and submit to the RQWCB individual annual reports	1.B	Aug-02	NA	NA	NA	NA	NA	NA	NA
Special Provisions									
Public Information and Participation - Permit Requirements									
Implement public information and participation program	4.B	Feb-02	I	NA	NA	I	NA	NA	I
Convene an Advisory Committee	4.B	ASAP	NA	NA	NA	I	NA	NA	NA
Mark all storm drain inlets with a "no dumping" message	4.B.1.a	Feb-04	NA	NA	NA	NA	NA	NA	NA
Maintain the (888) CLEAN-LA hotline	4.B.1.b	Feb-02	NA	NA	NA	I	NA	NA	I
Provide a list of reporting contacts to public through www.888CleanLA.com	4.B.1.b	Mar-02	NA	NA	NA	NA	NA	NA	NA
Media campaign for Storm Water Pollution Prevention (SPP)	4.B.1.c.1	Feb-02	NA	NA	NA	NA	NA	NA	I
Strategy to educate ethnic communities about SPP	4.B.1.c.2	Feb-03	NA	NA	NA	NA	NA	NA	I
Enhance outreach for proper disposal of cigarette butts	4.B.1.c.3	Feb-02	NA	NA	NA	NA	NA	I	I

Table O-1 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2010-2011

Program Tasks and Milestones	2001 MS4 Permit Part	Due Date	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	Los Angeles County[1]
Conduct educational activities within jurisdiction and participate in county-wide events	4.B.1.c.4	Feb-02	NA	NA	NA	NA	NA	NA	I
Organize Public Outreach Strategy meetings quarterly	4.B.1.c.5	May-02	NA	NA	NA	NA	NA	NA	I
Conduct Media Outreach to 35 million impressions per year	4.B.1.c.6	Annually	NA	NA	NA	NA	NA	NA	I
Distribute SPP information to K-12 schools	4.B.1.c.7	-	NA	NA	NA	NA	NA	NA	I
Coordinate and provide contact information for public education activities	4.B.1.c.8	Apr-02	NA	NA	NA	NA	NA	NA	NA
Strategy to measure effectiveness of in-school programs	4.B.c.9	May-02	NA	NA	NA	NA	NA	NA	NA
Behavioral change assessment strategy towards SPP	4.B.c.10	May-02	NA	NA	NA	**	NA	NA	NA
Coordinate watershed-specific pollution prevention outreach programs	4.B.1.d	Feb-03	NA	NA	NA	**	NA	NA	I
Corporate Outreach Program to target retail gas outlets and restaurant chains	4.B.2.a	Feb-03	NA	NA	NA	NA	**	NA	NA
Coordinate an SPP program for a Business Assistance Program	4.B.2.b	Optional	I	NA	NA	NA	NA	NA	I
Industrial/Commercial Facilities Control - Permit Requirements									
Maintain a list of industrial/commercial facilities to be inspected	4.C.1	Aug-02	NA	NA		NA	NA	NA	I
Inspect/visit industrial/commercial facilities appropriately	4.C.2	Aug-04	NA	NA		NA	NA	NA	I
Initiate progressive enforcement for facilities failing to implement BMP's	4.C.3	-	NA	NA		NA	I	NA	I
Inspect restaurants twice during Permit cycle	4.C.2	Aug-04	NA	NA		NA	NA	NA	NA
Development Planning - Permit Requirements									
Implement development planning program that requires SUSMP	4.D	Feb-02	NA	NA	NA	I	NA	NA	I
Develop peak flow control criteria	4.D.1	Feb-05	NA	NA	NA	**	NA	NA	NA
Amend codes and ordinances to give legal effect to SUSMP changes in permit	4.D.2.a	Aug-02	NA	NA	NA	NA	NA	NA	NA
Implement revised SUSMP	4.D.2.b	Sep-02	NA	NA	NA	I	NA	NA	I
Submit an Environmentally Sensitive Areas (ESAs) Delineation map to RWQCB	4.D.2.d	Jun-02	NA	NA	NA	I	NA	NA	NA

Table O-1 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2010-2011									
Program Tasks and Milestones	**2001 MS4 Permit Part**	**Due Date**	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**Los Angeles County[1]**
Implement SUSMP requirements for industrial/commercial projects >1 acre	4.D.5	Mar-03	NA	NA	NA	I	NA	NA	I
Update CEQA guidelines to include specific storm water related issues	4.D.11	Feb-02	NA	NA	NA	NA	NA	NA	NA
Update General Plan to include specific storm water related issues	4.D.12	-	NA	NA	NA	NA	NA	D	I
Train targeted employees in permit requirements for Development Planning	4.D.13	Varies	NA	NA	NA	NA	NA	NA	I
Develop and make SUSMP guidelines available to the developer	4.D.14.a	Feb-02	NA	NA	NA	NA	NA	NA	NA
Develop a technical manual for the siting and design of BMPs	4.D.14.b	Feb-04	NA	NA	NA	NA	NA	NA	NA
Development Construction - Permit Requirements									
Implement a development construction program	4.E.1 &2	Feb-02	NA	NA	NA	NA	NA	NA	I
Require proof of a Waste Discharger ID (WDID) number prior to filing Notice of Intent (NOI)	4.E.2.c	Mar-03	NA	NA	NA	NA	NA	NA	I
Require proof of an NOI and a copy of SWPPP for a transfer of ownership	4.E.3	Feb-02	NA	NA	NA	NA	NA	NA	I
Track the number of issued building and grading permits	4.E.3.c	Feb-02	NA	NA	NA	NA	NA	NA	I
Refer General Construction Activities Stormwater Permit (GCASP) violations to RWQCB	4.E.4	Feb-02	NA	NA	NA	D	NA	NA	I
Train targeted employees in permit requirements for Development Construction	4.E.5	Varies	NA	NA	NA	NA	NA	NA	I
Public Agency Activities - Permit Requirements									
Implement a sewer overflow prevention and response program	4.F.1	Aug-02	NA	NA	NA	NA	I	NA	I
Implement Development Planning Program at Permittee-owned construction projects	4.F.2.a	Aug-02	NA	NA	NA	I	I	NA	I
Implement Development Construction Program at Permittee-owned construction projects	4.F.2.b	Feb-02	NA	NA	NA	I	I	NA	I
Develop, if needed, and implement SWPPPs for field facilities	4.F.3	Feb-02	NA	NA	NA	I	I	NA	I
Equip wash areas with a clarifier, pre-treatment device, or be connected to sewer	4.F.3.c	Feb-02	NA	NA	NA	NA	NA	NA	NA
Store pesticides/herbicides/fertilizers indoors and apply only in accordance	4.F.4.c&g	Feb-02	NA	NA	NA	NA	NA	NA	I
Designate Catch Basins as priority A, B, or C	4.F.5.a	Feb-02	NA	NA	NA	NA	NA	NA	NA

Table O-1 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2010-2011										
Program Tasks and Milestones	**2001 MS4 Permit Part**	**Due Date**	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**Los Angeles County[1]**
Ensure that Catch Basins (CBs) are cleaned appropriately	4.F.5.c.1	Feb-02	NA	NA	NA	NA	NA	NA	I
Place temporary screens on CBs prior to special events or cleanout immediately afterwards	4.F.5.c.2	Feb-02	I	NA	NA	NA	I	NA	I
Place and maintain trash receptacles at all transit stops with shelters	4.F.5.c.3	Feb-02	NA	NA	NA	NA	NA	NA	I
Inspect the legibility of CB stencils and re-label within 180 days if necessary	4.F.5.d	-	I	NA	NA	NA	NA	NA	I
Visually monitor and clean all open channels annually for debris	4.F.5.e.1	Feb-02	I	NA	NA	NA	I	NA	I
Designate curbed streets as priority A, B, or C based on liter accumulation	4.F.6.a.b	Feb-02	NA	NA	NA	NA	I	NA	NA
Recover saw cutting waste and dispose it offsite	4.F.6.c	Feb-02	I	NA	NA	NA	I	NA	I
Train targeted employees in permit requirements for Public Agency Activities	4.F.6.d	Varies	NA	NA	NA	NA	NA	NA	I
Inspect and, if needed, clean Permittee owned parking lots twice per month, but at least once	4.F.7	Feb-02	I	NA	NA	NA	I	NA	I
Conduct a dry weather diversion study and create a priority list of drains for diversion	4.F.10	Jul-03	NA	NA	NA	NA	NA	NA	NA
Illicit Connections / Illicit Discharges - Permit Requirements									
Develop an Implementation Program which specifies how revisions of the IC/ID SQMP are implemented	4.G.1.a	-	I	NA	NA	I	I	NA	C
Create a database for permitted storm drain connections and map IC/ID	4.G.1.b	Feb-03	D	NA	NA	NA	NA	NA	C
Perform IC/ID Trend Analysis	4.G.1.b	Feb-03	NA	NA	NA	**	NA	NA	I
Train targeted employees in the permit requirements for IC/ID	4.G.1.c	Varies	NA	NA	NA	NA	NA	NA	I
Field screen the storm drain system for illicit connections in open channels	4.G.2.a	Feb-03	NA	NA	NA	NA	NA	NA	I
Field screen the storm drain system for illicit connections in underground storm drains in priority areas	4.G.2.a	Feb-05	NA	NA	NA	NA	NA	NA	I
Field screen the storm drain system for illicit connections in underground s/d larger than 36 inch diameter	4.G.2.a	Dec-06	NA	NA	NA	NA	NA	NA	I
Review all permitted connections to the storm drain system for compliance	4.G.2.a	Dec-06	NA	NA	NA	NA	NA	NA	I
Investigate illicit connections 21 days after discovery	4.G.2.b	-	I	NA	NA	I	NA	NA	I

Table O-1 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2010-2011

Program Tasks and Milestones	2001 MS4 Permit Part	Due Date	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	Los Angeles County[1]
Terminate illicit connections 180 days after confirmation	4.G.2.b	-	I	NA	NA	I	NA	NA	I
Respond to illicit discharges within one business day of discovery	4.G.3.a	-	I	NA	NA	I	I	NA	I
Investigate illicit discharges as soon as practicable	4.G.3.a	-	I	NA	NA	I	I	NA	I

[1] Data is a combination of Los Angeles County and Los Angeles County Flood Control District
** - Not Scheduled
NA - Not Applicable or Completed
D - Developed
I - Program Implemented/Completed

Table O-2 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2011-2012

Program Tasks and Milestones	2001 MS4 Permit Part	Due Date	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	Los Angeles County[1]
General Permit Requirements									
Prohibit non-stormwater discharges into the MS4 and watercourses	1	Feb-02	NA	NA	NA	NA	NA	NA	NA
Comply with Receiving Water Limitations (RWL) requirements	2	Feb-02	NA	NA	NA	NA	NA	NA	I
Implement the Stormwater Quality Management Plan (SQMP)	3.A.1	Feb-02	I	NA	NA	NA	NA	NA	NA
Revise the SQMP	3.A.4	Aug-02	NA	NA	NA	NA	NA	NA	NA
Implement the most effective combination of BMPs for storm water/ urban runoff pollution	3.B	Feb-02	I	NA	NA	NA	NA	NA	I
Prepare and submit Annual Budget Summary as part of the annual report to the RWQCB	3.E.5	Oct-02	NA	NA	NA	NA	NA	NA	NA
Conduct quarterly watershed management committee meetings	3.F.3.g	Mar-02	NA	NA	NA	NA	NA	NA	I
Amend and adopt county ordinance to enforce all requirements of the permit, if needed	3.G.3	Nov-02	NA	NA	NA	NA	NA	NA	NA
Submit to RWQCB a legal statement demonstrating the necessary legal authority	3.G.4	Dec-02	NA	NA	NA	NA	NA	NA	NA
Prepare and submit to the RQWCB individual annual reports	1.B	Aug-02	NA	NA	NA	NA	NA	NA	NA
Special Provisions									
Public Information and Participation - Permit Requirements									
Implement public information and participation program	4.B	Feb-02	I	NA	NA	I	NA	NA	I
Convene an Advisory Committee	4.B	ASAP	NA	NA	NA	I	NA	NA	NA
Mark all storm drain inlets with a "no dumping" message	4.B.1.a	Feb-04	NA	NA	NA	NA	NA	NA	NA
Maintain the (888) CLEAN-LA hotline	4.B.1.b	Feb-02	NA	NA	NA	NA	NA	NA	I
Provide a list of reporting contacts to public through www.888CleanLA.com	4.B.1.b	Mar-02	NA	NA	NA	NA	NA	NA	NA
Media campaign for Storm Water Pollution Prevention (SPP)	4.B.1.c.1	Feb-02	I	NA	NA	NA	NA	I	NA
Strategy to educate ethnic communities about SPP	4.B.1.c.2	Feb-03	NA	NA	NA	NA	NA	I	NA
Enhance outreach for proper disposal of cigarette butts	4.B.1.c.3	Feb-02	NA	NA	NA	NA	NA	NA	I

Table O-2 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2011-2012

Program Tasks and Milestones	2001 MS4 Permit Part	Due Date	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	Los Angeles County[1]
Conduct educational activities within jurisdiction and participate in county-wide events	4.B.1.c.4	Feb-02	NA	NA	NA	NA	NA	I	I
Organize Public Outreach Strategy meetings quarterly	4.B.1.c.5	May-02	NA	NA	NA	NA	NA	I	NA
Conduct Media Outreach to 35 million impressions per year	4.B.1.c.6	Annually	NA	NA	NA	NA	NA	D	NA
Distribute SPP information to K-12 schools	4.B.1.c.7	-	NA	NA	NA	NA	NA	I	NA
Coordinate and provide contact information for public education activities	4.B.1.c.8	Apr-02	NA	NA	NA	NA	NA	NA	NA
Strategy to measure effectiveness of in-school programs	4.B.c.9	May-02	NA	NA	NA	NA	NA	I	NA
Behavioral change assessment strategy towards SPP	4.B.c.10	May-02	NA	NA	NA	NA	NA	I	NA
Coordinate watershed-specific pollution prevention outreach programs	4.B.1.d	Feb-03	NA	NA	NA	NA	NA	I	I
Corporate Outreach Program to target retail gas outlets and restaurant chains	4.B.2.a	Feb-03	NA	NA	NA	NA	**	I	NA
Coordinate an SPP program for a Business Assistance Program	4.B.2.b	Optional	I	NA	NA	**	NA	I	NA
Industrial/Commercial Facilities Control - Permit Requirements									
Maintain a list of industrial/commercial facilities to be inspected	4.C.1	Aug-02	NA	NA	NA	NA	NA	I	I
Inspect/visit industrial/commercial facilities appropriately	4.C.2	Aug-04	NA	NA	NA	NA	NA	I	I
Initiate progressive enforcement for facilities failing to implement BMP's	4.C.3	-	NA	NA	NA	NA	I	I	I
Inspect restaurants twice during Permit cycle	4.C.2	Aug-04	NA	NA	NA	NA	NA	NA	NA
Development Planning - Permit Requirements									
Implement development planning program that requires SUSMP	4.D	Feb-02	I	NA	NA	I	NA	I	I
Develop peak flow control criteria	4.D.1	Feb-05	NA	NA	NA	NA	NA	I	NA
Amend codes and ordinances to give legal effect to SUSMP changes in permit	4.D.2.a	Aug-02	NA	NA	NA	NA	NA	I	NA
Implement revised SUSMP	4.D.2.b	Sep-02	I	NA	NA	NA	NA	I	I
Submit an Environmentally Sensitive Areas (ESAs) Delineation map to RWQCB	4.D.2.d	Jun-02	NA	NA	NA	NA	NA	NA	NA

Table O-2 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2011-2012									
Program Tasks and Milestones	**2001 MS4 Permit Part**	**Due Date**	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**Los Angeles County[1]**
Implement SUSMP requirements for industrial/commercial projects >1 acre	4.D.5	Mar-03	I	NA	NA	NA	NA	I	I
Update CEQA guidelines to include specific storm water related issues	4.D.11	Feb-02	NA	NA	NA	NA	NA	NA	NA
Update General Plan to include specific storm water related issues	4.D.12	-	NA	NA	NA	NA	NA	NA	I
Train targeted employees in permit requirements for Development Planning	4.D.13	Varies	NA	NA	NA	NA	NA	I	I
Develop and make SUSMP guidelines available to the developer	4.D.14.a	Feb-02	NA	NA	NA	NA	NA	I	NA
Develop a technical manual for the siting and design of BMPs	4.D.14.b	Feb-04	NA	NA	NA	NA	NA	NA	NA
Development Construction - Permit Requirements									
Implement a development construction program	4.E.1 &2	Feb-02	I	NA	NA	I	NA	I	I
Require proof of a Waste Discharger ID (WDID) number prior to filing Notice of Intent (NOI)	4.E.2.c	Mar-03	I	NA	NA	NA	NA	I	I
Require proof of an NOI and a copy of SWPPP for a transfer of ownership	4.E.3	Feb-02	I	NA	NA	NA	NA	I	I
Track the number of issued building and grading permits	4.E.3.c	Feb-02	I	NA	NA	NA	NA	I	I
Refer General Construction Activities Stormwater Permit (GCASP) violations to RWQCB	4.E.4	Feb-02	NA	NA	NA	NA	NA	I	I
Train targeted employees in permit requirements for Development Construction	4.E.5	Varies	NA	NA	NA	NA	NA	I	I
Public Agency Activities - Permit Requirements									
Implement a sewer overflow prevention and response program	4.F.1	Aug-02	I	NA	NA	I	I	I	I
Implement Development Planning Program at Permittee-owned construction projects	4.F.2.a	Aug-02	I	NA	NA	I	I	I	I
Implement Development Construction Program at Permittee-owned construction projects	4.F.2.b	Feb-02	I	NA	NA	I	I	I	I
Develop, if needed, and implement SWPPPs for field facilities	4.F.3	Feb-02	I	NA	NA	I	I	I	I
Equip wash areas with a clarifier, pre-treatment device, or be connected to sewer	4.F.3.c	Feb-02	NA	NA	NA	NA	NA	NA	NA
Store pesticides/herbicides/fertilizers indoors and apply only in accordance	4.F.4.c&g	Feb-02	I	NA	NA	NA	NA	I	I
Designate Catch Basins as priority A, B, or C	4.F.5.a	Feb-02	NA	NA	NA	NA	NA	NA	NA

Table O-2 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2011-2012										
Program Tasks and Milestones	**2001 MS4 Permit Part**	**Due Date**	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**Los Angeles County[1]**
Ensure that Catch Basins (CBs) are cleaned appropriately	4.F.5.c.1	Feb-02	NA	NA	NA	NA	NA	I	I
Place temporary screens on CBs prior to special events or cleanout immediately afterwards	4.F.5.c.2	Feb-02	I	NA	NA	NA	I	I	I
Place and maintain trash receptacles at all transit stops with shelters	4.F.5.c.3	Feb-02	I	NA	NA	NA	NA	I	I
Inspect the legibility of CB stencils and re-label within 180 days if necessary	4.F.5.d	-	I	NA	NA	NA	NA	I	I
Visually monitor and clean all open channels annually for debris	4.F.5.e.1	Feb-02	NA	NA	NA	NA	I	I	I
Designate curbed streets as priority A, B, or C based on liter accumulation	4.F.6.a.b	Feb-02	NA	NA	NA	NA	I	NA	NA
Recover saw cutting waste and dispose it offsite	4.F.6.c	Feb-02	I	NA	NA	NA	I	I	I
Train targeted employees in permit requirements for Public Agency Activities	4.F.6.d	Varies	NA	NA	NA	NA	NA	I	I
Inspect and, if needed, clean Permittee owned parking lots twice per month, but at least once	4.F.7	Feb-02	NA	NA	NA	NA	I	I	I
Conduct a dry weather diversion study and create a priority list of drains for diversion	4.F.10	Jul-03	**	NA	NA	NA	NA	NA	NA
Illicit Connections / Illicit Discharges - Permit Requirements										
Develop an Implementation Program which specifies how revisions of the IC/ID SQMP are implemented	4.G.1.a	-	I	NA	NA	I	I	NA	NA
Create a database for permitted storm drain connections and map IC/ID	4.G.1.b	Feb-03	D	NA	NA	NA	NA	I	NA
Perform IC/ID Trend Analysis	4.G.1.b	Feb-03	NA	NA	NA	NA	NA	I	I
Train targeted employees in the permit requirements for IC/ID	4.G.1.c	Varies	NA	NA	NA	I	NA	I	I
Field screen the storm drain system for illicit connections in open channels	4.G.2.a	Feb-03	NA	NA	NA	NA	NA	NA	I
Field screen the storm drain system for illicit connections in underground storm drains in priority areas	4.G.2.a	Feb-05	NA	NA	NA	NA	NA	NA	I
Field screen the storm drain system for illicit connections in underground s/d larger than 36 inch diameter	4.G.2.a	Dec-06	NA	NA	NA	NA	NA	NA	I
Review all permitted connections to the storm drain system for compliance	4.G.2.a	Dec-06	NA	NA	NA	NA	NA	NA	I
Investigate illicit connections 21 days after discovery	4.G.2.b	-	I	NA	NA	NA	NA	I	I

Table O-2 RH/SGRWQG Existing Minimum Control Measures Reported during Permit Year 2011-2012										
Program Tasks and Milestones	**2001 MS4 Permit Part**	**Due Date**	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**Los Angeles County[1]**
Terminate illicit connections 180 days after confirmation	4.G.2.b	-	I	NA	NA	NA	NA	I	I
Respond to illicit discharges within one business day of discovery	4.G.3.a	-	I	NA	NA	NA	I	I	I
Investigate illicit discharges as soon as practicable	4.G.3.a	-	I	NA	NA	NA	I	I	I

[1] Data is a combination of Los Angeles County and Los Angeles County Flood Control District
** - Not Scheduled
NA - Not Applicable or Completed
D - Developed
I - Program Implemented/Completed

Attachment P

MCM Implementation and Requirements

The tables presented in this attachment identify the existing and planned Minimum Control Measure (MCM) implementation following the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) Enhanced Watershed Management Program (EWMP) approval. Additionally, this attachment includes a comparison of the requirements per the 2001 Municipal Separate Storm Sewer System (MS4) Permit (Order No. 01-182) and the current 2012 MS4 Permit (Order No. R4-2012-0175). This attachment corresponds with **Section 3.1** of the RH/SGRWQG EWMP.

Attachment P List of Tables

The following table summarizes the current MS4 Permit requirements related to MCMs/non-structural Best Management Practices (BMPs) along with the existing and planned implementation by RH/SGRWQG members. The columns populated with "2001 MS4" represent the control measures that were required in the 2001 MS4 Permit and have been implemented based on those requirements. The new MCMs/institutional BMPs that were not required as part of the 2001 MS4 Permit, but are required as part of the current (2012) MS4 Permit, do not need to be implemented until this EWMP has been approved based on Part VI.D.a.b.ii of the MS4 Permit. The columns populated with "EWMP" represent the control measures that will be implemented following the EWMP approval. Columns populated with "X" represent MCMs/institutional BMPs that were implemented prior to the effective date of the 2012 MS4 Permit. In some instances "(County)" is mentioned in response, as the responsibility has been passed to the County.

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs

2012 MS4 Permit Requirement	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County
D.2 Progressive Enforcement (Applies D.6, D.7, D.8, and D.10)							
Develop and maintain a Progressive Enforcement Policy	EWMP	X	EWMP	EWMP	X	X	EWMP
Conduct follow-up inspection within 4 weeks of date of initial inspection	EWMP	X	EWMP	EWMP	EWMP	X	EWMP
Take progressive enforcement	EWMP	X	EWMP	EWMP	X	X	EWMP
Retain records	EWMP	X	EWMP	EWMP	X	X	EWMP
Refer violations to Regional Board (RB)	EWMP	X	EWMP	EWMP	X	X	EWMP
Investigate complaints from RB	EWMP	X	EWMP	EWMP	X	X	EWMP
Assist RB with Enforcement Actions	EWMP	X	EWMP	EWMP	X	X	EWMP
D.5 Public Information and Participation Program (PIPP)							
Participate in a Countywide PIPP, WMP PIPP, or individual PIPP that measurably increases knowledge and changes behavior, and involves a diversity of socio economic and ethnic communities	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Use effective strategies to educate and involve ethnic communities in SPP through culturally effective methods	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Maintain reporting hotline	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Publish hotline info on web, telephone book	EWMP	X	EWMP	EWMP	X	EWMP	EWMP
ID staff/department that serve as the contact (publish this info)	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs							
2012 MS4 Permit Requirement	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**LA County**
Organize events (e.g., clean ups)	EWMP	X	EWMP	EWMP	X[1,2]	X	EWMP
Residential Outreach (individually or with group):	EWMP	X	EWMP	EWMP	X	X	EWMP
➢ Public Service Announcements	X[3]	X	EWMP	EWMP	X[3]	X[3]	EWMP
➢ (Develop) Public education materials on: vehicle fluids; household waste; construction waste; pesticides, fertilizers, and integrated pest management (IPM); green wastes; and animal wastes	EWMP	X	EWMP	EWMP	X[2]	X[2]	EWMP
➢ Distribute public education materials at points of purchase	EWMP	X	EWMP	EWMP	EWMP	EWMP	EWMP
➢ Maintain stormwater website	EWMP	X	EWMP	EWMP	X[2]	X[2]	EWMP
➢ Provide schools with materials to educate children (K-12); can use state produced materials	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
D.6 Industrial/Commercial							
Track Critical Sources - maintain inventory (watershed based or latitude/longitude recorded)	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Educate - notify critical sources of BMP requirements	EWMP	X	EWMP	EWMP	1st round complete[4]	EWMP[2]	EWMP
Implement a Business Assistance Program for select sectors or small businesses - technical assistance, and distribute materials to specific sectors	EWMP	X	EWMP	EWMP	EWMP	N/A	EWMP
Inspect Commercial Sources	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Inspect Industrial Sources - initial mandatory inspection	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
➢ Secondary mandatory inspection	EWMP	X	EWMP	EWMP	EWMP	X	EWMP
➢ No Exposure - evaluate and conduct 2nd inspection at 25% of facilities	EWMP	X	EWMP	EWMP	EWMP	EWMP	EWMP
As needed conduct Progressive Enforcement follow-up inspections (see D.2)	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs							
2012 MS4 Permit Requirement	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**LA County**
D.7 Planning and Land Development							
Update ordinance/design standards to conform with new requirements (LID and Hydromod)	X	X	EWMP	X	X	X	EWMP
Optional: Establish alternative compliance for technical infeasibility, e.g., allow onsite biofiltration or offsite infiltration or GW replenishment or retrofit		EWMP		EWMP	X	X	
Optional if allowing offsite mitigation: Develop a prioritized list of offsite mitigation projects		EWMP		EWMP		EWMP	
Optional if allowing offsite mitigation: Develop a schedule for completion of offsite projects (must be with 4 years of the Certificate of Occupancy of the first project that contributed funds)		EWMP		EWMP		EWMP	
Optional if allowing offsite mitigation: Notice offsite projects to RB website		EWMP		EWMP		EWMP	
Optional if allowing offsite mitigation: List of mitigation projects descriptions and estimated pollutant and flow reductions		EWMP		EWMP	X	EWMP	
Optional if allowing offsite mitigation: Provide aggregated comparison of alternative compliance to results that would have been expected with onsite retention of the stormwater quality design volume (SWQDv)		EWMP		EWMP		EWMP	
Optional: Submit documentation that a previously adopted LID ordinance provides equivalent pollutant loading and flow reduction		EWMP		EWMP		X	
Plan Review process - check LID and BMP sizing, etc.,	EWMP	X	EWMP	X	X	X	EWMP
Establish internal agreements with structure for communication and authority for departments overseeing plan approval and project construction	EWMP	X	EWMP	EWMP	X	X	EWMP
Require O&M plan for LID, treatment, and hydromod BMPs	EWMP	X	EWMP	EWMP	EWMP	X[2]	EWMP

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs

2012 MS4 Permit Requirement	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County
Implement tracking and enforcement program for LID, treatment and hydromod BMPs	EWMP	X	EWMP	EWMP	EWMP	EWMP	EWMP
Inspect all development sites upon completion and prior to occupancy certificates	EWMP	X	EWMP	X	X	X	EWMP
Verify O&M of BMPs operated by Permittee through inspection	EWMP	X	EWMP	EWMP	X	EWMP	EWMP
Develop maintenance inspection checklist	EWMP	X	EWMP	EWMP	EWMP	EWMP	EWMP
Require private parties that operate BMPs to submit verification of O&M; enforce as needed	EWMP	X	EWMP	EWMP	EWMP	X	EWMP
As needed conduct Progressive Enforcement follow-up inspections (see D.2)	EWMP	X	EWMP	EWMP	EWMP	X	EWMP
D.8 Construction							
Update erosion and sediment control ordinance/procedures to conform with new requirements	EWMP	X	EWMP	X	X[5]	X	EWMP
Sites < 1 acre; inspect based upon water quality threat	EWMP	X	EWMP	X	X	X	EWMP
➢ Establish priority inspection process	EWMP	X	EWMP	EWMP	X	X	EWMP
Site < 1 acre; require sites with soil disturbing activities to implement minimum BMPs	EWMP	X	EWMP	X	X	X	EWMP
Require construction sites to prepare erosion sediment control plan (ESCP); review and approve (≥ 1 acre)	EWMP	X	EWMP	X	X	X	EWMP
Verify construction sites coverage under the CGP and 401 cert	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Develop/implement ESCP review checklist	X	X	EWMP	EWMP	X	X	EWMP
Require construction sites to adhere to standards and make standards readily available	EWMP	X	EWMP	X	X	X	EWMP

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs

2012 MS4 Permit Requirement	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County
Conduct inspections at public and private sites (at least 1x/2 weeks for high threat sites (more frequently when rain is predicted or occurs; at least monthly for lower threat; also must inspect during all phases of construction - at least 3 times)	EWMP	X	EWMP	X	X	X	EWMP
Develop/implement Standard Operating Procedures (SOPs)/inspection checklist	EWMP	X	EWMP	EWMP	X	X[3]	EWMP
Track number of inspections for inventoried sites and verify minimum inspections are completed	EWMP	X	EWMP	EWMP	X	X	EWMP
As needed conduct Progressive Enforcement follow-up inspections (see D.2)	EWMP	X	EWMP	X	X	X	EWMP
Train plan review staff and inspectors	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
➢ Staff must be knowledgeable in QSD/P key objectives, local BMPs standards	EWMP	X	EWMP	EWMP	X	EWMP	EWMP
D.9 Public Agency Activities							
Require public construction sites to implement Planning and Land Development requirements, implement Erosion and Sediment Control BMPs, and obtain Construction General Permit coverage	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Maintain inventory of Permittee owned facilities (including parks and recreation facilities)	EWMP	X	EWMP	EWMP	EWMP	X	EWMP
Update inventory	EWMP	X	EWMP	EWMP	EWMP	X	EWMP
Develop retrofit opportunity inventory; evaluate and rank	EWMP	EWMP	EWMP	EWMP	EWMP	X	EWMP
"Cooperate with private land owners to encourage site specific retrofitting"; includes pilot projects and outreach	EWMP	EWMP	EWMP	EWMP	EWMP	EWMP	EWMP
Obtain IGP coverage for public facilities where appropriate	EWMP	EWMP	EWMP	EWMP	EWMP	X	EWMP

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs

2012 MS4 Permit Requirement	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County
Develop procedures to assess impact of flood management projects on water quality of receiving waters; evaluate to determine if retrofitting is feasible	EWMP	EWMP	EWMP	EWMP	EWMP	Evaluating	EWMP
Evaluate existing structural flood control facilities to determine if retrofitting facility to provide additional pollutant removal is feasible	EWMP	EWMP	EWMP	EWMP	EWMP	Evaluating	EWMP
Implement source control BMPs at Permittee owned facilities/activities	EWMP	X	EWMP	EWMP	EWMP	X	EWMP
Require city-hired contractors to implement source control BMPs	EWMP	X	EWMP	X	EWMP	X	EWMP
Prevent vehicle/equipment washing discharges to the MS4, including firefighting and emergency response vehicles	EWMP	X	EWMP	X	X	X	EWMP
Ensure new/redeveloped/replaced wash facilities are plumbed to the sanitary sewer or self-contained.	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Implement IPM program	EWMP	EWMP	EWMP	EWMP	EWMP	X	EWMP
Ordinances, policies, and procedures reflect IPM techniques and include commitments and schedules to reduce the use of pesticides that cause impairments	EWMP	EWMP	EWMP	EWMP	EWMP	X	EWMP
Annually update in inventory of pesticides used by agency; quantify pesticides used by staff and contractors; demonstrate IPM alternatives to reduce pesticide use	EWMP	EWMP	EWMP	EWMP	EWMP	EWMP	EWMP
Use SOPs for pesticide application	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Ensure no application of pesticides or fertilizers when two or more days with a 50% chance of rain is predicted by NOAA; within 48 hours of 1/2-inch of rain; or when water is flowing off the site	EWMP	EWMP	EWMP	X	EWMP	X	EWMP

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs

2012 MS4 Permit Requirement	Arcadia	Azusa	Bradbury	Duarte	Monrovia	Sierra Madre	LA County
Ensure staff applying pesticides are certified or working under supervision of a certified applicator in the appropriate category	EWMP	EWMP	EWMP	X	EWMP	X	EWMP
Update catch basin map add GPS locations and update priority	EWMP	X	EWMP	X	EWMP	X[2]	EWMP
Inspect/Clean catch basin in areas not subject to Trash TMDL- Priority A: 3x during wet season, 1x during dry 1x; Priority B: 1x during wet 1x and 1x during dry; Priority C: 1x per year. Maintain records.	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Required trash management at public events	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Place and maintain trash receptacles/capture devices at newly identified high trash generating areas	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Label storm drains	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Inspect labels prior to each wet season	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Record and re-label illegible labels within 180 days of inspection	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Post signs at access points to water bodies (open channels, creeks; lakes)	EWMP	EWMP	EWMP	X	X	X	EWMP
In areas not subject to the Trash TMDL, install trash excluders on catch basins or outfalls in areas defined as Priority A, or implement substantially equivalent BMPs	EWMP	EWMP	EWMP	X	X	N/A	EWMP
Inspect and remove trash and debris from open channels and other drainage structures 1x/year before rainy season	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4 (County)	2001 MS4	2001 MS4
Eliminate discharge of contaminants during MS4 maintenance	EWMP	EWMP	EWMP	X	X	X	EWMP
Implement controls to limit infiltration of seepage from sanitary sewers to the storm drains	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs							
2012 MS4 Permit Requirement	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**LA County**
Implement routine preventative maintenance for both systems (survey sanitary sewer and MS4). Sanitary sewer overflow (SSO) General WDR may be used to fulfill this requirement.	EWMP	X	EWMP	EWMP	X	X	EWMP
Implement inspection and maintenance program for Permittee owned BMPs	EWMP	X	EWMP	EWMP	EWMP	EWMP	EWMP
Manage residual water in treatment control BMPs removed during maintenance	EWMP	X	EWMP	EWMP	EWMP	EWMP	EWMP
Street sweeping - Priority A: 2x/month; B: 1x/month; C: as needed, not less than 1x/year	X	X	EWMP	X	X[6]	X	EWMP
Implement road construction maintenance BMPs (e.g., restrict paving activity to exclude periods of rain)	EWMP	X	EWMP	X	X	X	EWMP
Inspect and/or clean Permittee owned parking lots 2x/month	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Train employees and contractors on stormwater requirements	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Train employees and contractors on pesticide use	EWMP	EWMP	EWMP	EWMP	EWMP	X[2]	EWMP
D.10 Illicit Connections (IC) and Illicit Discharges (ID) Elimination							
Continue IC/ID program	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Written procedures for conducting investigations and eliminations	EWMP	X	EWMP	EWMP	X	X[2]	EWMP
Initiate investigation within 72 hours from becoming aware of the discharge	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Implement solutions to eliminate discharge; conduct follow-up investigation to verify elimination; follow Progressive Enforcement Plan (see D.2)	EWMP	X	EWMP	EWMP	X	X	EWMP
When discharge originates upstream of jurisdiction, notify the upstream jurisdiction and RB within 30 days	EWMP	X	EWMP	EWMP	EWMP	N/A	EWMP
Initiate investigation within 21 days for illicit connection	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4

Table P-1 Summary of Existing and Planned Implementation of the 2012 MS4 Permit Required MCMs							
2012 MS4 Permit Requirement	**Arcadia**	**Azusa**	**Bradbury**	**Duarte**	**Monrovia**	**Sierra Madre**	**LA County**
Permit or document illicit connection that only discharge stormwater or allowed non-stormwater	EWMP	X	EWMP	EWMP	X	EWMP	EWMP
Eliminate illicit connection within 180 days of investigation	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Facilitate public reporting via hotline	EWMP	X	EWMP	EWMP	X	X	EWMP
Signage adjacent to open channels provide info re: public reporting	EWMP (County)	X	EWMP	EWMP	X	X[2]	EWMP
Document calls and actions associated with hotline	EWMP	X	EWMP	EWMP	X	X	EWMP
Implement procedures on responding to complaints; evaluate and update procedures	EWMP	X	EWMP	EWMP	X	X	EWMP
Implement a spill response plan	EWMP	EWMP	EWMP	EWMP	EWMP	X	EWMP
Train staff and contractors on ID/IC	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4	2001 MS4
Create a list of positions and contractors that require ID/IC training	EWMP	EWMP	EWMP	X	X EWMP[7]	X	EWMP

[1] Have organized community clean ups and disseminated stormwater prevention information at community events and car shows. Will continue to satisfy requirement following EWMP approval.
[2] Additional updates to materials are planned and/or being evaluated.
[3] Monthly newspaper ads are included in Arcadia Weekly, Monrovia Today, and Sierra Madre Weekly.
[4] Notified critical sources of BMP requirements (1st round) and a second round is planned for by June 2017.
[5] Included in new Low Impact Development (LID) ordinance.
[6] Street sweep once a week and sweep alleys and public parking lots once per month.
[7] Annual staff training has been conducted and following EWMP approval the contractors will be identified.

Table P-2 Comparison of 2001 MS4 Permit MCMs to 2012 MS4 Permit MCMs	
2012 MS4 Permit Requirement	**2001 MS4 Permit Requirement**
D.2 Progressive Enforcement (Applies D.6, D.7, D.8, and D.10)	
Develop and maintain a Progressive Enforcement Policy	
Conduct follow-up inspection within 4 weeks of date of initial inspection	
Take progressive enforcement	
Retain records	
Refer violations to RB	
Investigate complaints from RB	
Assist RB with Enforcement Actions	
D.5 Public Information and Participation Program (PIPP)	
Participate in a Countywide PIPP, WMP PIPP, or individual PIPP that measurably increases knowledge and changes behavior, and involves a diversity of socio economic and ethnic communities	Implement public information and participation program
	Media campaign for Storm Water Pollution Prevention (SPP)
Use effective strategies to educate and involve ethnic communities in SPP through culturally effective methods	Strategy to educate ethnic communities about SPP
	Enhance outreach for proper disposal of cigarette butts
	Conduct educational activities within jurisdiction and participate in county-wide events
	Organize Public Outreach Strategy meetings quarterly
	Conduct Media Outreach to 35 million impressions per year
	Coordinate watershed-specific pollution prevention outreach programs
	Corporate Outreach Program to target retail gas outlets and restaurant chains
Moved to Industrial/Commercial Facilities Program	Coordinate an SPP program for a Business Assistance Program
	Behavioral change assessment strategy towards SPP
Maintain reporting hotline	Maintain the (888) CLEAN-LA hotline
Publish hotline info on web, telephone book	
ID staff/department that serve as the contact (publish this info)	Provide a list of reporting contacts to public through www.888CleanLA.com
	Coordinate and provide contact information for public education activities
Organize events (e.g., clean ups)	
Residential Outreach (Individually or with group):	
➢ Public Service Announcements	

Table P-2 Comparison of 2001 MS4 Permit MCMs to 2012 MS4 Permit MCMs	
2012 MS4 Permit Requirement	**2001 MS4 Permit Requirement**
➢ (Develop) Public education materials on: vehicle fluids; household waste; construction waste; pesticides, fertilizers, and IPM; green wastes; and animal wastes	
➢ Distribute public education materials at points of purchase	
➢ Maintain stormwater website	
➢ Provide schools with materials to educate children (K-12); can use state produced materials	Distribute SPP information to K-12 schools
	Strategy to measure effectiveness of in-school programs
	Convene an Advisory Committee
Moved to IC/ID Program	Mark all storm drain inlets with a "no dumping" message
D.6 Industrial/Commercial	
Track Critical Sources - maintain inventory (watershed based or lat/long recorded)	Maintain a list of industrial/commercial facilities to be inspected
Educate - notify critical sources of BMP requirements	
Implement a Business Assistance Program for select sectors or small businesses - technical assistance, and distribute materials to specific sectors	
Inspect Commercial Sources	Inspect restaurants twice during Permit cycle
Inspect Industrial Sources - initial mandatory inspection	Inspect/visit industrial/commercial facilities appropriately
➢ Secondary mandatory inspection	
➢ No Exposure - evaluate and conduct 2nd inspection at 25% of facilities	
As needed conduct Progressive Enforcement follow-up inspections (see D.2)	Initiate progressive enforcement for facilities failing to implement BMP's
D.7 Planning and Land Development	
	Implement development planning program that requires SUSMP
	Develop peak flow control criteria
	Amend codes and ordinances to give legal effect to SUSMP changes in permit
	Implement revised SUSMP
	Submit an Environmentally Sensitive Areas (ESAs) Delineation map to RWQCB
	Implement SUSMP requirements for industrial/commercial projects >1 acre
	Update CEQA guidelines to include specific storm water related issues
	Update General Plan to include specific stormwater related issues

Table P-2 Comparison of 2001 MS4 Permit MCMs to 2012 MS4 Permit MCMs	
2012 MS4 Permit Requirement	**2001 MS4 Permit Requirement**
	Train targeted employees in permit requirements for Development Planning
	Develop and make SUSMP guidelines available to the developer
	Develop a technical manual for the siting and design of BMPs
Update ordinance/design standards to conform with new requirements (LID and Hydromod)	
Optional: Establish alternative compliance for technical infeasibility, e.g., allow onsite biofiltration or offsite infiltration or GW replenishment or retrofit	
Optional if allowing offsite mitigation: Develop a prioritized list of offsite mitigation projects	
Optional if allowing offsite mitigation: Develop a schedule for completion of offsite projects (must be with 4 yrs of the Certificate of Occupancy of the first project that contributed funds)	
Optional if allowing offsite mitigation: Notice offsite projects to RB website	
Optional if allowing offsite mitigation: List of mitigation projects descriptions and estimated pollutant and flow reductions	
Optional if allowing offsite mitigation: Provide aggregated comparison of alternative compliance to results that would have been expected with on site retention of the SWQDv	
Optional: Submit documentation that a previously adopted LID ordinance provides equivalent pollutant loading and flow reduction	
Plan Review process - check LID and BMP sizing, etc.,	
Establish internal agreements with structure for communication and authority for departments overseeing plan approval and project construction	
Require O&M plan for LID, treatment and hydromod BMPs	
Implement tracking and enforcement program for LID, treatment and hydromod BMPs	
Inspect all development sites upon completion and prior to occupancy certificates	
Verify O&M of BMPs operated by Permittee through inspection	
Develop maintenance inspection checklist	
Require private parties that operate BMPs to submit verification of O&M; enforce as needed	
As needed conduct Progressive Enforcement follow-up inspections (see D.2)	

Table P-2 Comparison of 2001 MS4 Permit MCMs to 2012 MS4 Permit MCMs	
2012 MS4 Permit Requirement	**2001 MS4 Permit Requirement**
D.8 Construction	
	Implement a development construction program
	Require proof of a Waste Discharger ID (WDID) number prior to filing Notice of Intent (NOI)
	Require proof of an NOI and a copy of SWPPP for a transfer of ownership
	Track the number of issued building and grading permits
Update erosion and sediment control ordinance/procedures to conform with new requirements	
Sites < 1 acre; inspect based upon water quality threat	
➢ Establish priority inspection process	
Site < 1 acre; Require sites with soil disturbing activities to implement minimum BMPs	
Require construction sites to prepare ESCP; review and approve (≥ 1 acre)	
Verify construction sites coverage under the CGP and 401 cert	Refer General Construction Activities Stormwater Permit (GCASP) violations to RWQCB
Develop/implement ESCP review checklist	
Require construction sites to adhere to standards and make standards readily available	
Conduct inspections at public and private sites (at least 1x/2 weeks for high threat sites (more frequently when rain is predicted or occurs; at least monthly for lower threat; also must inspect during all phases of construction - at least 3 times)	
Develop/implement SOPs/inspection checklist	
Track number of inspections for inventoried sites and verify minimum inspections are completed	
As needed conduct Progressive Enforcement follow-up inspections (see D.2)	
Train plan review staff and inspectors	Train targeted employees in permit requirements for Development Construction
➢ Staff must be knowledgeable in QSD/P key objectives, local BMPs standards	
D.9 Public Agency Activities	
Require public construction sites to implement Planning and Land Development requirements, implement Erosion and Sediment Control BMPs, and obtain Construction General Permit coverage	Implement Development Planning Program at Permittee-owned construction projects
	Implement Development Construction Program at Permittee-owned construction projects
	Develop, if needed, and implement SWPPPs for field facilities

Table P-2 Comparison of 2001 MS4 Permit MCMs to 2012 MS4 Permit MCMs	
2012 MS4 Permit Requirement	**2001 MS4 Permit Requirement**
Maintain inventory of Permittee owned facilities (including parks and recreation facilities)	
Update inventory	
Develop retrofit opportunity inventory; evaluate and rank	
"Cooperate with private land owners to encourage site specific retrofitting"; includes pilot projects and outreach	
Obtain IGP coverage for public facilities where appropriate	
Develop procedures to assess impact of flood mgt projects on water quality of receiving waters; evaluate to determine if retrofitting is feasible	
Evaluate existing structural flood control facilities to determine if retrofitting facility to provide additional pollutant removal is feasible	
Implement source control BMPs at Permittee owned facilities/activities	
Require city-hired contractors to implement source control BMPs	
Prevent vehicle/equipment washing discharges to the MS4, including fire fighting and emergency response vehicles	
Ensure new/redeveloped/replaced wash facilities are plumbed to the sanitary sewer or self contained.	Equip wash areas with a clarifier, pre-treatment device, or be connected to sewer
Implement IPM program	
Ordinances, policies, and procedures reflect IPM techniques and include commitments and schedules to reduce the use of pesticides that cause impairments	
Annually update in inventory of pesticides used by agency; quantify pesticides used by staff and contractors; demonstrate IPM alternatives to reduce pesticide use	
Use SOPs for pesticide application	Store pesticides/herbicides/fertilizers indoors and apply only in accordance with label directions
Ensure no application of pesticides or fertilizers when two or more days with a 50% chance of rain is predicted by NOAA; within 48 hrs of 1/2-inch of rain; or when water is flowing off the site	
Ensure staff applying pesticides are certified or working under supervision of a certified applicator in the appropriate category	
Update catch basin map add GPS locations and update priority	

Table P-2 Comparison of 2001 MS4 Permit MCMs to 2012 MS4 Permit MCMs

2012 MS4 Permit Requirement	2001 MS4 Permit Requirement
Inspect/Clean catch basin in areas not subject to Trash TMDL- Priority A: 3x during wet season, 1x during dry 1x; PriorityB:1x during wet 1x and 1x during dry; Priority C: 1x per yr. Maintain records.	Designate Catch Basins as priority A, B, or C
Required trash management at public events	Ensure that Catch Basins (CBs) are cleaned appropriately
Place and maintain trash receptacles/capture devices at newly identified high trash generating areas	Place temporary screens on CBs prior to special events or cleanout immediately afterwards
	Place and maintain trash receptacles at all transit stops with shelters
	Designate curbed streets as priority A, B, or C based on liter accumulation
Label storm drains	(Required under PIPP in 2001)
Inspect labels prior to each wet season	Inspect the legibility of CB stencils and re-label within 180 days if necessary
Record and re-label illegible labels within 180 days of inspection	
Post signs at access points to water bodies (open channels, creeks; lakes)	
In areas not subject to the Trash TMDL, install trash excluders on catch basins or outfalls in areas defined as Priority A, or implement substantially equivalent BMPs	
Inspect and Remove trash and debris from open channels and other drainage structures 1x/yr before rainy season.	Visually monitor and clean all open channels annually for debris
Eliminate discharge of contaminants during MS4 maintenance	
Implement controls to limit infiltration of seepage from sanitary sewers to the storm drains	Implement a sewer overflow prevention and response program
Implement routine preventative maintenance for both systems, survey sanitary sewer and MS4. May use sanitary sewer overflow (SSO) General WDR to fulfill this requirement	
Implement inspection and maintenance program for Permittee owned BMPs	
Manage residual water in treatment control BMPs removed during maintenance	
Street sweeping - Priority A: 2x/mo; B: 1x/mo; C: as needed, not less than 1x/yr	
Implement road construction maintenance BMPs (e.g., restrict paving activity to exclude periods of rain)	
Inspect and/or clean Permittee owned parking lots 2x/mo	Inspect and, if needed, clean Permittee owned parking lots twice per month, but at least once
Train employees and contractors on stormwater requirements	Train targeted employees in permit requirements for Public Agency Activities

Table P-2 Comparison of 2001 MS4 Permit MCMs to 2012 MS4 Permit MCMs	
2012 MS4 Permit Requirement	**2001 MS4 Permit Requirement**
Train employees and contractors on pesticide use	
	Recover saw cutting waste and dispose it offsite
	Conduct a dry weather diversion study and create a priority list of drains for diversion
D.10 Illicit Connections (IC) and Illicit Discharges (ID) Elimination	
Continue IC/ID program	Develop an Implementation Program which specifies how revisions of the IC/ID SQMP are implemented
	Create a database for permitted storm drain connections and map IC/ID
	Field screen the storm drain system for illicit connections in open channels
	Field screen the storm drain system for illicit connections in underground storm drains in priority areas
	Field screen the storm drain system for illicit connections in underground s/d larger than 36 inch diameter
	Review all permitted connections to the storm drain system for compliance
Written procedures for conducting investigations and eliminations	
Initiate investigation within 72 hours from becoming aware of the discharge	Respond to illicit discharges within one business day of discovery
	Investigate illicit discharges as soon as practicable
Implement solutions to eliminate discharge; conduct follow-up investigation to verify elimination; follow Progressive Enforcement Plan (see D.2)	
When discharge originates upstream of jurisdiction, notify the upstream jurisdiction and Regional Board within 30 days	
Initiate investigation within 21 days for illicit connection	Investigate illicit connections 21 days after discovery
Permit or document illicit connection that only discharge stormwater or allowed non-stormwater	
Eliminate illicit connection within 180 days of investigation	Terminate illicit connections 180 days after confirmation
Facilitate public reporting via hotline	
Signage adjacent to open channels provide info re: public reporting	
Document calls and actions associated with hotline	
Implement procedures on responding to complaints; evaluate and update procedures	
Implement a spill response plan	
Train staff and contractors on ID/IC	Train targeted employees in the permit requirements for IC/ID

Table P-2 Comparison of 2001 MS4 Permit MCMs to 2012 MS4 Permit MCMs

2012 MS4 Permit Requirement	2001 MS4 Permit Requirement
Create a list of positions and contractors that require ID/IC training	
	Perform IC/ID Trend Analysis

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Attachment Q

Regional Project Concepts

THE ENTIRETY OF ATTACHMENT Q IS SUPERSEDED BY THE 2018 REVISED EWMP

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Attachment R

Green Street Subarea Analysis Figures

THE ENTIRETY OF ATTACHMENT R IS SUPERSEDED BY THE 2018 REVISED EWMP

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Attachment S

Green Street Summary Tables

THE ENTIRETY OF ATTACHMENT S IS SUPERSEDED BY THE 2018 REVISED EWMP

Attachment T

Green Street Subarea Summary

THE ENTIRETY OF ATTACHMENT T IS SUPERSEDED BY THE 2018 REVISED EWMP

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Attachment U

LSPC Flow Calibration Figures

THE ENTIRETY OF ATTACHMENT U IS SUPERSEDED BY THE 2018 REVISED EWMP

Attachment V

Industrial and Other Permitted Facilities

The table and figure presented in this attachment identifies the industrial and other permitted facilities within the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG). This reference corresponds with **Section 4.6** of the RH/SGRWQG Enhanced Watershed Management Program (EWMP).

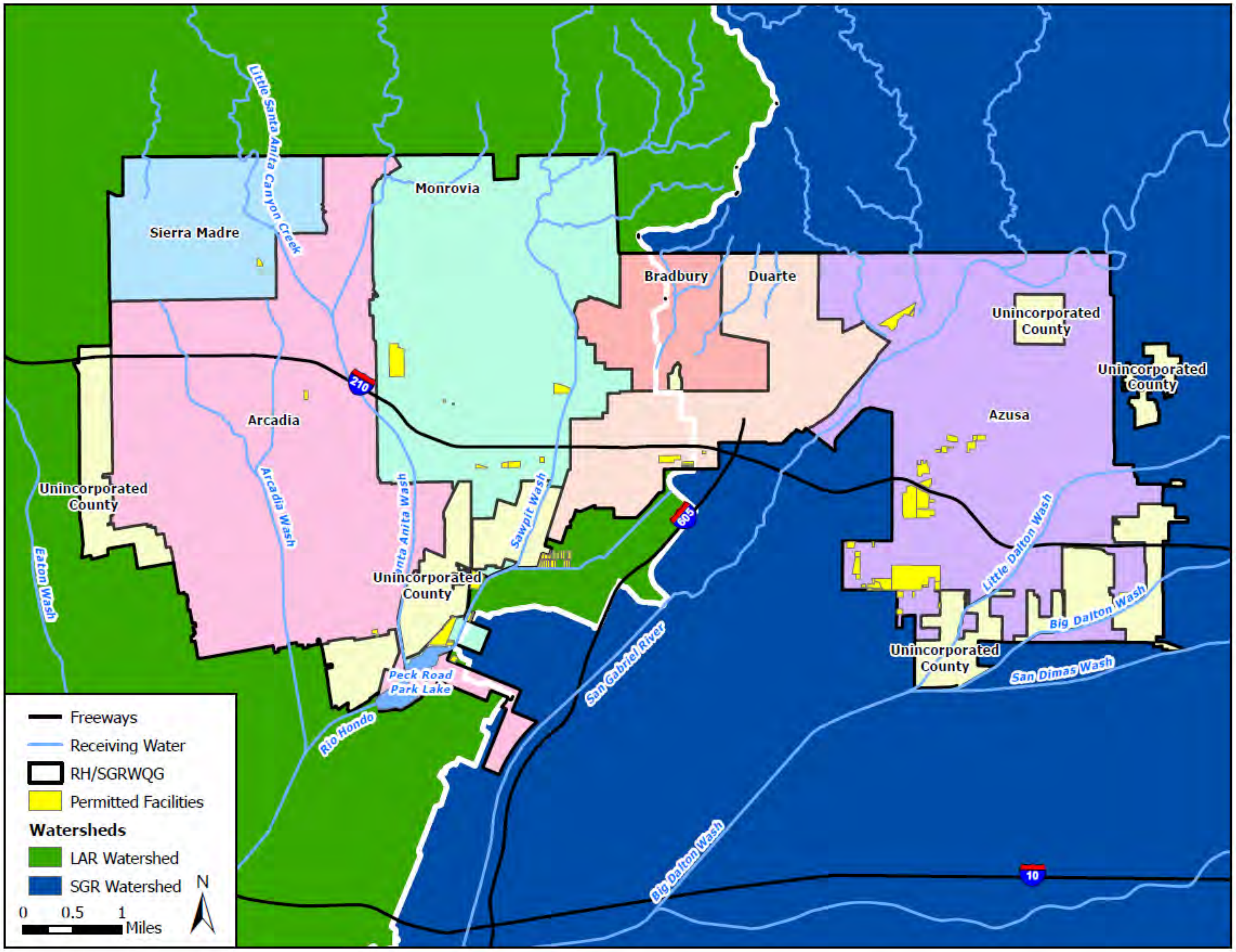

Figure V-1 Industrial Permitted Facilities Covered by the Industrial General Permit in the RH/SGRWQG

Table V-1 Summary of Industrial Permitted Facilities Covered by the Industrial General Permit in the RH/SGRWQG

Application ID	WDID	Status Date	Owner/Operator Name	Site/Facility Name	Address	City	Zip Code	APN
Arcadia								
430950	4 19I023809	41159	First Transit Inc co Strata Environmental	First Transit Inc 55593	5640 Peck Road	Arcadia	91006	8532007904
191494	4 19I017940	37693	Arcadia High School	Arcadia Vehicle Maint Fac	35 W Saint Joseph St	Arcadia	91007	5775021902
191271	4 19I016849	40927	Digital Optics Corp	DigitalOptics Corp	400 E Live Oak Ave	Arcadia	91006	8572001030
Azusa								
190871	4 19I015135	36294	Veolia ES Technical Solutions LLC	Veolia ES Technical Solutions LLC	1704 W 1st St	Azusa	91702	8533011002
440234	4 19I024436	41515	Acrylatex Recycling & Coatings	Acrylatex Recycling & Coatings	1001 W Kirkwall Rd	Azusa	91702	8619007040
190558	4 19I013578	35787	Fluorochem Inc	Fluorochem Inc	680 S Ayon Ave	Azusa	91702	8619010039
435081	4 19I024083	41324	NoracPharma	Norac Pharma	405 S Motor Ave	Azusa	91702	8615002022
190053	4 19I010982	34439	Reichhold Inc	Reichhold Inc	237 S Motor Ave	Azusa	91702	8615002025
190053	4 19I010982	34439	Reichhold Inc	Reichhold Inc	237 S Motor Ave	Azusa	91702	8615002023
413877	4 19I023093	40638	Michael K Holmes	Valley Forge Inc	444 S Motor Ave	Azusa	91702	8615005046
188694	4 19I000805	33683	Azusa School District	Azusa Sch Dist	546 S Citrus Ave	Azusa	91702	8630008900
191284	4 19I016904	37203	Northrop Grumman Systems Corporation	Northrop Grumman Systems Corporation	1100 W Hollyvale St	Azusa	91702	8615001056
191284	4 19I016904	37203	Northrop Grumman Systems Corporation	Northrop Grumman Systems Corporation	1100 W Hollyvale St	Azusa	91702	8615001068
191284	4 19I016904	37203	Northrop Grumman Systems Corporation	Northrop Grumman Systems Corporation	1100 W Hollyvale St	Azusa	91702	8615001055
191284	4 19I016904	37203	Northrop Grumman Systems Corporation	Northrop Grumman Systems Corporation	1100 W Hollyvale St	Azusa	91702	8615001065
188740	4 19I001038	33688	Mag Parts	Mag Parts	1545 W Roosevelt St	Azusa	91702	8615007010
189208	4 19I003642	33700	Universal Metal Plating	Universal Metal Plating	1526 W 1st St	Azusa	91702	8615010039
191713	4 19I018755	38099	Burrtec Waste Services LLC	Burrtec Waste Services LLC	1017 W Gladstone St	Azusa	91702	8615016012
426139	4 19I023600	41012	V & L Auto Salvage	V & L Auto Salvage	470 S Mira Loma Dr Unit B	Azusa	91702	8615016007
189367	4 19I004450	33700	USA Waste of California Inc	Azusa Land Reclamation Incorporated	1211 Gladstone	Azusa	91702	8615016006
436144	4 19I024156	41358	S and S Foods LLC	S and S Foods LLC	1120 W Foothill Blvd	Azusa	91702	8616001420
423943	4 19I023500	40941	MLS Fluid Solutions LLC	MLS Fluid Solutions LLC	1061 W 5th St	Azusa	91702	8616011012
188736	4 19I001029	33688	Don Ansell	CA Amforge	750 N Vernon Ave	Azusa	91702	8605003044
189796	4 19I009320	33922	Heppner Hardwoods Inc	Heppner Hardwoods Inc	555 Danlee	Azusa	91702	8605003049
189796	4 19I009320	33922	Heppner Hardwoods Inc	Heppner Hardwoods Inc	555 Danlee	Azusa	91702	8605003052
425139	4 19I023558	40981	Ancra International LLC	Ancra International LLC	875 W 8th St	Azusa	91702	8605015023
369964	4 19I022290	40045	Cryogenics Transportation Inc	CTI Azusa Terminal	975 W Industrial St	Azusa	91702	8605019401
334572	4 19I021259	39391	Stone Roofing Co Inc	Stone Roofing Co Inc	730 N Coney Ave	Azusa	91702	8605019423
293072	4 19I019437	38464	Keith Lindsey	Lindsey Manufacturing Co	755 N Georgia Ave	Azusa	91702	8605019405
188924	4 19I002248	33694	CalMat Co dba Vulcan Materials Co	Calmat Co Azusa Rock	3901 Fish Canyon Rd	Azusa	91016	8610023009
292983	4 19I019285	38372	Kemac Technology Inc	Kemac Tech Inc	503 S Vincent Ave	Azusa	91702	8619017037
441231	4 19I024468	41530	Azusa Land Reclamation Nc	Azusa Transfer Station & MRF	1501 W Gladstone St	Azusa	91702	8615007017
188820	4 19I001527	33661	Cemex Construction Materials Pacific LLC	Cemex Construction Materials Pacific LLC	1201 Gladstone	Azusa	91702	8615007018
292940	4 19I018895	38180	Savios Custom Furniture	Savios Custom Furniture	1340 W Gladstone St	Azusa	91702	8619010044

Table V-1 Summary of Industrial Permitted Facilities Covered by the Industrial General Permit in the RH/SGRWQG

Application ID	WDID	Status Date	Owner/Operator Name	Site/Facility Name	Address	City	Zip Code	APN
Duarte								
189919	4 19I010111	34169	De La Huerta Auto Parts	De La Huerta Auto Parts	852 Alpha St	Duarte	91010	8533013027
409806	4 19I022938	40521	Best Choice Auto Dismantling	Best Choice Auto Dismantling	750 Alpha St	Duarte	91010	8533013029
190446	4 19I012893	41726	Popular Auto Parts	Popular Auto Parts	782 Alpha St	Duarte	91010	8533013022
414193	4 19I023102	40647	Sunrise Auto Wrecker LLC dba M L Auto Wrecker	Sunrise Auto WreckSunrise Auto Wrecker LLC dba M L Auto Wreckerer LLC dba M and L Auto Wrecke	797 Alpha St	Duarte	91010	8533013030
403700	4 19I022666	40339	Nemos Auto Inc	Nemos Auto Inc	712 Alpha St	Duarte	91010	8533013037
441641	4 19I024494	41548	Narine Malkhasyan	Beemer and Benz Auto Dismantler	872 Alpha St	Duarte	91010	8533013040
292907	4 19I018559	37988	Jim Lortson	Russ Recycling	756 Alpha St	Duarte	91010	8533013033
402970	4 19I022600	40288	OK Auto Salvage	OK Auto Salvage	864 Alpha St	Duarte	91010	8533013039
434345	4 19I024029	41297	My Boys Auto Inc	My Boys Auto	706 Alpha St	Duarte	91010	8533013038
314213	4 19I020539	39027	A Abar Auto Wrecking	AAA Auto Wrecking	863 Alpha St	Duarte	91010	8533013045
188843	4 19I001717	33693	Noriega David	Dave S Auto & Truck Dismantlin	734 Alpha St	Duarte	91010	8533013035
447434	4 19I024928	41815	S & J Auto	S & J Auto	740 Alpha Street	Duarte	91010	8533013034
190288	4 19I012245	35163	PV Auto Dismantling Inc	P V Auto Dismantling Inc	775 Alpha	Duarte	91010	8533013032
190423	4 19I012811	35436	Alpha Auto Wrecking	Alpha Auto Wrecking	772 Alpha St	Duarte	91010	8533013041
440990	4 19I024442	41521	Los 3 Gallos	Los 3 Gallos	739 Alpha St	Duarte	91010	8533013042
190792	4 19I014889	36172	Sunny Morning Corp	Ylm Auto Wrecking	722 Alpha St	Duarte	91010	8533013036
190608	4 19I013800	35865	Tat Auto Dismantler	Tat Auto Dismantler	713 Alpha St	Duarte	91010	8533013043
189950	4 19I010302	34158	LPD II Auto Wrecking	LPD II Auto Wrecking	845 Alpha St	Duarte	91010	8533013048
301646	4 19I020190	38828	All California Truck Auto Salvage	All California Truck & Auto Salvage	867 Alpha St	Duarte	91010	8533013051
189950	4 19I010302	34158	LPD II Auto Wrecking	LPD II Auto Wrecking	845 Alpha St	Duarte	91010	8533013047
429352	4 19I023760	41123	IPP Plastic Products Inc	IPP Plastic Products Inc	1956 Evergreen St	Duarte	91010	8528013127
189751	4 19I009090	33915	HTL Pacific Scientific	H T L Pac Scientific	1800 Highland Ave	Duarte	91010	8528014067
435225	4 19I024098	41327	Woodward Inc	Woodward HRT	1700 Business Center Drive	Duarte	91010	8528011020
189751	4 19I009090	33915	HTL Pacific Scientific	H T L Pac Scientific	1800 Highland Ave	Duarte	91010	8528014068
189751	4 19I009090	33915	HTL Pacific Scientific	H T L Pac Scientific	1800 Highland Ave	Duarte	91010	8528014063
Monrovia								
191107	4 19I016242	36850	SLS & N Inc	S L S & N Inc Peck Rd Gravel P	128 Live Oak Ave	Monrovia	91016	8532005901
191107	4 19I016242	36850	SLS & N Inc	S L S & N Inc Peck Rd Gravel P	128 Live Oak Ave	Monrovia	91016	8532005001
188681	4 19I000751	33683	Allan Co	Monrovia Recycling	145 W Duarte Rd	Monrovia	91016	8507003044
190029	4 19I010791	34317	Pick A Part	Pick A Part Auto Dismantling	3333 Peck Rd	Monrovia	91016	8571009022
441434	4 19I024477	41540	Lexus Land Auto Wrecking Inc	Lexus Land Auto Wrecking Inc	3301 Peck Rd	Monrovia	91016	8571009024
190029	4 19I010791	34317	Pick A Part	Pick A Part Auto Dismantling	3333 Peck Rd	Monrovia	91016	8571009023
188765	4 19I001198	33689	3M Unitek	3M Unitek	2724 South Peck Road	Monrovia	91016	8511016012
189815	4 19I009484	33932	UPL Decco Inc	Decco Cerexagri Inc	1713 S California Ave	Monrovia	91016	8513011037
403432	4 19I022640	40315	Vinyl Technology Inc	Vinyl Technology Inc	200 Railroad Ave	Monrovia	91016	8513011036
188885	4 19I002054	33693	3M Company Corona	3M Monrovia Tape Mfg Div	1601 S Shamrock Ave	Monrovia	91016	8513012037
191499	4 19I017959	37694	Monrovia Unified School District	Transportaion Yard	124 S Madison Ave	Monrovia	91016	8505027900
189183	4 19I003539	33697	Mask Off Co Inc	Mask Off Co Inc	345 W Maple Ave	Monrovia	91016	8506004012

Table V-1 Summary of Industrial Permitted Facilities Covered by the Industrial General Permit in the RH/SGRWQG								
Application ID	**WDID**	**Status Date**	**Owner/Operator Name**	**Site/Facility Name**	**Address**	**City**	**Zip Code**	**APN**
189183	4 19I003539	33697	Mask Off Co Inc	Mask Off Co Inc	345 W Maple Ave	Monrovia	91016	8506004011
189183	4 19I003539	33697	Mask Off Co Inc	Mask Off Co Inc	345 W Maple Ave	Monrovia	91016	8506004013
322261	4 19I020736	39163	Donna Leiby	JP Paper Shredders	428 W Chestnut Ave	Monrovia	91016	8506007032
191811	4 19I019056	38258	Ducommun AeroStructures Inc	Ducommun Aerostructures	801 Royal Oaks Dr	Monrovia	91016	8517016015
Sierra Madre								
190553	4 19I013547	35760	Sierra Madre City	Sierra Madre City	579 E Sierra Madre Blvd	Sierra Madre	91024	5766005901

Attachment W

90th Percentile Load Determination

THE ENTIRETY OF ATTACHMENT W IS SUPERSEDED BY THE 2018 REVISED EWMP

Attachment X

Load Reduction Summaries

THE ENTIRETY OF ATTACHMENT X IS SUPERSEDED BY THE 2018 REVISED EWMP

Attachment Y

Regional Project Cost Estimates

THE ENTIRETY OF ATTACHMENT Y IS SUPERSEDED BY THE 2018 REVISED EWMP

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Attachment Z

Green Street Cost Estimate

THE ENTIRETY OF ATTACHMENT Z IS SUPERSEDED BY THE 2018 REVISED EWMP

Attachment AA

Grant and Loan Opportunities

This attachment includes tables summarizing grant and loan opportunities and their applicability in funding the control measures proposed in the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) Enhanced Watershed Management Program (EWMP), as discussed in **Section 6.5**.

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation

Grant Program	Proposition 84 Stormwater Program	Proposition 84 (Chapter 2, §75026) Integrated Regional Water Management (IRWM)	Proposition 84 Urban Stream Restoration
Department	State Water Resources Control Board (SWRCB)	SWRCB	SWRCB
Purpose	Provides funding for projects that reduce and prevent stormwater contamination of rivers, lakes, and streams.	Projects to assist local public agencies to meet long-term water management needs of the State, including the delivery of safe drinking water, flood risk reduction, and protection of water quality and the environment.	Projects that reduce urban flooding and erosion, restore environmental values, and promote stewardship of urban streams.
Eligibility Requirements	Local public agencies	Local public agencies or nonprofit representing an accepted IRWM Region	Local government agencies and citizens groups/nonprofits (together)
Eligible Uses	➢ Implement Low Impact Development (LID) and other onsite and regional practices that seek to maintain predevelopment hydrology. ➢ Comply with stormwater related TMDL requirements	Projects that implement IRWM Plans	Creek cleanups; eradication of exotic or invasive plants; revegetation efforts; bioengineering bank stabilization projects; channel reconfiguration to improve stream geomorphology and aquatic habitat functions; acquisition of parcels critical for flood management; and coordination of community involvement in projects.
Ineligible Uses	Operation and maintenance activities	Operation and maintenance activities	Exclusively educational or fish and wildlife enhancement projects; lake or reservoir enhancements; planning only projects; and mitigation for development or other projects
Funding Limits	$250,000 to $3,000,000 per project Requires 20% match (less for Disadvantaged Communities (DACs))	➢ Bond funding allocation for entire program is $1,000,000,000. ➢ Prop 84 allots grant funding to 11 funding areas. ➢ Each proposal solicitation package will have predetermined amount of funds available.	$1,000,000 per eligible project
Terms/Dates	Round 2 grants were awarded by June 2014. Future opportunities will be presented at a future time.	➢ 25% minimum cost share with waivers for DACs ➢ Applicant workshop in June 2015 ➢ Applications due August 7, 2015 (Approximately $215,000,000 available for Los Angeles Funding Areas).	2014 grant cycle has been closed. 2015 grant cycle dates to be determined.
Website	http://www.waterboards.ca.gov/water_issues/programs/grants_loans/prop84/index.shtml	http://www.water.ca.gov/irwm/grants/p84implementation.cfm	http://www.water.ca.gov/urbanstreams
Examples	➢ City of Los Angeles Broadway Neighborhood Stormwater Greenway Project ➢ City of Encinitas Cottonwood Creek Watershed LID Retrofit Project	➢ City of Carson's Trash Reduction Automatic Retracting Screen Project ➢ Dominguez Gap Spreading Grounds West Basin Percolation Improvements ➢ Oxford Retention Basin Multi-Use Enhancement Project ➢ Vermont Avenue Stormwater Capture and Green Street Project.	➢ Restoration of Berkshire Creek sponsored by Pasadena and Arroyo Seco ➢ Dry Canyon Creek Historic Meander Restoration sponsored by the City of Calabasas ➢ Las Virgenes Creek Bank Stabilization, Stream Restoration, and Fish Barrier Enhancement Project
Comments	All projects awarded funds through this grant program have planning and monitoring requirements or an implementation requirement. The projects funded through this program also involve LID or green streets in order to reduce and prevent stormwater contamination of rivers, lakes, and streams. This program gives agencies the opportunity to enhance water quality while also assisting in compliance.	IRWM is a collaborative effort to manage all aspects of water resources in a region. IRWM crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions. Some eligible project types include: ➢ Stormwater capture, storage, clean-up, treatment, and management; ➢ Non-point source pollution reduction, management, and monitoring; ➢ Groundwater recharge and management projects; ➢ Planning and implementation of multipurpose flood management programs; and ➢ Watershed protection and management.	RH/SGRWQG may be able to take advantage of this funding opportunity if the proposed projects are related to stream restoration. If project concepts change in the future, this opportunity may be more applicable.
RH/SGRWQG Potential Uses	➢ Regional BMP Projects ➢ Distributed BMP Projects	➢ Regional BMP Projects ➢ Distributed BMP Projects	No projects apply at this time
Contact Information	Robert Reeves Division of Financial Assistance Project Development (916) 341-5877 Robert.Reeves@waterboards.ca.gov	Zaffar Eusuff or Keith Wallace Program Manager/Project Manager (916) 651-9266 or (916) 651-9624 Muzaffar.Eusuff@water.ca.gov Keith.Wallace@water.ca.gov	Program Manager Amy Young Staff Environmental Scientist (916) 651-9626 Amy.Young@water.ca.gov

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)			
Grant Program	**Community Action for a Renewed Environment (CARE)**	**Pollution Prevention (P2)**	**Clean Beaches Initiative (CBI)**
Department	United States Environmental Protection Agency (USEPA)	USEPA	SWRCB
Purpose	Provide support to help communities form collaborative partnerships, develop a comprehensive understanding of many sources of risk from toxics and environmental pollutants, set priorities and identify and carry out projects to reduce risks through collaborative action at the local level.	Fund projects that help reduce hazardous substances, pollutants, or contaminants entering waste streams or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, disposal or energy recovery activities.	Projects that restore and protect water quality of coastal waters, estuaries, bays, and near shore waters, with an emphasis on projects that reduce bacterial contamination on public beaches.
Eligibility Requirements	Local non-profit organizations, Native American Organizations, quasi-public non-profit organizations, inter and intrastate, local government, colleges, and universities.	State governments, colleges, and universities, federally-recognized tribes and intertribal consortia.	Local agencies, public agencies, non-profits, and Indian tribes
Eligible Uses	Community projects involving education of environmental pollutants	Projects that implement pollution prevention technical assistance services and/or training for businesses and support projects that utilize pollution prevention techniques to reduce and/or eliminate pollution from air, water, and/or land.	Planning and implementation projects meeting CBI priorities
Ineligible Uses	Not identified	Not identified	Operation and maintenance activities
Funding Limits	➢ Two funding levels: $75,000-$100,000 and $150,000-$300,000 ➢ No matching required	➢ Approximately forty grants awarded annually for $20,000-$180,000 ➢ 50 percent match required	➢ $150,000 to $5,000,000 ➢ Requires match (variable based on project or if benefits a DAC)
Terms/Dates	Applications are not currently being accepted due to absence of congressional funding.	Current applications are due May 14, 2015. Grants are posted annually and are awarded between May and August.	➢ Continuous funding cycle, with intermittent closures to review proposals, until funds are exhausted ($30,000,000 available). ➢ Applications through Financial Assistance Application Submittal Tool (FAAST)
Website	www.epa.gov/care	http://www.epa.gov/p2/pubs/grants/index.htm	http://www.waterboards.ca.gov/water_issues/programs/beaches/cbi_projects/index.shtml
Examples	➢ Environmental Justice Action Collaborative for Maywood in 2010 ➢ Environmental Health Coalition - Clean Ports in 2009 ➢ Pacoima Beautiful in 2005 and 2007	➢ Funded the Santa Ynez Band of Chumash Indians and trained over 1,700 business employees regarding pollution prevention techniques (2013) ➢ Funded the University of California San Francisco so that a database could be developed that identifies environmentally friendlier product alternatives (2012)	➢ Los Angeles Sanitation District and City of Los Angeles Ballona Creek Water Quality Improvement and Beneficial Use Project ➢ City of Santa Cruz Reduce Sources of Bacteria at Cowell Beach and Main Beach Project ➢ Low flow diversions and sewer improvements
Comments	CARE projects have been implemented and funded within the United States since 2005. RH/SGRWQG may be able to take advantage of the CARE grant opportunity to fund community programs associated with MCM program elements involving community outreach.	P2 has funded various training and educational programs across the United States. RH/SGRWQG may be able to benefit from this grant program in order to implement requirements associated with the MS4 Permit required MCMs and other pollution prevention training programs.	The projects awarded this grant promote LID and projects are designed to implement a stormwater resource plan. As mentioned above, priority is given to projects that reduce bacterial contamination on public beaches. An even higher priority is given to projects addressing bacteria on beaches that have a low grade on the Heal the Bay Report Card (http://brc.healthebay.org).
RH/SGRWQG Potential Uses	➢ Stormwater Program	➢ Stormwater Program	➢ Regional BMP Projects ➢ Distributed BMP Projects (If a link between clean beaches can be made)
Contact Information	CARE Program USEPA (8001A) 1200 Pennsylvania Avenue, NW Washington, DC 20460 (877) CARE-909	Jessica Counts-Arnold USEPA Region 9 75 Hawthorne Street (WST-7) San Francisco, CA 94105 (415) 972-3288 Counts-arnold.jessica@epa.gov	Patricia Leary Senior Water Resources Control Engineer Division of Financial Assistance (916) 341-5167 pleary@waterboards.ca.gov

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)			
Grant Program	**Urban Waters Small Grant**	**Environmental Education Grant and SubGrant**	**Cooperative Watershed Management Plan**
Department	USEPA	USEPA	United States Department of the Interior Bureau of Reclamation
Purpose	Fund projects that will foster a comprehensive understanding of local urban water issues, identify and address these issues at the local level, and educate and empower the community.	Provide financial support for projects which design, demonstrate or disseminate environmental education practices, methods, or techniques.	Enhance water conservation including alternative uses, improve water quality, improve ecological resiliency of a river or stream, and reduce conflicts over water at the watershed level by supporting the formation of watershed groups.
Eligibility Requirements	Educational institutions, Indian tribes, local governments, non-profit groups, schools, governments, state/territorial agency, and Tribal agencies.	Local, Tribal, or state education agencies, colleges and universities, state environmental agencies, and non-commercial educational broadcasting agencies.	Existing or proposed watershed groups, states, and local districts.
Eligible Uses	Fund research, investigations, experiments, training, surveys, studies, and demonstrations that will advance the restoration of urban waters by improving water quality through activities that also support community revitalization and other local priorities.	Project must address one of the following educational and environmental priority issues. Educational issues: community projects; human health and environment; or career development. Environmental issues: protecting air quality; safety of chemicals; cleaning up our communities; or protecting America's waters.	Activities falling under categories Task Area A and B described below. Task Area A: establishment of a new watershed group. Task Area B: expansion of an existing watershed group.
Ineligible Uses	Not identified	Not identified	Not identified
Funding Limits	Approximately $1.6 million annually, $40,000-$60,000 each	➢ Approximately $2,778,940 available annually ➢ Each grant between $75,000-$200,000 ➢ 2-3 grants awarded to each region for an expected 22-32 grants total ➢ Cost sharing requirement of a minimum of 25% of the total cost	Typically $22,000-$100,000 each and an annual total of about $200,000
Terms/Dates	The 2013/14 application period is closed and future periods have not been announced.	The 2014-2015 program cycle is closed. Future opportunities to be determined.	The 2014 cycle is closed. Future dates have not yet been announced.
Website	http://www2.epa.gov/urbanwaters/urban-waters-small-grants	http://www2.epa.gov/education/environmental-education-ee-grants	http://www.usbr.gov/WaterSMART/cwmp/index.html
Examples	➢ California Coastal Commission in Santa Cruz County (see below) ➢ Council for Watershed Health (see below)	➢ Bay Institute of San Francisco for a watershed restoration educational program ➢ San Joaquin for an Adopt-a-Watershed training for teachers ➢ Santa Monica Baykeeper for a variety of stormwater pollution prevention education	➢ Western Slope Conservation Center in Colorado (see below) ➢ Friends of Teton River, Inc. in Idaho (see below)
Comments	During the 2011/12 funding cycle, the California Coastal Commission in Santa Cruz County received funding for a project that will reduce specific urban sources of water quality impacts in two target watershed areas by implementing structural and non-structural control measures. The Council for Watershed Health also received funding to develop a Los Angeles River Watershed assessment framework and then disseminate the results to the community via multi-media outlets. RH/SGRWQG may be able to take advantage of funding through this grant depending on the requirements set forth during the application year. These funds could be used to fund various MCM programs, other institutional BMP control measures, and distributed structural BMPs.	Various environmental educational programs within California have received funding through this grant program dating back as far as 1992. RH/SGRWQG may be able to utilize this grant opportunity for funding stormwater pollution prevention educational programs, including various MCM program elements.	Five entities received funding in 2013 to establish or expand watershed groups in Colorado, Idaho, and Oregon. The Western Slope Conservation Center in Colorado was an established watershed group that will use the funding to address exceedances in *E. coli* and selenium. The Friends of Teton River, Inc. in Idaho used the grant money to expand their current watershed group to form an advisory council to prioritize and endorse various projects. The Cooperative Watershed Management Program grant is applicable to RH/SGRWQG and could be used to expand or implement projects or programs associated with the group.
RH/SGRWQG Potential Uses	➢ Stormwater Program	➢ Stormwater Program	➢ Stormwater Program ➢ Regional BMP Projects ➢ Distributed BMP Projects (as long as the group applies for the grant opposed to individual agencies)
Contact Information	Jared Vollmer USEPA Region 9 (WTR-3) 75 Hawthorne Street San Francisco, CA 94105 (415) 972-3447 Vollmer.jared@epa.gov	Adrienne Priselac USEPA Region 9 Environmental Education (CED-4) 75 Hawthorne Street San Francisco, CA 94105 Priselac.adrienne@epa.gov	Dean Marrone (303) 445-3577 www.usbr.gov/WaterSMART

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)

Grant Program	**State of California Coastal Conservancy Program**	**Wildlife Conservation Board (WCB)**	**Habitat Conservation Fund (HCF)**
Department	State of California Coastal Conservancy	State of California Wildlife Conservation Board	State of California Department of Parks and Recreation
Purpose	Projects that protect and improve coastal wetlands, streams, and watersheds; work with local communities to revitalize urban waterfronts; and helps to solve complex land use problems.	Projects that can be categorized by the following WCB programs: riparian habitat conservation, inland wetlands conservation, ecosystem restoration or agricultural lands, and habitat enhancement and restoration.	Projects that protect threatened species, address wildlife corridors, create trails, and provide nature interpretation programs.
Eligibility Requirements	Government agencies and non-profit organizations	Government agencies, state departments, federal agencies, and non-profit organizations	Cities, counties, and districts
Eligible Uses	Goals and projects that meet the objectives in the Conservancy's Strategic Plan and consistent with the purposes of the funding source (typically Proposition 84)	Projects that restore and enhance wildlife habitats	Nature interpretation programs to bring urban residents into park and wildlife areas, protection of various plant and animal species, and acquisition and development of wildlife corridors and trails.
Ineligible Uses	Not identified	Not identified	Not identified
Funding Limits	No established minimum or maximum grant amount	No established minimum or maximum grant amount	➢ $2,000,000 funded annually through 2019-2020 Fiscal Year ➢ 50 percent match required from grantees
Terms/Dates	Proposals are accepted on a continuous basis. Periodically grant rounds will be advertised and applications will be accepted for projects of a particular type or a particular location.	Proposals are accepted on a continuous basis. WCB meets four times per year, typically in February, May, August, and November.	Applications are due the first workday in October each year.
Website	http://scc.ca.gov/applying-for-grants-and-assistance/forms/	www.wcb.ca.gov/Programs.aspx	http://www.parks.ca.gov/?Page_id=21361
Examples	➢ Los Cerritos Wetlands Authority (see below) ➢ Mountains Recreation and Conservation Authority (see below) ➢ Ballona Creek Wetlands Ecological Reserve (see below)	➢ Malibu Lagoon State Park Coastal Restoration Project ➢ Moss Landing Wildlife Area Wetland Restoration Project	➢ Wilderness Park Pond Restoration in the City of Downey ➢ Wildlife Inspired Leadership Development in Los Angeles County ➢ San Jacinto River Trail in the City of Perris
Comments	Various projects within southern California have received funding through the Coastal Conservancy Grant Program. In 2011, $225,000 was provided to the Los Cerritos Wetlands Authority to prepare a comprehensive conceptual restoration plan for the Los Cerritos wetlands complex in the Cities of Long Beach and Seal Beach near the mouth of the San Gabriel River. $500,000 was awarded to the Mountains Recreation and Conservation Authority for the design and construction of the Compton Creek Nature Park and $280,000 was provided for site improvements and planning to provide for public access, community stewardship, and educational programs at the Ballona Wetlands Ecological Reserve. This grant program may be applicable to RH/SGRWQG for different types of control measures.	Various projects within California have received funding through this grant program. Projects that may be authorized as inland wetland conservation projects incorporate elements such as the construction of swales, installation of water control structures, and the establishment of upland grasslands. RH/SGRWQG may be able to benefit from the WCB Grant Program if the projects identified through the EWMP development pertain to wetlands or habitat enhancements. It may be easy to add elements to potential projects so that the project qualifies for funding while also incorporating water quality improvement elements.	The HCF has opportunities annually that the RH/SGRWQG may be able to benefit from if selected projects concern a wildlife aspect. In some cases, projects can be modified to incorporate additional elements to address water quality. Multi-use projects may qualify for funding through this grant.
RH/SGRWQG Potential Uses	➢ No projects apply at this time	➢ Regional BMP projects	➢ Regional BMP Projects
Contact Information	South Coast: Ventura County to San Diego County Joan Cardellino (510) 286-4093 jcard@scc.ca.gov	Dave Means Assistant Executive Director Dave.means@wildlife.ca.gov www.wcb.ca.gov/Programs.aspx	California State Parks Office of Grants & Local Services P.O. Box 942896 Sacramento, CA 94296 (916) 653-7423 localservices@parks.ca.gov

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)

Grant Program	Land and Water Conservation Fund (LWCF)	Recreational Trails Program (RTP)	TIGER Discretionary Grant
Department	State of California Department of Parks and Recreation	State of California Department of Parks and Recreation	Department of Transportation (DOT)
Purpose	Projects that protect threatened species, address wildlife corridors, create trails, and provide nature interpretation programs.	Provides funding for recreational trails and trails-related projects.	Provides funding for road, rail, transit, and port projects that will deliver long-term outcomes of safety, economic competitiveness, state of good repair, livability, and environmental sustainability.
Eligibility Requirements	Cities, counties, Native American tribes, joint power authorities, and non-state agency recreation and park districts	Cities, counties, districts, state agencies, federal agencies, and non-profit organizations	State, local, and tribal governments, including United States territories, transit agencies, port authorities, metropolitan planning organizations, other political subdivisions of state or local governments, and multi-state or multi-jurisdictional groups applying through a single lead applicant.
Eligible Uses	Projects that are associated with parks which promote children play, exercise, family bonding, senior socializing, connections with nature, and cultural differences.	Non-motorized and motorized projects that involve acquisitions for trails, trail rehabilitation, and construction of new trails.	Based on the Consolidated Appropriations Act, 2014 (Public Law No. 113-76)
Ineligible Uses	Not identified	See application guidelines	Not identified
Funding Limits	➢ $2,000,000 is the maximum grant request which cannot exceed 50 percent of total project cost ➢ This is a reimbursement-only program	➢ No minimum or maximum amount specified ➢ The maximum amount of funds allowed for each project is 88 percent, requiring a minimum of 12 percent match	➢ $600 million to be awarded for National Infrastructure Investments ➢ Minimum award in urban area is $10,000,000 with a minimum construction cost of $12,500,000 ➢ Minimum award of $1,000,000 in rural areas
Terms/Dates	Applications are due February 3rd of every year	Next application deadline unknown (no earlier than January 2016).	The pre-application deadline is May 4, 2015 and the final application deadline is June 5, 2015. Additional rounds of funding are anticipated, but deadlines are not posted.
Website	http://www.parks.ca.gov/?Page_id=21360	http://www.parks.ca.gov/?Page_id=24324	http://www.dot.gov/tiger
Examples	➢ City of Covina's City Center Park ➢ Los Angeles County Cold Creek High Trail ➢ City of El Monte's Rio Hondo River Park	➢ City of Los Angeles' Peck Bandini ➢ City of El Monte Rio Hondo River Park ➢ City of Pasadena Lower Arroyo Seco Trail/Trailhead Improvements ➢ City of Glendale's San Rafael Hills "Mountain Do" Trail	➢ Crenshaw/Los Angeles Airport Light Rail Connection ➢ Port of Long Beach Rail Realignment ➢ Port of Los Angeles West Basin Rail Yard
Comments	Types of projects eligible: ➢ Athletic fields and courts ➢ Community gardens ➢ Non-motorized neighborhood and regional recreational trails ➢ Open space and natural areas ➢ Picnic areas ➢ Play grounds RH/SGRWQG may be able to take advantage of this funding opportunity if the proposed projects are related to parks, which most of the proposed regional projects are. It may be easy to add elements to potential projects so that the project qualifies for funding while also incorporating water quality improvement elements.	RH/SGRWQG may be able to take advantage of this funding opportunity if the proposed projects are related to trails, as some of the proposed regional projects are. It may be easy to add elements to potential projects so that the project qualifies for funding while also incorporating water quality improvement elements.	According to the March 24, 2014 CASQA bi-weekly newsletter, the notice for available funding provides guidance on selection criteria and application requirements for the National Infrastructure Investments. The legislation includes substantial language including funding for "addressing stormwater through natural means, "groundwater recharge in areas of water scarcity," and "stormwater mitigation," therefore stormwater projects may be eligible for funding. RH/SGRWQG may be able to receive funding from this program now or in the future in order to assist in projects that incorporate both a transportation and water quality aspect.
RH/SGRWQG Potential Uses	➢ Regional BMP Projects (with park elements)	➢ Regional BMP Projects (with trail elements)	➢ Regional BMP Projects ➢ Distributed BMP Projects (related to transportation such as green streets)
Contact Information	California State Parks Office of Grants & Local Services P.O. Box 942896 Sacramento, CA 94296 (916) 653-7423 localservices@parks.ca.gov	California State Parks Office of Grants & Local Services P.O. Box 942896 Sacramento, CA 94296 (916) 653-7423 localservices@parks.ca.gov	Office of Infrastructure Finance and Innovation -Office of the Secretary of Transportation 1200 New Jersey Avenue, SE Washington, DC 20590 (202) 366-0301 TIGERgrants@dot.gov

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)

Grant Program	Environmental Solutions for Communities	Clean Water Act (CWA) §319(h) Non-Point Source (NPS)	2014 Water Bond
Department	Wells Fargo and the National Fish and Wildlife Foundation	SWRCB	State of California
Purpose	Support projects that link economic development and community well-being to the stewardship and health of the environment.	Support implementation and planning projects that address water quality problems in surface and groundwater resulting from NPS. The goal is to eventually restore the impacted beneficial uses in receiving waters.	Provide funding for projects that ensure reliable water supply for future generations.
Eligibility Requirements	Community/watershed groups, cooperative associations or districts, local governments, state/territorial agencies, and non-profit groups.	The projects must be located within a watershed that has a TMDL with constituents identified in the NPS Program Preferences. The project must also be located in a watershed that has a plan or suite of plans that meet the Nine Key Elements found in Appendix A of the grant guidelines. Lastly the project cannot be located in an area subject to an NPDES Permit.	Varies by program. There are multiple programs that are funded under this bond, each having different eligibility requirements.
Eligible Uses	Funding priorities include: supporting sustainable agricultural practices and private lands stewardship; conserving critical land and water resources and improving local water quality; restoring and managing natural habitat, species, and ecosystems that are important to community livelihood; facilitating investments in green infrastructure, renewable energy and energy efficiency; and encouraging broad-based citizen participation in project implementation.	Projects that address TMDLs associated with NPS.	Provide funding for projects must address water storage capacity, recycling facilities, levee improvements, flood control facilities, water treatment plants, ecosystem restoration, and habitat improvements.
Ineligible Uses	Supporting political advocacy, fundraising, lobbying, litigation, or supporting ongoing efforts to comply with permit or settlement conditions.	Projects in areas that are under or affiliated with a NPDES Permit or address an issue in a land use included in a MS4 Permit	Unclear at this time.
Funding Limits	➢ Approximately $2,500,000 annually, between $25,000-$100,000 each ➢ 1:1 match required	➢ Funding allocation for entire program is $4,000,000 ➢ Provide the minimum match funding of 25 percent of the total cost ➢ For planning/assessment projects the minimum award is $75,000 and maximum award is $175,000 ➢ For implementation projects the minimum award is $250,000 and the maximum award is $750,000	The South Coast Region has access to $213.5 million. The match requirements are not clear at this time.
Terms/Dates	Applications accepted in December annually until 2016.	Annual solicitations (2015 solicitations were required by January 15, 2015)	Vary by category. The guidelines for each of the grant categories are in progress and will be released in 2015.
Website	http://www.nfwf.org/environmentalsolutions/Pages/home.aspx	http://www.waterboards.ca.gov/water_issues/programs/nps/grant_program.shtml#eligible	http://www.acwa.com/spotlight/2014-water-bond
Examples	➢ Newark Urban Tree and Urban Farm Project ➢ Greening Art Alley: Pedestrian Corridor/Urban Renewal Project	➢ San Diego County Nutrient Source Reduction Program in Rainbow Creek Watershed ➢ Desert Wildlife Unlimited Alamo River Treatment Wetlands at Shank Road	Not Applicable
Comments	The Urban Tree and Urban Farm Project established tree and urban farms in Newark to reduce the carbon footprint, improve stormwater management, and provide job training opportunities for the youth. The Greening Art Alley: Pedestrian Corridor/Urban Renewal Project installed rain gardens and other green infrastructure techniques in a local pedestrian facility to improve stormwater management and increase community engagement with natural habitats.	RH/SGRWQG will not be able to benefit from this grant program because the receiving waterbodies associated with the group are not identified on the NPS Program Preferences. In addition, the projects the RH/SGRWQG would be interested in implementing would be in areas covered by an NPDES Permit and therefore would not quality.	The 2014 Water Bond is the product of a comprehensive legislative package developed in 2009 by the Governor and state lawmakers to meet California's growing water challenges. The progression of this bond will be tracked in the future in order to determine if funding opportunities exist for the RH/SGRWQG. Categories that may potentially qualify include "multibenefit watershed projects," "watershed and urban river enhancements," "integrated regional water management," "water use efficiency," and "stormwater management."
RH/SGRWQG Potential Uses	➢ Regional BMP Projects ➢ Distributed BMP Projects	➢ None at this time	➢ Regional BMP Projects ➢ Distributed BMP Projects
Contact Information	National Fish and Wildlife Foundation Carrie Clingan (202) 595-2471 Carrie.Clingan@nfwf.org	For CWA §319(h) Grant Program: Division of Water Quality Matthew Freese (916) 341-5485 Matthew.Freese@waterboards.ca.gov For FAAST: Patricia Leary (916) 341-5167 Patricia.Leary@waterboards.ca.gov	Timothy Quinn Association of California Water Agencies (CWA) Executive Director (916)441-4545 Timq@acwa.com

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)

Grant Program	**Metropolitan Transportation Authority (MTA) Call for Projects Program**	**Prop 1B (Local Street and Road, Congestion Relief, and Traffic Safety Account of 2006)**	**Prop 1B (Public Transportation Modernization, Improvement, and Service Enhancement Account [PTMISEA])**
Department	LACMTA	Department of Finance, administered by Caltrans	Department of Finance, administered by Caltrans
Purpose	Allocates capital transportation funds to regionally significant projects.	Provides funding for improvements to transportation facilities that will assist in reducing local traffic congestion and further deterioration, increasing traffic safety or improving traffic flows.	Provides funding for transit rehabilitation, safety or modernization improvements, capital services enhancements or expansions, new capital projects, bus rapid transit improvements, or rolling stock (buses and rails) procurements, rehabilitation, or replacement.
Eligibility Requirements	Local public agencies that provide transportation facilities or services within Los Angeles County	Local public agencies	Local public agencies
Eligible Uses	Provides funding for capital projects that fall under eight modal categories that each has its own eligibility criteria: Regional Surface Transportation Improvements (RSTI), good movement improvements, signal synchronization and bus speed improvements, transportation demand management, bicycle improvements, pedestrian improvements, and transit capital.	➢ Street and highway pavement maintenance, rehabilitation, installation, construction and reconstruction of necessary associated facilities ➢ Maintenance, rehabilitation, installation, construction, and reconstruction of facilities that expand rider ship on transit systems, safety projects to reduce fatalities, or as a local match to obtain state or federal transportation funds for similar purposes	➢ Rehabilitation, safety, or modernization: includes purchase of equipment for rehabilitation, operation, modernization, or safety ➢ New construction or capital service enhancement/expansion, such as modernization of bus shelters, transit centers, and operation and maintenance facilities, for design and/or construction phases ➢ Bus rapid transit improvements. Construction or expansion of BRT lanes or equipment
Ineligible Uses	Operation and maintenance activities; mitigation measures; demonstration projects with a limited time period, environmental studies/assessments directly related to project	Operation and maintenance activities	Environmental work
Funding Limits	➢ Minimum 20% local monetary match requirement (can include cash and/or land) ➢ Other limits vary by category	➢ Minimum $400,000 to each city funds are apportioned to ➢ Proposition 1B provided $19.925 billion in bond funds for a variety of transportation priorities, including $2 billion for cities and counties to fund the maintenance and improvement of local transportation facilities.	➢ Proposition 1B provided $19.925 billion in bond funds for a variety of transportation priorities, including $3.6 billion for PTMISEA ➢ 50% allocated to local operators based on fare-box revenue and 50% to regional entities based on population
Terms/Dates	2015 grant cycle has been closed. 2016 grant cycle dates to be determined.	Last reporting deadline: December 1, 2014. Future dates have not been announced	Call for new projects due March 31, 2015. Future dates have not been announced.
Website	http://www.metro.net/projects/call_projects/	http://www.dot.ca.gov/hq/transprog/ibond.htm	http://www.dot.ca.gov/hq/MassTrans/Proposition-1B.html
Examples	➢ Rosemead Boulevard Enhancement and Beautification Project ➢ Balboa Boulevard Widening at Devonshire Street	➢ City of Anaheim Walnut Avenue Street Improvement Project ➢ Culver City Residential Paving Program	➢ Culver City transit bus purchase ➢ Hillcrest Park and Ride Improvement Project in San Francisco
Comments	MTA does not fund stand-alone State Transportation Improvement Projects (STIPs) for environmental and engineering work and projects submitted must have a capital construction component.	➢ Funds apportioned to cities are based on total population of city in relation to all cities in the state ➢ RH/SGRWQG may be able to take advantage of this fund when rehabilitating or repaving a local street ➢ Online application: http://p1blsr.dot.ca.gov/	➢ The green streets proposed that can couple with a bus station or other modernized transit system will be able to qualify for funding ➢ Creative multi-use projects that include green streets may be required
RH/SGRWQG Potential Uses	➢ Distributed BMPs (green streets)	➢ Distributed BMPs (green streets)	➢ Distributed BMPs (green streets)
Contact Information	Rena Lum Call for Projects Information (213) 922-6963	Jamey Matalka Department of Finance (916) 322-2263 Prop1B_LSR@dof.ca.gov	Wendy King Branch Chief (916) 651-8239

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)

Grant Program	Measure R	Proposition A and C (Sales Tax)	Environmental Enhancement and Mitigation (EEM) Program
Department	LACMTA	LACMTA	California Natural Resources Agency, administrated by the California Transportation Committee
Purpose	Finances new transportation projects and programs and accelerates current projects through a half-cent sales tax for Los Angeles County. Revenues are earmarked for the Local Return Programs to be used by cities and the County of Los Angeles in developing and/or improving local public transit, paratransit, and related transportation infrastructure.	Finances a Transit Development Program through two ½ cent sales tax measures from Los Angeles County and is used for the development and/or improvement of public transit, paratransit, and related transportation infrastructure.	Provides funding for projects that contribute to the mitigation of the environmental effects of transportation facilities.
Eligibility Requirements	Los Angeles County cities and County unincorporated areas	Los Angeles County cities and County unincorporated areas	State, Local, federal, and non-profit entities
Eligible Uses	➢ Street resurfacing ➢ Rehabilitation and reconstruction ➢ Pothole repair ➢ Left-turn signals ➢ Bikeways ➢ Pedestrian improvements ➢ Streetscapes ➢ Signal synchronization ➢ Transit service improvements ➢ Transportation engineering/study	➢ Public transit purposes that sustain or improve the quality and safety of and/or access to public transit services by the general public or those requiring special transit assistance ➢ Operating public transit services, bus stop improvements and maintenance, public transit (capital), transportation systems management, transit security, fare subsidy, transportation planning, transit marketing, park and ride lots, and transit facilities/ transportation enhancements	➢ Urban forestry projects designed to offset vehicular emissions of carbon dioxide through the planting of trees and other suitable plants ➢ Resource lands projects for the acquisition, restoration, or enhancement of resource lands to mitigate the loss of or detriment to such lands within or near the right of way ➢ Mitigation projects beyond the scope of the California Natural Resources Agency responsible for assessing the environmental impact of transportation improvements
Ineligible Uses	System/signal timing alterations that was implemented under a traffic forum project/grant; supplementing existing local revenues being used for transportation purposes and non-transportation related projects	➢ Standalone projects (lighting, landscaping, traffic signals, storm drains, or transportation planning projects) unrelated to an eligible project ➢ Prop A: bikeway and bike lanes, congestion management activities, and pavement management systems	Maintenance and replacement construction projects (i.e. pavement resurfacing); bicycle lanes; and sound barriers
Funding Limits	➢ Expected to generate $40 billion in new local sales tax revenues over 30 years, but only 15% of all sales tax revenue will be distributed for local needs	➢ 25% of Prop A tax and 20% of Prop C tax is to be used by cities and the County for local return funds based on population ➢ Prop A requires funds be used exclusively to benefit public transit and funds can be traded to other jurisdictions in exchange for general or other funds ➢ Prop C funds cannot be traded for general or other funds	Projects limited to $500,000 each.
Terms/Dates	➢ Each agency must submit an Expenditure Plan annually by August 1st of each year; an Expenditure Report annually by October 15th; and a recreational transit form for recreational transit services only by October 15th (annually) ➢ Funds are distributed monthly on a per capita basis	➢ Jurisdictions can submit a Project Description Form (Form A) any time during the year; must submit an Annual Project Update (Form B) before or on August 1st of each year; and must submit an Annual Expenditure Report (Form C) on or before October 15th of each year.	Call for new projects due July 13, 2015. Future dates have not been announced
Website	http://www.metro.net/projects/local_return_pgm/ and http://www.metro.net/projects/measurer/	http://media.metro.net/projects_studies/local_return/default.htm	http://resources.ca.gov/bonds_and_grants/eemp/
Examples	➢ Gold Line Foothill Extension ➢ City of Santa Monica sidewalk widening ➢ City of Agoura Hills Agoura Road Widening	➢ City of Bell – Florence Avenue Street Resurfacing ➢ City of Temple City Rosemead Boulevard Project	➢ City of South Gate Urban Greening ➢ North East Trees La Brea Greenbelt Urban Forestry Project ➢ Amigos de los Rios Emerald Necklace Expanded Multi-Benefit Park and Greenway
Comments	➢ RH/SGRWQG can use these funds for green street implementation ➢ Cities will have to evaluate what these funds are currently being used for to determine how to optimize the money available	➢ RH/SGRWQG may be able to take advantage of this fund when rehabilitating or repaving a local street ➢ MTA disburses funds on a monthly basis and disbursements are based on the jurisdiction's population-based share of actual net receipts for the month	➢ RH/SGRWQG may be able to take advantage of this fund if a project is proposed near the public right-of-way ➢ An argument may be made that green streets mitigate some of the negative impacts of roads ➢ Capital improvement projects could incorporate trees to qualify
RH/SGRWQG Potential Uses	➢ Distributed BMPs (green streets)	➢ Distributed BMPs (green streets)	➢ Distributed BMPs (green streets) ➢ Regional BMP Projects
Contact Information	Brian Boudreau Program Management Office (PMO) (213) 922-2474 boudreaub@metro.net	Brian Boudreau Program Management Office (PMO) (213) 922-2474 boudreaub@metro.net	California Natural Resources Agency (916) 653-2812 eemcoordinator@resources.ca.gov

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)

Grant Program	Highway Safety Improvement Program (HSIP)	Active Transportation Program (ATP)	Drought Resiliency
Department	Caltrans	Caltrans, administered by the Division of Local Assistance, Office of Active Transportation and Special Programs	US Department of the Interior, Bureau of Reclamation
Purpose	Under the Moving Ahead for Progress in the 21st Century Act (MAP-21), the HSIP is a core federal-aid program that provides funds to reduce traffic fatalities and serious injuries on all public roads.	Provides funds to increase use of active modes of transportation, such as biking and walking, by increasing the proportion of trips accomplished by biking and walking; increasing safety and mobility for non-motorized users; advancing the efforts to achieve greenhouse gas reduction goals; enhancing public health; ensuring disadvantaged communities full share the benefits of the program; and providing a variety of projects to benefit all types of active transportation users.	Improve the ability to prepare and address drought in advance of a crisis. Supports projects that will build long-term resiliency to drought and reduce the need for emergency response actions.
Eligibility Requirements	City, County, or tribal government federally recognized within the State of California	Local, regional, or state agencies, transit agencies, natural resource or public land agencies, federally recognized tribal governments, public schools or school districts, and private nonprofit tax-exempt organizations	States, Indian tribes, irrigation districts, water districts, or other organizations with water or power delivery authority in the western United States
Eligible Uses	➢ Work on public roads or publicly owned bicycle or pedestrian pathway or trail that improves safety for its users ➢ Non-infrastructure elements (education, enforcement, and Emergency Medical Services)	➢ Capital improvements that further the goals of the program ➢ Development of community wide bicycle, pedestrian, safe routes to school, or active transportation plan in a disadvantaged community ➢ Education, encouragement, and enforcement, activities	➢ Increase reliability of water supply and sustainability ➢ Improve water management and increase operational flexibility ➢ Implement systems to facilitate voluntary sale, transfer, or exchange of water ➢ Provide benefits for fish and wildlife and the environment ➢ Mitigate poor water quality caused by drought
Ineligible Uses	➢ Projects focused mainly on street maintenance, landscaping, highway beautification, etc.	Roadway rehabilitation, construction, or re-pavement; bus or transit facility installation or repairs; median landscaping; lighting not specific to pedestrian or bicycle facilities; and general recreation and park facilities	➢ Scientific research, water hauling, education and outreach, land fallow, cover cropping, and reimbursement for economic losses resulting from drought ➢ Operation and maintenance projects ➢ Water conservation projects ➢ Water purchases ➢ Pilot projects
Funding Limits	➢ For Cycle 7, the maximum reimbursement amount for any single project is $10 million and the maximum funding an agency can receive is $10 million ➢ Non-safety related construction items (landscaping, highway beautification, and preventative maintenance) shall not exceed 10% of the project construction costs	➢ Minimum request for funds is $250,000 for Statewide and Small Urban and Rural solicitations	➢ $2 to $3 million available, up to $300,000 per applicant ➢ Cost sharing of 50 percent or more of the project cost is required
Terms/Dates	Call for new projects for Cycle 7 due July 31, 2015. Future dates have not been announced.	Call for new projects due June 1, 2015. Future dates have not been announced	Application due June 25, 2015. Future dates have not been announced
Website	http://dot.ca.gov/hq/LocalPrograms/hsip.html	http://www.dot.ca.gov/hq/LocalPrograms/atp/index.html	http://www.usbr.gov/drought/ or http://www.grants.gov/web/grants/view-opportunity.html?oppId=276505
Examples	➢ City of Azusa raised medians along Arrow Highway between Citrus Avenue and Azusa Avenue ➢ City of Downey raised medians, left turn lanes, signs and striping on Firestone Boulevard between Westerly City Limits and Old River School Road	➢ City of Duarte Gold Line Station Pedestrian and Bike Improvements ➢ City of Compton Wilmington Avenue Safe Streets Pedestrian/Bike Improvements ➢ City of Lancaster 5th Street East Corridor Improvements	No projects have been awarded
Comments	➢ RH/SGRWQG may be able to take advantage of this fund for green streets if the new street will be improved compared to the existing street in terms of safety ➢ To make a project eligible, a specific safety problem must be identified and the proposed countermeasure(s) must address the problem	➢ The RH/SGRWQG may be able to use this funding for green streets if the streets can increase use of active transportation, for example, if a bike lane is added, or sidewalks are made more accessible ➢ Funds may also be available for the Royal Oak Trails projects if they enhance trails and enhance pedestrian and bike access	➢ The proposed regional projects involve augmented water supply, which recharges the local aquifers and can be used during times of drought
RH/SGRWQG Potential Uses	➢ Distributed BMPs (green streets)	➢ Distributed BMPs (green streets) ➢ Regional BMP Projects	➢ Regional BMP Projects
Contact Information	Steve Novotny Caltrans District 7 – Local Assistance (213) 897-0784 Steve.Novotny@dot.ca.gov	Dale Benson Caltrans District 7 – Active Transportation Program (213) 897-2934 Dale.benson@dot.ca.gov	Irene Hoiby US Department of Interior Grants Officer (303) 445-2025 ihoiby@usbr.gov

Table AA-1 Potential Grant Programs to Fund RH/SGRWQG EWMP Implementation (cont.)	
Grant Program	**Proposition 1 – Stormwater Grant Program (SWGP)**
Department	SWRCB
Purpose	Proposition 1 (Assembly Bill 1471, Rendon) authorizes monies in general obligation bonds for water projects including surface and groundwater storage, ecosystem/watershed protection, restoration, and drinking water protection. Water Code Section 79747 identifies funds available for multi-benefit stormwater management projects which may include, but are not limited to, green infrastructure, rainwater and stormwater capture projects, and stormwater treatment facilities. Stormwater Resource Plans, or functionally equivalent plan(s), are required to obtain grant funds for stormwater and dry-weather capture projects.
Eligibility Requirements	Public agencies, 501(c)(3) nonprofit organizations, public utilities, federally recognized Indian tribes, state Indian tribes listed on the Native American Heritage Commission's Tribal Consultation List, and mutual water companies
Eligible Uses	➢ Green Infrastructure (LID) ➢ Rainwater, stormwater, and dry-weather runoff capture and use ➢ Stormwater treatment train facilities ➢ Planning – development of Stormwater Resource Plan or equivalent
Ineligible Uses	➢ Projects that must seek eminent domain as part of their project implementation timeline ➢ Projects that do not meet the requirements of these Prop 1 SWGP Guidelines, the Storm Water Resource Plan Guidelines, Water Code, and Prop 1 ➢ Projects that consist of only education and outreach activities
Funding Limits	➢ Planning type projects can receive grants ranging from $100,000 to $500,00 ➢ Implementation type projects can receive grants ranging from $500,000 to $5,000,000 ➢ The applicant is required to provide a funding match. The match requirement is fifty percent (50%) of the total project cost. Match is not based solely on the size of the grant request. Other State grant funds (regardless of issuing State agencies) cannot be used for the required match. The funding match may include, but is not limited to: federal loans, local and private funding, or donated and volunteer ("in-kind") services. Repayable financing received through the CWSRF or a federal sponsored loan program may be used for match. The SWRCB reserves the discretion to review and approve funding match expenditures.
Terms/Dates	Round 1 will award projects in spring 2016 and construction must be completed by October 2019. Round 2 will award projects in spring 2018 and construction must be completed by October 2021.
Website	http://www.waterboards.ca.gov/swgp
Examples	No projects have been awarded
Comments	The EWMP will be able to be used (at least in part) to fulfill the requirement of having a Stormwater Resource Plan.
RH/SGRWQG Potential Uses	➢ Regional BMP Projects ➢ Distributed BMP Projects
Contact Information	Sean Maguire, Program Manager (916) 341-5877 Sean.Maguire@waterboards.ca.gov Ruben Mora, SWGP (916) 341-5387 Ruben.Mora@waterboards.ca.gov Division of Financial Assistance Storm Water Grant Program State Water Resources Control Board P.O. Box 944212 Sacramento, CA 94244-2120

Table AA-2 Potential Loan Programs to Fund RH/SGRWQG EWMP Implementation

Loan Program	Clean Water State Revolving Fund (CWSRF)	Infrastructure State Revolving Fund (ISRF)
Department	USEPA	California Infrastructure and Economic Development Bank
Purpose	Provide funding for publically-owned facilities. Funding programs include, but are not limited to, nonpoint source, watershed protection, wet-weather projects, water conservation and reuse, sustainability and smart growth, and green infrastructure.	Provide financing for public infrastructure projects.
Eligibility Requirements	Public agencies and nonprofit organizations	Applicant must be a local municipal entity. Project must promote economic development and attract, create, and sustain long-term employment opportunities
Eligible Uses	Stormwater treatment and diversions, sediment and erosion control, stream restoration, green infrastructure, and land acquisitions. Eligible uses vary by different programs/categories.	Construct or modify public infrastructure, purchase and install pollution control or noise abatement equipment, or acquire land. Project must meet tax-exempt financing criteria.
Ineligible Uses	Operation and maintenance activities, legal fees	Privately owned facilities or debt refinancing
Funding Limits	No maximum funding limit.	➢ $2,000,000 maximum per environmental mitigation project per fiscal year ➢ $10,000,000 maximum per project for all other purposes per fiscal year ➢ $20,000,000 per jurisdiction per fiscal year
Terms/Dates	➢ Interest rate is one-half general obligation bond rate. ➢ Repayment term of twenty years ➢ Applications accepted continuously	➢ Maximum 30 year term and open application process ➢ Preliminary application available at www.ibank.ca.gov
Website	http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm	http://ibank.ca.gov/infrastructure_loans.htm
Examples	➢ City of Anaheim Sewer Reconstruction Project ➢ Eastern Municipal Water District Recycled Water Pond Expansion and Optimization Project	➢ City of Paramount Water Well #15 Construction Project ➢ City of Monterey Park Water Main Replacement Project ➢ Lawndale Redevelopment Agency Hawthorne Boulevard Revitalization Project ➢ City of Lawndale Charles B. Hopper Park Project
Comments	Other project types that are considered under this financing program include: ➢ Construction of publicly-owned facilities: ▪ Wastewater treatment ▪ Local sewers ▪ Sewer interceptors ▪ Water reclamation facilities ▪ Stormwater treatment ➢ Expanded use projects include, but are not limited to: ▪ Implementation of nonpoint source projects or programs ▪ Development and implementation of estuary comprehensive conservation and management plan Expanded use project include, but are not limited to NPS projects/programs and estuary comprehensive conservation and management plan.	This program provides low-cost, long-term financing to local governments for a variety of public infrastructure projects. A lot of the eligible project categories are not applicable to the RH/SGRWQG in terms of using this funding to implement stormwater compliance measures, but the following project categories would be applicable to RH/SGRWQG: ➢ Drainage, water supply, and flood control ➢ Environmental mitigation measures ➢ Parks and recreation facilities. It may be easy to add water quality elements to potential infrastructure projects so that the project qualifies for funding while also incorporating water quality improvement elements.
RH/SGRWQG Potential Uses	➢ Regional BMP Projects ➢ Distributed BMP Projects	➢ Regional BMP Projects ➢ Distributed BMP Projects
Contact Information	(916) 327-9978 CleanWaterSRF@waterboards.ca.gov	Tad Thomas, Program Manager 1325 J Street, 18th Floor Sacramento, CA 95814 (916) 322-3506 Tad.Thomas@ibank.ca.gov

Table AA-3 Funding Opportunities by EWMP Implementation Effort

Funding Opportunity X = program applicable, P = potentially applicable	Stormwater Program						Regional BMPs										Distributed BMPs
	Public Information and Participation Program	Industrial/Commercial Facilities Program	Planning and Land Development Program	Development Construction Program	Public Agency Activities Program	IC/ID Elimination Program	Recreation Park	Arboretum of Los Angeles County	Sierra Vista Park	Royal Oaks Trail (LAR)	L. Garcia Park	Eisenhower Park	LADWP Easement	Encanto Park	Memorial Park (Azusa)	Royal Oaks Trail (SGR)	Green Streets
General Funds	X	X	X	X	X	X											
Additional taxes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Stormwater Utility Fee	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
General Fees	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Grant Opportunities																	
Proposition 84 Stormwater Program							X	X	X	X	X	X	X	X	X	X	X
Proposition 84 (Chapter 2 §75026) Integrated Regional Water Management (IRWM)							X	X	X	X	X	X	X	X	X	X	X
Proposition 84 Urban Streams Restoration																	
Community Action for a Renewed Environment (CARE)	X	X	X	X	X	X											
Pollution Prevention (P2)	X	X	X	X	X	X											
Clean Beaches Initiative (CBI)																	
Urban Waters Small Grant	X	X	X	X	X	X											
Environmental Education Grant and SubGrant	X	X	X	X	X	X											
Cooperative Watershed Management Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
State of California Coastal Conservancy Program	P																
Wildlife Conservation Board (WCB)																	
Habitat Conservation Fund (HCF)								X		P						P	
Land and Water Conservation Fund (LWCF)								X		X						X	
Recreational Trails Program (RTP)										X						X	
TIGER Discretionary Grant							P	P	P	P	P	P	P	P	P	P	X
Environmental Solutions for Communities	P						X	X	X	X	X	X	X	X	X	X	X
Clean Water Act (CWA) §319(h) Non-Point Source (NPS)																	
Potential 2014 Water Bond	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MTA Call for Projects Program																	X
Prop 1B (Local Street and Road, Congestion Relief, and Traffic Safety Account of 2006)																	X
Prop 1B (Public Transportation Modernization, Improvement, and Service Enhancement Account [PTMISEA])																	X
Proposition 1 Stormwater Grant Program (SWGP)							X	X	X	X	X	X	X	X	X	X	X
Loan Opportunities																	
Clean Water State Revolving Fund (CWSRF)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Infrastructure State Revolving Fund (ISRF)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Attachment AB

USEPA's Financial Capabilities Framework for Municipal Clean Water Act Requirements

This attachment includes the United States Environmental Protection Agency's (USEPA's) memorandum, Financial Capability Assessment Framework for Municipal Clean Water Act Requirements from Ken Kopocis dated November 24, 2014. This letter will be considered when assessing legislative and policy related financial strategies to support the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) Enhanced Watershed Management Program (EWMP), as discussed in **Section 6.5.3**.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 24 2014

MEMORANDUM

SUBJECT: Financial Capability Assessment Framework for Municipal Clean Water Act Requirements

FROM: Ken Kopocis Kenneth Kopocis
Deputy Assistant Administrator
Office of Water (OW)

Cynthia Giles Cynthia Giles
Assistant Administrator
Office of Enforcement and Compliance Assurance (OECA)

TO: Regional Administrators
Regional Water Division Directors
Regional Enforcement Division Directors

In May of 2012, we distributed the Integrated Municipal Stormwater and Wastewater Planning Approach Framework (Integrated Planning Framework). Since that time, we have made solid progress in promoting integrated approaches to meet Clean Water Act (CWA) obligations. Thanks to the hard work of regional and headquarters staff, and the active engagement of cities, many of our enforcement settlements now embody integrated planning principles in the structure and schedule for injunctive relief or explicitly include integrated planning as part of the settlement. We have also seen an increasing number of municipalities and local authorities moving towards developing integrated plans to support the development of their NPDES permits. We have been working with EPA Regions and States to assist in that process.

As the implementation of the Integrated Planning Framework has progressed and evolved, we have been actively engaged with stakeholders on ways to build on our efforts. Those discussions found a natural focus on issues related to the financial capability of permittees working toward our shared goals of clean water. One consistent theme that emerged was the benefit of more clearly articulating the flexibility available under the existing guidance. EPA continues to be guided by the 1997 "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development" (FCA Guidance) that provides an aid for assessing financial capability as part of negotiating schedules for implementing CWA requirements for municipalities and local authorities. The FCA Guidance also encourages permittees "to submit any additional documentation that would create a more accurate and complete picture of their financial capability" that may "affect the conclusion" of the analysis described in the guidance.

As part of EPA's commitment to implementing CWA objectives in a sustainable manner, we have developed the attached "Financial Capability Assessment Framework" (FCA Framework). The FCA Framework has been greatly informed by the comments and experiences of a variety of stakeholders and financial experts. The FCA Framework identifies the key elements EPA uses in working with permittees to evaluate how their financial capability should influence schedules. In addition, the FCA Framework provides examples of additional information that may help some communities provide a "more accurate and complete picture" of their financial capability as is envisioned in the FCA guidance. We will be posting the FCA Framework to our website as an important next step in the pursuit of integrated planning approaches and in our ongoing work with municipalities and local authorities to achieve our shared goals of protecting our nation's waters. While this memorandum releases the FCA Framework, we know that we will continue to learn and refine our understanding of the issues surrounding financial capability assessments as we use it moving forward. We will continue to look for ways to improve the Framework as we gain new insights and additional information.

We look forward to continue working with the Regions on these important issues and encourage you to contact Deborah Nagle, Director, Water Permits Division (nagle.deborah@epa.gov) and Mark Pollins, Director, Water Enforcement Division (pollins.mark@epa.gov) with any questions you might have.

Attachment

cc: Regional Permit and Enforcement Liaisons

FINANCIAL CAPABILITY ASSESSMENT FRAMEWORK

November 24, 2014

Purpose

The Environmental Protection Agency (EPA) is committed to working with state and local government partners to assist local municipalities and local authorities to meet Clean Water Act (CWA) obligations in a manner that recognizes the unique financial challenges that local jurisdictions face. This financial capability assessment framework is intended to provide additional examples and greater clarity on the flexibilities built into existing guidance that local governments or authorities can use in assessing their financial capability, and the relationship between that assessment and consideration of schedules for permit and consent decree implementation. This framework builds on the progress already made in the May 2012 "Integrated Municipal Stormwater and Wastewater Planning Approach Framework," and the experience gained from talking with communities about their financial capability in actual, on the ground circumstances. Integrated Planning has been helping in identifying a permittee's relative priorities for projects based on the relative importance of adverse impacts on human health and water quality and the municipality's financial capability.

Background

Local governments and authorities want to provide clean water for their communities, and they play an essential role in providing wastewater and stormwater infrastructure and services for their citizens, businesses and institutions. These municipal functions have been an important part of implementing the CWA to protect public health and improve water quality in streams, lakes, bays, and other waters nationwide. However, significant water quality challenges remain. Public officials remain strong supporters of the CWA goals and objectives by directing the public investments that are necessary to comply with the Act and to provide clean water for their citizens. Many local governments face complex water quality issues that are heightened by the need to address population growth or decline, increases in impervious surfaces, source water supply needs, and aging infrastructure. In recent years, many local governments and authorities have increased investments in their wastewater and stormwater infrastructure through capital projects to rehabilitate existing systems, improve operation and maintenance, and address additional regulatory requirements. As programs are implemented to improve water quality and attain CWA objectives, many state and local government partners find themselves facing difficult economic challenges with limited resources and financial capability. We recognize these challenging conditions and are working with states and local governments to develop and implement new approaches that will achieve water quality goals at lower costs and in a manner that addresses the most pressing problems first.

Long-term approaches to meeting CWA objectives should be sustainable and within a local government or authority's financial capability. The financial capability of these entities and other relevant factors are important to consider when developing appropriate schedules for infrastructure projects in permits or enforcement actions to help protect human health and the environment. EPA's financial capability assessment guidance, "Combined Sewer Overflows:

Guidance for Financial Capability Assessment and Schedule Development" (FCA Guidance) (EPA 832-B-97-004) provides a reference point to aid all parties in negotiating reasonable and effective schedules for implementing CWA requirements, and the flexibility to take into account local considerations that may not be fully captured by the approach detailed in the guidance. As described in more detail in this Framework, the guidance provides for consideration of the impact on residential rate payers and the financial capability of the permittee using a suite of indicators, as well as allowing schedules to be responsive to circumstances unique to that community, while advancing the mutual goal to protect clean water. The FCA Guidance encourages permittees to provide any additional information that would be useful in understanding those unique or atypical circumstances and how they may affect CWA schedules, so that all relevant information presented by a community can be taken into account to ensure that a full understanding of financial capability guides the development of schedules.

Financial Capability Assessment

The following are key elements of EPA's approach to the evaluation of the financial capability of municipalities to inform implementation schedules, both in permits and enforcement actions. The elements are fully compatible with the FCA Guidance, integrated planning approaches, and the flexibility embodied in both.

1. **The 1997 FCA Guidance identifies a valuable assessment that provides a common basis for financial burden discussions between the permittee, EPA and state NPDES authorities. Permittees have the option of submitting additional information that would create a more accurate and complete picture of their financial conditions.** The financial capability assessment described in the 1997 FCA Guidance identifies information that provides a basis for a general comparison of financial conditions between communities across the country and provides a consistent assessment of basic financial indicators as part of the overall analysis. Additional information that the community provides on its unique financial circumstances will be considered so that schedules take local considerations into account. Where appropriate, this information can result in schedules that are different than the schedules suggested by the baseline analysis suggested in the 1997 FCA Guidance.

2. **Financial capability is on a continuum.** Although the FCA Guidance approach categorizes financial burden as "high, medium, or low," this does not mean that schedules will be rigidly set according to the break points between the categories. For example, two communities whose total residential share of costs are 1.1% and 1.9% of median household income (MHI) are both categorized in the FCA Guidance as having a "medium" burden for the Residential Indicator (RI). All other things being equal, the appropriate schedules for those communities are likely to be different. Similarly, all other things being equal, two communities whose residential share of costs are 1.9% and 2.1% of MHI would be more likely to have similar overall compliance timeframes, even though one community is ranked as having a "medium" burden and the other as having a "high" burden. Finally, additional information submitted by the community may affect the length of the schedule regardless of where the community is on the "high, medium, and low" continuum.

3. **EPA will consider all CWA costs presented in the analysis described in the FCA Guidance**. EPA originally published the FCA Guidance to assist in negotiating schedules for communities with combined sewer systems, as these typically represent the most expensive CWA compliance issues. The FCA Guidance has since been recognized as equally suitable for considering other municipal CWA obligations as well, such as those related to separate sanitary sewer systems. With the release of EPA's 2012 Integrated Planning Framework, the Agency clarified that the financial capability analysis could include costs of: stormwater and wastewater; ongoing asset management or system rehabilitation programs; existing, CWA related capital improvement programs; collection systems and treatment facilities; and other CWA obligations required by state or other regulators. Where the costs of multiple CWA obligations are included in an FCA, each of those costs should be enumerated separately, so as to provide an understanding of how each contributes to the overall analysis.

4. **When presented, Safe Drinking Water Act (SDWA) obligations will be considered, primarily as additional information about a permittee's financial capability.** EPA believes that the SDWA obligations of a community can be an important consideration in establishing schedules for implementing integrated plans. EPA recognizes that both clean water and drinking water costs are often covered through charges on a single rate base. One component of a financial capability assessment includes an evaluation of the residential indicator that is based on only CWA costs as this best reflects the intended use of the metric and allows for comparisons with other communities. Drinking water costs may be reflected in other components of a financial capability assessment. For example, the financial capability indicator includes consideration of bond rating of the entity that issues debt to fund the permittee's capital project, which can be impacted by both wastewater and drinking water obligations for a permittee that provides both services. If a community has incurred general obligation debt associated with the SDWA, these obligations would be considered in the indicator "overall net debt as a percent of full market property value." In addition, as discussed below, additional information, including information regarding drinking water obligations, may be submitted for consideration in analyzing financial capability. To the extent that drinking water costs are not fully addressed by these other components, communities are encouraged to provide additional information about these costs.

5. **Communities should demonstrate how the CWA work included as costs in the financial capability assessment will be implemented, including appropriate assurances that those expenditures will be made.**

The Financial Capability Assessment Guidance and Examples of Additional Information that are Relevant to a Consideration of Financial Capability

The specific approaches laid out in the FCA Guidance provide a good foundation for the assessment of financial capability. As stated in the guidance and outlined in this Framework, communities can build on that foundation to include additional relevant information. The FCA Guidance presents a two-phased approach to assessing overall financial capability. The first phase assesses the impact on residential customers, and the first step is to calculate the portion of the annual costs that would be borne by residential households for both current and projected Clean Water Act related expenses. The residential share of the annual costs of CWA obligations is then compared to the MHI of the service area. MHI is calculated using current census data and may be adjusted based on the current Consumer Price Index. Finally, the CWA compliance costs per household are divided by the adjusted MHI to calculate the residential indicator (RI). The FCA Guidance then identifies various ranges of RI scores as “low, mid-range or high” levels of burden. In situations where there are unique circumstances that would affect the conclusion of the first phase of the assessment, additional information documenting unique financial conditions may be submitted.

The second phase of the financial capability analysis assesses the financial strength of the permittee. Six indicators are used to evaluate the debt, socioeconomic and financial conditions that affect a permittee’s financial capability to implement CWA controls necessary for compliance with the Act. These include bond ratings, overall net debt as a percent of full market property value, unemployment rate, median household income, property tax revenue collection rate, and property taxes as a percent of full market property value. In the Guidance, EPA has established benchmarks for each of the six indicators showing whether the indicator reflects a “weak”, “mid-range”, or “strong” financial capability. These benchmarks are used to generate an overall score of a permittee’s financial capability.

The residential indicator calculated in phase one and the permittee capability indicators analyzed in phase two are evaluated together in a Financial Capability Matrix to assess the level of financial burden. The level of burden is then used to inform discussions to establish an appropriate schedule for meeting CWA obligations in permits and enforcement actions. EPA uses these indicators, including the annualized costs as a percent of MHI, to help assess when costs are reaching levels that may represent a high burden on ratepayers and that longer compliance timeframes are likely to be appropriate to spread the cost over a longer period. EPA does not view or use the Financial Capability Matrix as a rigid metric that points to a given schedule length or threshold over which the costs are unaffordable.

Permittees have suggested and the FCA Guidance recognizes that the two step analysis may not provide a complete representation of financial capability. As noted above, other relevant financial or demographic information presented that illustrates the unique or atypical circumstances faced by a permittee will also be considered in evaluating financial capability. The presentation of additional information can be very valuable in analyzing financial capability, and the submission of this type of information has become fairly common practice. For example, in many consent decree negotiations, additional information has resulted in the establishment of schedules that differ from the ones suggested by the baseline analysis described in the FCA Guidance.

Some examples of information that may be relevant in negotiating schedules to be included in permits and consent decrees are given below. In order for such information to adequately illustrate that a permittee’s situation is atypical, EPA encourages permittees to compare any additional information on their circumstances to national averages or to that of other permittees.

The examples given below are not intended to be a complete list, nor a list of factors that will be relevant in every community. Rather it provides an illustration of information that may prove useful in some instances.

Examples of Information Related to Residential Impacts:

1. Income distribution by quintile, geography or other breakdown, illustrating how income distribution in the service area differs from comparable data on the national level or for similar cities.

2. Where cities have adopted differential rates for low income customers, the income distribution that led to that rate structure.

3. Information about service area poverty rates and trends.

4. Projected, current and historical sewer, and stormwater fees as a percentage of household income, quintile, geography or other breakdown.

5. Information on sewer and water usage for various classes of ratepayers or by type of dwelling unit.

6. Information on the percent of households who own versus rent.

Examples of Information Related to Financial Strength:

1. Historical population trends or population projections.

2. Service area unemployment data and trends, or other labor market indicators, including unemployment on an absolute basis.

3. Rate or revenue models, including dynamic financial planning models showing the projections of impacts over the program period. All revenue sources tied to CWA obligations may be included as appropriate.

4. Rate determination studies used to develop and support recent rate increases.

5. Data and trends on late payments, disconnection notices, service terminations, uncollectable accounts, or revenue collection rates.

6. Historical increases in rates or other dedicated revenue streams.

7. State or local legal restrictions or limitations on property taxes, other revenue streams or debt levels.

8. Other costs or financial obligations, such as those that relate to drinking water or other infrastructure, that significantly affect a permittee's ability to raise revenue.

9. Circumstances that may affect a permittee's bond rating. For instance, incurring debt beyond certain thresholds may negatively impact the permittee's bond rating, thus reducing the ability to raise capital.

10. Financial plans that show the implications of incurring additional debt for a permittee's ability to secure financing, including projections of metrics such as debt ratios, debt service coverage, debt per customer, days of cash on hand, days

of working capital and other metrics used by rating agencies. Such data should be benchmarked to metrics such as rating agency medians and relative to similar entities. This will be especially relevant where the permittee does not have a bond rating.

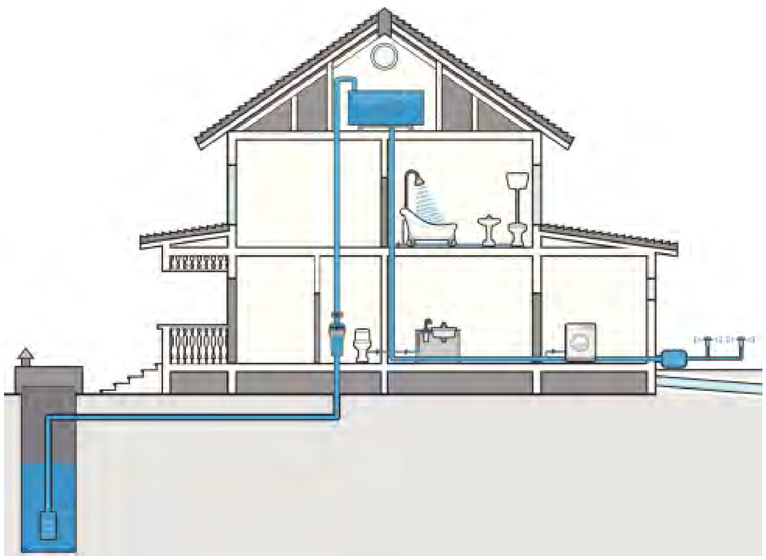
11. Extraordinary stressors such as those from natural disasters, municipal bankruptcies, unusual capital market conditions, or other situations which impact a permittee's ability to raise revenue or acquire needed financing. When such stressors occur, they may also provide support for making changes to existing schedules.

Attachment AC

Public Water Cost per Household: Assessing Financial Impacts of EPA Affordability Criteria in California Cities

This attachment includes the United States Conference of Mayors report, Public Water Cost Per Household: Assessing Financial Impacts of EPA Affordability Criteria in California Cities dated November 2014. This report will be considered when assessing legislative and policy related financial strategies to support the Rio Hondo/San Gabriel River Water Quality Group (RH/SGRWQG) Enhanced Watershed Management Program (EWMP), as discussed in **Section 6.5.3**.

THE UNITED STATES CONFERENCE OF MAYORS



Public Water Cost Per Household: Assessing Financial Impacts of EPA Affordability Criteria in California Cities

NOVEMBER 2014

The United States Conference of Mayors

Kevin Johnson
Mayor of Sacramento
President

Stephanie Rawlings-Blake
Mayor of Baltimore
Vice President

Mick Cornett
Mayor of Oklahoma City
Second Vice President

Tom Cochran
CEO & Executive Director

MAYOR'S BRIEFING

The demand for public water infrastructure investments persists even though local government continues to substantially increase investments nearly every year for the last five decades. Cities are facing dual responsibilities to reinvest in an aging infrastructure to sustain services and public health, and to comply with long term obligations under water mandates. Sometimes these needs compete for scarce resources in a city.

Cities have expressed concern over costly consent agreements regarding sewer overflows and long term control plans, and nutrients impacting water quality that are regulated as total maximum daily loadings (TMDLs) into receiving water bodies. The United States Conference of Mayors (USCM) and its Mayors Water Council (MWC) has urged EPA to exercise greater flexibility when imposing compliance mandates to lessen the financial burdens on customers; and also because sewer overflow and TMDL consent agreements are so costly that they compete with reinvestment in current water infrastructure and other essential public services such as public safety, road repairs and maintenance programs and other local priorities.

Growth in regulatory compliance requirements that continue to emerge from EPA in silo fashion ignores the cumulative and distributive costs to households. Household costs are largely irrelevant under the water laws; and especially due to the way EPA assesses affordability at the local level (i.e., indexing the affordability threshold to the more affluent median income household, and then expecting below median income households to bear a disproportionate financial burden in rate setting).

California cities were asked to provide information on the average annual cost per household for water, sewer and flood control. The cost per household involves only the residential customers. Current cost levels represent the cumulative costs over time to the present, but do not reflect future costs, particularly anticipated rate increases required to address emerging TMDL compliance standards.

We compared actual cost per household in over 30 California cities, 28 of them clustered in Los Angeles County, to EPA's affordability criteria under the Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) regulatory programs, both indexed to Median Household Income (MHI) (2.0% MHI under CWA; 2.5% MHI under the SDWA). For the purposes of this research 4.5% MHI is used as a combined affordability measure. These criteria have become our focus because their intended purposes are set to measures against which EPA might find economic burdens that do not relieve cities of their obligations, but could be used to justify greater flexibility over the terms and timeframes for compliance.

When EPA affordability criteria regarding stormwater and sewer overflow costs exceed 2% of MHI in a community, the Agency will consider greater flexibility. Generally speaking, EPA affordability criteria are seldom reached when estimates are based on MHI, a relatively poor measure of burden on below median income households.

There are different levels of financial distress based on where a household is on the income distribution: if a median income household experiences financial distress when water and sewer costs exceed 4.5% of their income, the severity of that distress for a below median income household is substantial and should trigger greater flexibility. Cities in this study exhibit already high levels of cost per household for public water services. Measured by actual household income rather than MHI, this study underscores the fact that many of the communities are experiencing both widespread and substantial (and sustained over time) financial impacts in below median income households.

Cities in this study exhibit already high levels of cost per household for public water services. Measured by actual household income rather than MHI, this study underscores the fact that many of the communities are experiencing both widespread and substantial (and sustained over time) financial impacts in below median income households.

Major Findings

Public Water Cost per Household in the Surveyed Cities is Already High

- Total public water cost per household ranges from $366 to $2,640/yr, (Table A).
- Median total cost per household is $1,172/yr.

  ◊ Annual median water costs at $902/yr are four times sewer costs.
  ◊ Sewer cost per household is $199/yr (median).
  ◊ Flood Control cost per household is $41/yr (median).

- Cost per household in 4 cities exceed one standard deviation above average:

  ◊ La Canada Flintridge $ 2,640
  ◊ Sierra Madre $ 2,040
  ◊ La Verne $ 1,936
  ◊ Escondido $ 1,730

Substantial Economic Burdens on Below Median Households

- As expected, households with high income spend a lesser percentage of annual income on public water.
- When EPA applies the MHI as the economic burden indicator it masks the distributional cost impacts on below median income households (Table C). The severity of economic burden is found in the lower income decile groups which are virtually hidden by using the MHI indicator.
- The difference between 4.5% of actual income and 4.5% of MHI can be considerable:

  ◊ Sacramento has a relatively large population coupled with high public water costs and therefore the lower median income households are paying roughly $29 million/yr over 4.5% of actual income.

- This financial impact is masked by using just MHI as the affordability threshold.
- Over a 10-year period the lower median income households are carrying a $293 million financial burden.

  ◊ Escondido has 34% of its households in a 148,738 population city with spending that exceeds 4.5% of actual income:

- Annually, these households spend a combined $12.1 million in excess of 4.5% of their actual income.
- Over a 10-year period the financial burden is $122 million.

  ◊ Eleven of the study area communities have 10-year period financial burdens above $10 million borne by the lowest income households.

- More than half of the cities in the study exhibit excessive public water spending based on actual income, and the dollar amount of excessive spending is substantial, (Table C).

Widespread Economic Burdens on Households

- Comparing Actual Cost per Household to MHI Criteria provides a way to calculate how widespread the substantial economic burden is- measured by the percent of a city's households that carry a substantial economic burden.
- Total public water cost per household ranges from slightly to substantially greater than 4.5% of actual household income across the household income distribution deciles as described below:

  ◊ Eleven cities report combined water, sewer and flood control costs per household in excess of 4.5% of annual income for 20% or more of households.

  ◊ Paramount, La Verne and Escondido households exceed the 4.5% of actual income by 39%, 35% and 34%, respectively.

- Thirteen cities exceed spending 4.5% of actual income for 10 to 18% of their households.
- Six cities exceed spending 4.5% of actual income for 4 to 9% of their households.
- Three cities have less than 4% of households not spending in excess of 4.5% of their actual annual income on public water.

Introduction and Statement of Purpose

Lower income households spend a greater percentage of their annual income on public water services than households with median or higher income, and the disparate financial impact is not adequately taken into account by EPA when setting compliance levels and timeframes.

The United States Conference of Mayors (USCM) and its member cities have been engaged with the US Environmental Protection Agency (EPA) concerning the affordability of local public water services and federal/state mandates associated with current water laws. USCM member cities have expressed concern over costly consent agreements regarding sewer overflows and long term control plans, and nutrients impacting water quality that are regulated as total maximum daily loadings (TMDLs) into receiving water bodies. The USCM and its Mayors Water Council (MWC) has urged EPA to exercise greater flexibility when imposing compliance mandates to lessen the financial burdens on customers; and also because sewer overflow and TMDL consent agreements are so costly that they compete with reinvestment in the aging current water infrastructure and other essential public services such as public safety, road repairs and maintenance programs and other local priorities. During the course of these discussions it became clear from focusing on how EPA assesses local affordability that the current cost per household for public water services impacts households differently from a financial perspective based on actual household income. Lower income households spend a greater percentage of their annual income on public water services than households with median or higher income, and the disparate financial impact is not adequately taken into account by EPA when setting compliance levels and timeframes.

EPA developed affordability guidelines for certain regulations under the CWA[1] and SDWA[2]. The guidelines include an algorithm for estimating whether marginal (additional) expenditures necessary to achieve compliance would exact a substantial and widespread economic burden on the community. Regulations under the SDWA are based on national cost estimates, but EPA has stated that a new drinking water regulation can be implemented if the cost to household customers does not exceed 2.5 percent of median household income (MHI)[3]. Guidelines developed by EPA for use in CWA enforcement efforts regarding stormwater and sewer overflows considers a long term control plan to be affordable if the cost to household customers does not exceed 2.0 percent of MHI. MHI, the one common characteristic of the 2 guidelines, may be intended to stretch national and local efforts to achieve the goals of the CWA and SDWA, but its unintended consequence is a disparate financial burden on below median income households as a regressive tax. Households under the poverty level and under MHI pay a disproportionate share of their annual incomes for public water compared to the

1. U.S. EPA. 1997. Guidance for Financial Capability Assessment and Schedule Development
2. U.S. EPA. 2002. Affordability Criteria for Small Drinking Water Systems: An EPA Science Advisory Board Report. EPA-SAB-EEAC-03-004. U.S. Environmental Protection Agency, Washington, DC.
3. Affordability criteria considered by EPA under the SDWA pertains to setting national drinking water standards on a national basis. Using 2.5% of MHI to assess affordability for small community drinking water systems is intended to determine if a variance is appropriate.

affluent households (median and above median income households) in a community. EPA's insistence on using affordability criteria indexed to MHI creates a class-based environmental injustice. While there are good arguments for wanting and expecting greater levels of water quality and safe drinking water, there are limited resources in below median income households, and limits to overall local government resources. The clearly disproportionate and unfair financial impact on below median income households is a problem that EPA and Congress should be aware of and do something about.

EPA's insistence on using affordability criteria indexed to MHI creates a class-based environmental injustice.

This report has four purposes: first, it is intended to generate information on the current cost per household for public water services (sewer, water, flood control/stormwater). This is accomplished via a multi-community survey that collects and reports the current average annual cost per household in dollars and as a percent of annual household income according to different household income levels. The second purpose of the report is to compare current cost per household to EPA affordability criteria, taking into account the cost per household on all income levels. Third, this information is important to cities because it provides a profile of where current costs are, and how future investments, whether for system renewal or for regulatory compliance, or both, will impact the cost per household. It also makes a compelling argument for greater federal financial support for local governments, which has been reduced in a time where regulatory requirements have been increasing. Fourth, the study provides a framework for permit writers to consider the affordability of permit programs when considering compliance levels and deadlines.

Community Survey Information and Analysis

The data used in this report are gathered from participating communities regarding water costs, and from Census data at census.gov[4]. The USCM's Mayors Water Council collaborated with a number of California and Los Angeles County cities via an on-line survey. We choose Los Angeles County since it is one of the first areas in the nation to be regulated under a federal TMDL Consent Decree for stormwater. Additional California communities participated in the survey from outside of Los Angeles County.

Cities were asked to provide information on the average annual cost per household for water, sewer and flood control. The cost per household involves only the residential customers. Current cost levels represent the cumulative costs over time to the present.

Census information was collected for each participating city, and includes data on population, poverty rate, median household income (MHI), and the number of households per income category. The Census reports income for 10 income level categories (deciles)[5].

Current public water cost per household information provides the city with an accurate measure of how much households spend across the income distribution. Any additional costs for renewal, expansion or increased compliance requirements can be compared to the 2014 cost as a benchmark. Current costs are not static, and public water rates are rising in many cities around the nation. Cities in the survey are facing substantial new financial responsibilities related to compliance with Total Maximum Daily Loads, and there will likely be additional CWA/SDWA mandates as EPA continues to develop regulations in silo fashion over time.

The key findings are presented in the next section. Appendix A includes information on the distribution of cost per household across the income spectrum for each survey city. Appendix B provides comments on bias, estimation and uncertainty identified and considered in the survey and presentation of data.

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4. See Table A
5. The ten categories of household income are: $10,000 or less; 10,001 to 14,999; 15,000 to 24,999; 25,000 to 34,999; 35,000 to 49,999; 50,000 to 74,999; 75,000 to 99,999; 100,000 to 149,999; 150,000 to 199,999; and, 200,000 plus. For analytical purposes these categories are represented by the mid-point of income, except for the lowest income decile which is set at $10,000.00, and highest income decile which is set at $200,000.00.

Results

I: The Current Cost per Household for Public Water Services in the Survey Cities: (See Tables A & B)

A. Average Annual Water Cost per Household All Water Services (sewer, water and flood control)

- Total public water cost per household ranges from $366 to $2,640/yr
- Median total cost per household is $1,172/yr
  - ◊ Annual median water costs at $902/yr are four times sewer costs.
  - ◊ Sewer cost per household is $199/yr (median).
  - ◊ Flood Control cost per household is $41/yr (median).

- Cost per household in 4 cities exceed one standard deviation above average for total public water costs
  - ◊ La Canada Flintridge $ 2,640
  - ◊ Sierra Madre $ 2,040
  - ◊ La Verne $ 1,936
  - ◊ Escondido $ 1,730

- There is a wide range of current cost per household for all public water services
  - ◊ San Marino has the lowest at $366 annual average cost
  - ◊ La Canada Flintridge has the highest at $2,640/yr

B. Drinking Water Cost per Household

- Drinking water cost per households ranges from
  - ◊ Low $115/yr in San Marino
  - ◊ High of $2,245/yr in La Canada Flintridge

- The median Drinking Water cost per household is $902, and it is four times greater than the median Sewer cost per household at $199.

C. Sewer

- Sewer cost per household ranges from
  - ◊ $12/yr a year in Monterey Park
  - ◊ $738/yr in Sierra Madre

- The median cost per household is $199/yr

D. Flood Control

- Flood control cost per household ranges from
  - ◊ $0 in Azusa
  - ◊ $351/yr in South Gate

- The median cost per household is $41/yr

II: EPA Affordability Criteria Indexed to MHI Masks Substantial and Widespread Financial Impact (See Table B)

When EPA affordability criteria regarding stormwater and sewer overflow costs exceed 2% of MHI in a community, the Agency will consider greater flexibility. Generally speaking, EPA affordability criteria are seldom reached when estimates are based on MHI, a relatively poor measure of burden on below median income households.

For example, in the study area the median 2% of MHI for the cities is $1,352, but the median cost for sewer and flood control (CWA) is only $240. Similarly, the median combined water, sewer and flood control cost per household in the study cities is $1,171, and does not come close to the median 4.5% of MHI of cities at $3,042. Consent decrees involving local investment, from this mathematical vantage point, appear affordable with ample unused margin and no perceived substantial or widespread economic burden on the community.

When actual household income levels are considered in the affordability determination it becomes clear that MHI, as the presumptive critical criteria, masks the financial impact on lower income households.

Estimating affordability based on MHI results in financial burdens on below median income households because they pay a disproportionate share of their annual incomes. Drilling down into the cost per household as a percent of actual income reveals the disparate financial impact on below median income households.

City of Sierra Madre

- 2% MHI in the City of Sierra Madre is $1,806; and average annual sewer costs are $738, or about 40% of the 2% MHI affordability criteria. The affordability of a project does not appear to be an economic burden when the MHI serves as the critical metric.
- 18% of households are estimated to be paying in excess of 2% of their actual annual income on sewer.
  - ◊ The excess sewer payments are felt by households earning up to $35,000/yr.
- Another 8% of households, 26% in all, exceed 2% of actual income when adding flood control to sewer cost per household.
- Potential affordability obligation of EPA criteria
  - ◊ 2% MHI in Sierra Madre is equal to 18% of actual income for households with in come of $10,000/yr.
  - ◊ 4.5% MHI ($4,064) is equal to 40% of actual income in $10,000/yr households.

City of Sacramento

- 2% MHI in the City of Sacramento is $1,013; and average annual sewer costs are $617, or about 61% of the 2% MHI affordability criteria.
- 36% of households pay in excess of 2% of annual income for sewer
    - ◊ The excess sewer payments are felt by households earning up to $35,000/yr.
- Potential affordability obligation of EPA criteria
    - ◊ 2% MHI in Sacramento is equal to 10% of actual income for households with income of $10,000/yr.
    - ◊ 4.5% MHI ($2,279) is equal to 23% of actual income in $10,000/yr households.

If EPA triggers consideration of regulatory flexibility when the median income household experiences a substantial economic burden, then the same trigger should apply when water and sewer costs impose a substantial economic burden on the below median income household.

III: Substantial Economic Burdens on Below Median Households

If EPA triggers consideration of regulatory flexibility when the median income household experiences a substantial economic burden, then the same trigger should apply when water and sewer costs impose a substantial economic burden on the below median income household. It is possible to quantify the regressive nature, and amount, of economic burden to determine if it is substantial. This study uses 4.5% of MHI and 4.5% of actual annual income to measure the severity of economic burden (or, excessive spending by households) that results from using MHI as the critical metric.

A spectrum from mild to severe financial distress was found in households in most cities in the study. As expected, households with high income spend a lesser percentage of annual income on public water.

The severity of economic burden depends on where a household is on the income distribution. The study area communities exhibit substantial financial burdens that are sustained over time due to the recurring need for water and sewer services and the growing cost per household.

Estimates are generated of how much money a household spends in excess of 4.5% of actual income to gauge the severity of economic burden. The excess cost per household can then be multiplied by the number of households in each income category to estimate the magnitude of sustained economic burden.

- As expected, as income increases excessive spending decreases. (Table C).

- Lower median income households can experience a substantial financial burden (spending in excess of 4.5% of actual income).

Regulations developed under the separate silos of CWA and SDWA do not adequately consider the economic burden associated with overall public water and wastewater costs. Consideration of total public water costs are a more accurate depiction of the true household and community affordability, and of potential economic burdens and how widespread those burdens are.

◊ Sacramento has a relatively large population coupled with high public water costs and therefore the lower median income households are paying an estimated $29 million/yr over 4.5% of actual income

  » This financial impact is masked by using just MHI as the affordability threshold.
  » Over a 10-year period the lower median income households are carrying a $293 million financial burden when using actual income versus MHI.

◊ Escondido has 34% of its households in a 148,738 population city with spending that exceeds 4.5% of actual income.

  » Annually, these households spend a combined $12.1 million in excess of their 4.5% of actual income
  » Over a 10-year period the financial burden is $122 million

- Seventeen of the study area communities have 10-year period financial burdens above $10 million

- Two cities (Monterey Park, San Marino) have sewer, water and flood control costs below $500/year; and do not currently have households paying in excess of 4.5% of their actual annual incomes.

IV: Widespread Economic Burdens on Below Median Households

Water costs are on average four times higher than sewer costs in the survey communities. It is common for communities in arid regions to have this relationship between sewer and water services. Looking at combined water, sewer and flood control costs per household serves to demonstrate that different combinations of water costs and their associated mandates can vary considerably by community. Regulations developed under the separate silos of CWA and SDWA do not adequately consider the economic burden associated with overall public water and wastewater costs. Consideration of total public water costs are a more accurate depiction of the true household and community affordability, and of potential economic burdens and how widespread those burdens are.

- Eleven cities report combined water, sewer and flood control costs greater than 20% of households pay in excess of 4.5% of annual income.

Paramount	39.4%
La Verne	35.3%
Escondido	34.4%
Lomita	29.6%
Santa Barbara	27.9%
South Gate	26.4%
Sierra Madre	26.2%
Sacramento	24.3%
Arcadia	23.8%
Alhambra	22.1%
Claremont	21.1%

- Thirteen cities report combined water, sewer and flood control costs per household exceeding 4.5% of actual income for 10 to 20% of their households.

Downey	18.2%
Redondo Beach	17.6%
South Pasadena	17.3%
Norwalk	17.0%
La Canada Flintridge	14.7%
Bell Gardens	14.5%
La Mirada	14.0%
Glendora	12.6%
Signal Hill	11.6%
Pomona	11.5%
Bellflower	11.1%
Manhattan Beach	10.9%
Azusa	10.1%

- Six cities report combined water, sewer and flood control costs per household exceeding 4.5% of actual income for 4 to 8% of their households.

San Gabriel	8.0%
Torrance	8.0%
Diamond Bar	7.9%
San Dimas	7.7%
Lakewood	5.4%
Monrovia	4.4%

- Two cities (Monterey Park and San Marino) did not report any households paying over 4.5% of their annual income on combined water, sewer and flood control services.

- Three cities do not have data available to calculate excess cost per household, (Bradbury, Inglewood and Vernon).

V: EPA Affordability Criteria Exposure for Below Median Income Households (See Table C)

Public water customers (households) may be required to spend more money to address mandates imposed by EPA under the CWA and the SDWA, as well as assume responsibility to cover normal cost of service and any upgrades required to provide service. The affordability index of 2% MHI is used by EPA to assess the appropriateness of CWA requirements, but only some of them. Similarly, the SDWA use of 2.5% of MHI does not address all public drinking water systems, and it is likely that new mandates or new interpretations of what is required under existing mandates puts the rate payer household at a long-term financial disadvantage.

- The median of 2% MHI for the study cities is $1,352
- The median of 4.5% MHI for the study cities is $3,042

- Two cities currently have public water costs per household that nearly reach 4.5% of MHI, and experience both substantial and widespread economic burdens

		Combined Water Cost per Household	4.5% MHI	Households Impacted	10-Year Impact
•	Paramount	$1,439	$1,987	39.4%	$27 mill
•	South Gate	$1,171	$1,883	26.4%	$29.8 mill

- Three cities have statistically high exposure to higher public water costs because they are wealthy communities measured by MHI

		2% MHI	4.5% MHI
•	La Canada Flintridge	$3,099	$6,972
•	Manhattan Beach	$2,688	$6,050
•	San Marino	$2,782	$6,260

Table A: Summary of Public Water Cost By Component

	Average Annual Public Water Cost (1) Per Household ($)	Sewer Cost ($)	Water Cost ($)	Flood Control Cost ($)
Alhambra	1,323.89	178.26	1,110.00	35.63
Arcadia	1,493.78	354.52	1,089.26	50.00
Azusa	730.18	134.30	595.88	0.00
Bellflower	836.75	197.50	613.00	26.25
Bell Gardens	878.63	150.00	627.28	101.35
Bradbury	1,549.98	155.00	1,145.06	249.92
Claremont	1,498.78	113.23	1,344.00	41.55
Diamond Bar	1,137.38	198.79	902.26	36.33
Downey	1,142.54	216.18	891.72	34.64
Escondido	1,730.00	202.00	1,460.00	50.00
Glendora	1,172.11	152.00	967.50	52.61
Inglewood	1,008.00	90.00	860.00	58.00
La Canada Flintridge	2,640.00	330.00	2,245.00	65.00
La Mirada	1,213.64	189.50	995.75	28.39
La Verne	1,936.08	245.00	1,661.12	29.96
Lakewood	743.46	201.50	491.73	50.23
Lomita	1,295.21	258.20	1,000.56	36.45
Manhattan Beach	1,429.12	284.00	1,126.00	19.12
Monrovia	502.00	60.00	400.00	42.00
Monterey Park	412.00	12.00	360.00	40.00
Norwalk	1,290.48	240.48	1,000.00	50.00
Paramount	1,439.19	197.50	1,218.26	23.43
Pomona	741.80	158.90	580.50	2.40
Redondo Beach	1,474.21	331.00	1,110.66	32.57
Sacramento	1,302.00	617.00	549.00	136.00
San Dimas	896.20	199.50	631.19	65.51
San Gabriel	679.00	267.00	412.00	NA
San Marino	366.91	211.00	115.91	40.00
Santa Barbara	1,480.33	516.00	941.52	22.81
Sierra Madre	2,040.00	738.00	1,189.00	113.00
Signal Hill	796.69	407.70	331.50	57.49
South Gate	1,171.00	210.00	610.00	351.00
South Pasadena	1,384.98	154.98	1,320.00	0.00
Torrance	695.64	52.08	643.56	NA
Vernon	580.00	158.00	422.00	NA

(1) Includes payment for sewer, water and flood control

Table B: Average/Median Cost per Household for Survey Cities

Water Cost Characteristic	*Total Water Cost*	*Sewer Cost*	*Water Cost*	*Flood Control*
Median	$1,172.11	$199.50	$902.26	$40.78
Average	$1,172.80	$235.29	$882.03	$60.68
1 Standard Deviation	$488.43	$151.96	$429.22	$47.10

Table C: Comparison of Public Water Cost and EPA Affordability Criteria

	Public Water Cost Per Household (1) ($)	*2% of MHI (2) ($)*	*4.5% of MHI (3) ($)*	*Excess of 4.5% of Actual Income (4) (%)*	*10-YR Excess Payments ($ Mill)*
Alhambra	1,323.89	1,078	2,426	22.1	40.0
Arcadia	1,493.78	1,546	3,480	23.8	29.3
Azusa	730.18	1,016	2,387	10.1	2.8
Bellflower	836.75	1,015	2,284	11.1	8.5
Bell Gardens	878.63	765	1,722	14.5	5.2
Bradbury	1,549.98	NA	NA	NA	NA
Claremont	1,498.78	1,615	3,663	21.1	15.0
Diamond Bar	1,137.38	1,803	4,058	7.9	5.8
Downey	1,142.54	1,202	2,705	18.2	24.6
Escondido	1,730.00	995	2,240	34.4	121.9
Glendora	1,172.11	1,492	3,357	12.6	10.0
Inglewood	1,008.00	891	2,005	NA	NA
La Canada Flintridge	2,640.00	3,099	6,972	14.7	13.0
La Mirada	1,213.64	1,626	3,659	14.0	9.2
La Verne	1,936.08	1,530	3,443	35.3	25.6
Lakewood	743.46	1,577	3,549	5.4	3.4
Lomita	1,295.21	1,257	2,830	29.6	10.8
Manhattan Beach	1,429.12	2,688	6,050	10.9	7.6
Monrovia	502.00	1,389	3,125	4.4	0.3
Monterey Park	372.00	1,116	2,511	0.0	0.0
Norwalk	1,290.48	1,209	2,721	17.0	27.7
Paramount	1,439.19	883	1,987	39.4	27.0
Pomona	741.80	977	2,198	11.5	10.4
Redondo Beach	1,474.21	1,976	4,446	17.6	29.5
Sacramento	1,302.00	1,013	2,279	24.3	293.7
San Dimas	822.78	1,529	3,440	7.7	3.0
San Gabriel	679.00	1,125	2,531	8.0	1.7
San Marino	366.91	2,782	6,260	0.0	0.0
Santa Barbara	1,480.33	1,275	2,869	27.9	55.0
Sierra Madre	2,040.00	1,806	4,064	26.2	10.0
Signal Hill	796.69	1,315	2,958	11.6	13.6
South Gate	1,171.00	837	1,883	26.4	29.8
South Pasadena	1,384.98	1,683	3,788	17.3	11.3
Torrance	695.64	1,521	3,423	8.0	8.6
Vernon	580.00	NA	NA	NA	NA

(1) Includes spending on sewer, water and flood control.
(2) EPA affordability criteria under the CWA and the 1997 Financial Guidance (2% MHI).
(3) EPA affordability criteria under the SDWA (2.5% MHI).
(4) Comparing the percent of actual income spent to 4.5% MHI (2.5% MHI plus 2.0% MHI from CWA guidelines)..

Appendix A *Public Water Cost per Household and EPA Affordability Criteria for California Cities*

Alhambra, CA

Population 2013: 84,577

Poverty Rate 2012: 13.4%

Median Household Income (MHI), 2012: 59,917

EPA Affordability Criteria
2% of MHI: $1,078.34
4.5% of MHI: $2,426.27

Current Average Cost per Household

Sewer	$ 178.26
Water	$1,110.00
Flood Control	$ 35.63
Total	$1,323.89

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 29,103*	*Percent of Households*	*CWA 2% MHI $1,078.34 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,426.27 as Percent of Actual Income*
Less than $10,000	10,000	1,591	5.5%	10.8	24.26
$10,000 to $14,999	12,500	1,688	5.8%	8.6	19.41
$15,000 to $24,999	20,000	3,138	10.8%	5.4	12.13
$25,000 to $34,999	30,000	3,201	11.0%	3.6	8.09
$35,000 to $49,999	42,500	3,978	13.7%	2.5	5.71
$50,000 to $74,999	62,500	5,019	17.2%	1.7	3.88
$75,000 to $99,999	87,500	4,003	13.8%	1.2	2.77
$100,000 to $149,999	125,000	3,759	12.9%	0.9	1.94
$150,000 to $199,999	175,000	1,661	5.7%	0.6	1.39
$200,000 or more	200,000	1,065	3.7%	0.5	1.21

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 29,103*	*Percent of Households*	*2% MHI $1,078.34 Percent of Actual Income*	*Sewer Bill $178.26 Percent of Actual Income*	*Water Bill $1,110.00 Percent of Actual Income*	*Flood Control Bill $35.63 Percent of Actual Income*	*Sewer & Water Bill $1,323.89 Percent of Actual Income*
Less than $10,000	10,000	1,591	5.5%	10.8	1.8	11.1	0.36	13.24
$10,000 to $14,999	12,500	1,688	5.8%	8.6	1.4	8.9	0.29	10.59
$15,000 to $24,999	20,000	3,138	10.8%	5.4	0.9	5.6	0.18	6.62
$25,000 to $34,999	30,000	3,201	11.0%	3.6	0.6	3.7	0.12	4.41
$35,000 to $49,999	42,500	3,978	13.7%	2.5	0.4	2.6	0.08	3.12
$50,000 to $74,999	62,500	5,019	17.2%	1.7	0.3	1.8	0.06	2.12
$75,000 to $99,999	87,500	4,003	13.8%	1.2	0.2	1.3	0.04	1.51
$100,000 to $149,999	125,000	3,759	12.9%	0.9	0.1	0.9	0.03	1.06
$150,000 to $199,999	175,000	1,661	5.7%	0.6	0.1	0.6	0.02	0.76
$200,000 or more	200,000	1,065	3.7%	0.5	0.1	0.6	0.02	0.66

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 29,103*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	1,591	13.24	873.89	1,390,359	13,903,590
$10,000 to $14,999	12,500	1,688	10.59	761.39	1,285,226	12,852,263
$15,000 to $24,999	20,000	3,138	6.62	423.89	1,330,167	13,301,668
$25,000 to $34,999	30,000	3,201	4.41			
$35,000 to $49,999	42,500	3,978	3.12			
$50,000 to $74,999	62,500	5,019	2.12			
$75,000 to $99,999	87,500	4,003	1.51			
$100,000 to $149,999	125,000	3,759	1.06			
$150,000 to $199,999	175,000	1,661	0.76			
$200,000 or more	200,000	1,065	0.66			

Arcadia, CA

Population 2013: 57,639

Poverty Rate 2012: 9.9%

Median Household Income (MHI), 2012: $77,342

EPA Affordability Criteria
2% of MHI: $1,546.84
4.5% of MHI: $3,480.39

Current Average Cost per Household

Sewer	$ 354.52
Water	$ 1,089.26
Flood Control	$ 50.00
Total	$ 1,493.78

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 19,409*	*Percent of Households*	*CWA 2% MHI $1,546.84 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,480.39 as Percent of Actual Income*
Less than $10,000	10,000	1,248	6.4%	15.6	34.8
$10,000 to $14,999	12,500	826	4.3%	12.5	27.8
$15,000 to $24,999	20,000	1,167	6.0%	7.8	17.4
$25,000 to $34,999	30,000	1,369	7.1%	5.2	11.6
$35,000 to $49,999	42,500	1,825	9.4%	3.7	8.2
$50,000 to $74,999	62,500	3,084	15.9%	2.5	5.6
$75,000 to $99,999	87,500	2,128	11.0%	1.8	4.0
$100,000 to $149,999	125,000	3,372	17.4%	1.3	2.8
$150,000 to $199,999	175,000	1857	9.6%	0.9	2.0
$200,000 or more	200,000	2533	13.1%	0.8	1.7

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 19,409*	*Percent of Households*	*2% MHI $1,546.84 Percent of Actual Income*	*Sewer Bill $354.52 Percent of Actual Income*	*Water Bill $1,089.26 Percent of Actual Income*	*Flood Control Bill $50.00 Percent of Actual Income*	*Sewer & Water Bill $1,493.78 Percent of Actual Income*
Less than $10,000	10,000	1,248	6.4%	15.6	3.55	10.89	0.500	14.94
$10,000 to $14,999	12,500	826	4.3%	12.5	2.84	8.71	0.400	11.95
$15,000 to $24,999	20,000	1,167	6.0%	7.8	1.77	5.45	0.250	7.47
$25,000 to $34,999	30,000	1,369	7.1%	5.2	1.18	3.63	0.167	4.98
$35,000 to $49,999	42,500	1,825	9.4%	3.7	0.83	2.56	0.118	3.51
$50,000 to $74,999	62,500	3,084	15.9%	2.5	0.57	1.74	0.080	2.39
$75,000 to $99,999	87,500	2,128	11.0%	1.8	0.41	1.24	0.057	1.71
$100,000 to $149,999	125,000	3,372	17.4%	1.3	0.28	0.87	0.040	1.20
$150,000 to $199,999	175,000	1857	9.6%	0.9	0.20	0.62	0.029	0.85
$200,000 or more	200,000	2533	13.1%	0.8	0.18	0.54	0.025	0.75

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 19,409*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	1,248	14.94	1,043.78	1,302,637	13,026,374
$10,000 to $14,999	12,500	826	11.95	931.28	769,237	7,692,373
$15,000 to $24,999	20,000	1,167	7.47	593.78	692,941	6,929,413
$25,000 to $34,999	30,000	1,369	4.98	143.78	196,835	1,968,35
$35,000 to $49,999	42,500	1,825	3.51	-418.72		
$50,000 to $74,999	62,500	3,084	2.39	-1,318.72		
$75,000 to $99,999	87,500	2,128	1.71	-2,443.72		
$100,000 to $149,999	125,000	3,372	1.20	-4,131.22		
$150,000 to $199,999	175,000	1857	0.85	-6,381.22		
$200,000 or more	200,000	2533	0.75	-7,506.22		

Azusa, CA

Population 2013: 47,842

Poverty Rate 2012: 19.2%

Median Household Income (MHI), 2012: $53,063

EPA Affordability Criteria
2% of MHI: $1,061.26
4.5% of MHI: $ 2,387.84

Current Average Cost per Household

Sewer	$ 134.30
Water	$ 595.88
Flood Control	$
Total	$ 730.18

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	Household Income	Number of Households 12,137	Percent of Households	CWA 2% MHI $1,061.26 as Percent of Actual Income	CWA & SDWA 4.5% MHI $2,387.84 as Percent of Actual Income
Less than $10,000	10,000	650	5.3%	10.6	23.88
$10,000 to $14,999	12,500	584	4.8%	8.5	19.10
$15,000 to $24,999	20,000	1,466	12.0%	5.3	11.94
$25,000 to $34,999	30,000	1,137	9.3%	3.5	7.96
$35,000 to $49,999	42,500	1,863	15.3%	2.5	5.62
$50,000 to $74,999	62,500	2,475	20.3%	1.7	3.82
$75,000 to $99,999	87,500	1,705	14.0%	1.2	2.73
$100,000 to $149,999	125,000	1,458	12.0%	0.8	1.91
$150,000 to $199,999	175,000	590	4.8%	0.6	1.36
$200,000 or more	200,000	209	1.7%	0.5	1.19

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	Household Income	Number of Households 12,137	Percent of Households	2% MHI $1,061.26 Percent of Actual Income	Sewer Bill $134.30 Percent of Actual Income	Water Bill $595.88 Percent of Actual Income	Flood Control Bill Percent of Actual Income	Sewer & Water Bill $730.18 Percent of Actual Income
Less than $10,000	10,000	650	5.3%	10.6	1.34	5.96		7.30
$10,000 to $14,999	12,500	584	4.8%	8.5	1.07	4.77		5.84
$15,000 to $24,999	20,000	1,466	12.0%	5.3	0.67	2.98		3.65
$25,000 to $34,999	30,000	1,137	9.3%	3.5	0.45	1.99		2.43
$35,000 to $49,999	42,500	1,863	15.3%	2.5	0.32	1.40		1.72
$50,000 to $74,999	62,500	2,475	20.3%	1.7	0.21	0.95		1.17
$75,000 to $99,999	87,500	1,705	14.0%	1.2	0.15	0.68		0.83
$100,000 to $149,999	125,000	1,458	12.0%	0.8	0.11	0.48		0.58
$150,000 to $199,999	175,000	590	4.8%	0.6	0.08	0.34		0.42
$200,000 or more	200,000	209	1.7%	0.5	0.07	0.30		0.37

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	Household Income	Number of Households 12,137	2014 Average Total Water Cost per Household As % of Actual Income	2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income	Cost per Household Income Category in Excess of 4.5% of Actual Income $	10-Year Impact $
Less than $10,000	10,000	650	7.30	280.18	182,117	1,821,170
$10,000 to $14,999	12,500	584	5.84	167.68	97,925	979,251
$15,000 to $24,999	20,000	1,466	3.65	-169.82		
$25,000 to $34,999	30,000	1,137	2.43	-619.82		
$35,000 to $49,999	42,500	1,863	1.72	-1,182.32		
$50,000 to $74,999	62,500	2,475	1.17	-2,082.32		
$75,000 to $99,999	87,500	1,705	0.83	-3,207.32		
$100,000 to $149,999	125,000	1,458	0.58	-4,894.82		
$150,000 to $199,999	175,000	590	0.42	-7,144.82		
$200,000 or more	200,000	209	0.37	-8,269.82		

Bellflower, CA

Population: 77,593

Poverty Rate, 2012: 15.9%

Median Household Income (MHI), 2012: $50,765

EPA Affordability Criteria
2% of MHI: $1,015.30
4.5% of MHI: $2,284.43

Current Average Cost per Household

Sewer	$ 197.50
Water	$ 613.00
Flood Control	$ 26.25
Total	$ 836.75

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 23,257*	*Percent of Households*	*CWA 2% MHI $1,015.30 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,284.43 as Percent of Actual Income*
Less than $10,000	10,000	1,259	5.4%	10.2	22.8
$10,000 to $14,999	12,500	1,336	5.7%	8.1	18.3
$15,000 to $24,999	20,000	2,887	12.4%	5.1	11.4
$25,000 to $34,999	30,000	2,361	10.2%	3.4	7.6
$35,000 to $49,999	42,500	3,579	15.4%	2.4	5.4
$50,000 to $74,999	62,500	4,900	21.1%	1.6	3.7
$75,000 to $99,999	87,500	2,717	11.7%	1.2	2.6
$100,000 to $149,999	125,000	3,113	13.4%	0.8	1.8
$150,000 to $199,999	175,000	733	3.2%	0.6	1.3
$200,000 or more	200,000	372	1.6%	0.5	1.1

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 23,257*	*Percent of Households*	*2% MHI $1,015.30 Percent of Actual Income*	*Sewer Bill $197.50 Percent of Actual Income*	*Water Bill $613.00 Percent of Actual Income*	*Flood Control Bill $26.25 Percent of Actual Income*	*Sewer & Water Bill $836.75 Percent of Actual Income*
Less than $10,000	10,000	1,259	5.4%	10.2	1.98	6.13	0.263	8.37
$10,000 to $14,999	12,500	1,336	5.7%	8.1	1.58	4.90	0.210	6.69
$15,000 to $24,999	20,000	2,887	12.4%	5.1	0.99	3.07	0.131	4.18
$25,000 to $34,999	30,000	2,361	10.2%	3.4	0.66	2.04	0.088	2.79
$35,000 to $49,999	42,500	3,579	15.4%	2.4	0.46	1.44	0.062	1.97
$50,000 to $74,999	62,500	4,900	21.1%	1.6	0.32	0.98	0.042	1.34
$75,000 to $99,999	87,500	2,717	11.7%	1.2	0.23	0.70	0.030	0.96
$100,000 to $149,999	125,000	3,113	13.4%	0.8	0.16	0.49	0.021	0.67
$150,000 to $199,999	175,000	733	3.2%	0.6	0.11	0.35	0.015	0.48
$200,000 or more	200,000	372	1.6%	0.5	0.10	0.31	0.013	0.42

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*NumberB of Households 23,257*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	1,259	8.37	386.75	486,918	4,869,183
$10,000 to $14,999	12,500	1,336	6.69	274.25	366,398	3,663,980
$15,000 to $24,999	20,000	2,887	4.18	-63.25		
$25,000 to $34,999	30,000	2,361	2.79	-513.25		
$35,000 to $49,999	42,500	3,579	1.97	-1,075.75		
$50,000 to $74,999	62,500	4,900	1.34	-1,975.75		
$75,000 to $99,999	87,500	2,717	0.96	-3,100.75		
$100,000 to $149,999	125,000	3,113	0.67	-4,788.25		
$150,000 to $199,999	175,000	733	0.48	-7,038.25		
$200,000 or more	200,000	372	0.42	-8,163.25		

Bell Gardens, CA

Population, 2013:42,889

Poverty Rate, 2012: 26.9%

Median Household Income (MHI), 2012:$38,272

EPA Affordability Criteria
2% of MHI: $ 765.44
4.5% of MHI: $1,722.24

Current Average Cost per Household

Sewer	$627.28
Water	$150.00
Flood Control	$101.35
Total	$878.63

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 9,928*	*Percent of Households*	*CWA 2% MHI $765.44 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $1,722.24 as Percent of Actual Income*
Less than $10,000	10,000	643	6.48	7.65	17.22
$10,000 to $14,999	12,500	795	8.01	6.12	13.78
$15,000 to $24,999	20,000	1,538	15.49	3.83	8.61
$25,000 to $34,999	30,000	1,611	16.23	2.55	5.74
$35,000 to $49,999	42,500	1,741	17.54	1.80	4.05
$50,000 to $74,999	62,500	1,922	19.36	1.22	2.76
$75,000 to $99,999	87,500	1,048	10.56	0.87	1.97
$100,000 to $149,999	125,000	457	4.60	0.61	1.38
$150,000 to $199,999	175,000	135	1.36	0.44	0.98
$200,000 or more	200,000	38	0.38	0.38	0.86

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 9,928*	*Percent of Households*	*2% MHI $765.44 Percent of Actual Income*	*Sewer Bill $150.00 Percent of Actual Income*	*Water Bill $627.28 Percent of Actual Income*	*Flood Control Bill $101.35 Percent of Actual Income*	*Sewer & Water Bill $878.63 Percent of Actual Income*
Less than $10,000	10,000	643	6.48	7.65	1.50	6.27	1.01	8.79
$10,000 to $14,999	12,500	795	8.01	6.12	1.20	5.02	0.81	7.03
$15,000 to $24,999	20,000	1,538	15.49	3.83	0.75	3.14	0.51	4.39
$25,000 to $34,999	30,000	1,611	16.23	2.55	0.50	2.09	0.34	2.93
$35,000 to $49,999	42,500	1,741	17.54	1.80	0.35	1.48	0.24	2.07
$50,000 to $74,999	62,500	1,922	19.36	1.22	0.24	1.00	0.16	1.41
$75,000 to $99,999	87,500	1,048	10.56	0.87	0.17	0.72	0.12	1.00
$100,000 to $149,999	125,000	457	4.60	0.61	0.12	0.50	0.08	0.70
$150,000 to $199,999	175,000	135	1.36	0.44	0.09	0.36	0.06	0.50
$200,000 or more	200,000	38	0.38	0.38	0.08	0.31	0.05	0.44

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 9,928*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	643	8.79	428.63	275,609	2,756,091
$10,000 to $14,999	12,500	795	7.03	316.13	251,323	2,513,234
$15,000 to $24,999	20,000	1,538	4.39	-21.37		
$25,000 to $34,999	30,000	1,611	2.93	-471.37		
$35,000 to $49,999	42,500	1,741	2.07	-1,033.87		
$50,000 to $74,999	62,500	1,922	1.41	-1,933.87		
$75,000 to $99,999	87,500	1,048	1.00	-3,058.87		
$100,000 to $149,999	125,000	457	0.70	-4,746.37		
$150,000 to $199,999	175,000	135	0.50	-6,996.37		
$200,000 or more	200,000	38	0.44	-8,121.37		

Bradbury, CA

Population 2013: 57,639

Poverty Rate 2012: 9.9%

Median Household Income (MHI), 2012: $77,342

EPA Affordability Criteria
2% of MHI: $1,546.84
4.5% of MHI: $3,480.39

Current Average Cost per Household

Sewer	$ 354.52
Water	$ 1,089.26
Flood Control	$ 50.00
Total	$ 1,493.78

Claremont, CA

Population, 2013: 35,824

Poverty Rate, 2012: 8.6%

Median Household Income (MHI), 2012: $80,754

EPA Affordability Criteria
2% of MHI: $1,615.08
4.5% of MHI: $3,663.93

Current Average Cost per Household

Sewer	$ 113.23
Water	$1,344.00
Flood Control	$ 41.55
Total	$1,498.78

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 11,651*	*Percent of Households*	*CWA 2% MHI $1,615.08 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,663.93 as Percent of Actual Income*
Less than $10,000	10,000	610	5.2%	16.2	36.6
$10,000 to $14,999	12,500	340	2.9%	12.9	29.3
$15,000 to $24,999	20,000	774	6.6%	8.1	18.3
$25,000 to $34,999	30,000	740	6.4%	5.4	12.2
$35,000 to $49,999	42,500	1,221	10.5%	3.8	8.6
$50,000 to $74,999	62,500	1,771	15.2%	2.6	5.9
$75,000 to $99,999	87,500	1,329	11.4%	1.8	4.2
$100,000 to $149,999	125,000	1,873	16.1%	1.3	2.9
$150,000 to $199,999	175,000	1,574	13.5%	0.9	2.1
$200,000 or more	200,000	1,419	12.2%	0.8	1.8

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 11,651*	*Percent of Households*	*2% MHI $1,615.08 Percent of Actual Income*	*Sewer Bill $113.23 Percent of Actual Income*	*Water Bill $1,344.00 Percent of Actual Income*	*Flood Control Bill $41.55 Percent of Actual Income*	*Sewer & Water Bill $1,498.78 Percent of Actual Income*
Less than $10,000	10,000	610	5.2%	16.2	1.13	13.44	0.416	14.99
$10,000 to $14,999	12,500	340	2.9%	12.9	0.91	10.75	0.332	11.99
$15,000 to $24,999	20,000	774	6.6%	8.1	0.57	6.72	0.208	7.49
$25,000 to $34,999	30,000	740	6.4%	5.4	0.38	4.48	0.139	5.00
$35,000 to $49,999	42,500	1,221	10.5%	3.8	0.27	3.16	0.098	3.53
$50,000 to $74,999	62,500	1,771	15.2%	2.6	0.18	2.15	0.066	2.40
$75,000 to $99,999	87,500	1,329	11.4%	1.8	0.13	1.54	0.047	1.71
$100,000 to $149,999	125,000	1,873	16.1%	1.3	0.09	1.08	0.033	1.20
$150,000 to $199,999	175,000	1,574	13.5%	0.9	0.06	0.77	0.024	0.86
$200,000 or more	200,000	1,419	12.2%	0.8	0.06	0.67	0.021	0.75

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 11,651*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	610	14.99	1,048.78	639,756	6,397,558
$10,000 to $14,999	12,500	340	11.99	936.28	318,335	3,183,352
$15,000 to $24,999	20,000	774	7.49	598.78	463,456	4,634,557
$25,000 to $34,999	30,000	740	5.00	148.78	110,097	1,100,972
$35,000 to $49,999	42,500	1,221	3.53	-413.72		
$50,000 to $74,999	62,500	1,771	2.40	-1,313.72		
$75,000 to $99,999	87,500	1,329	1.71	-2,438.72		
$100,000 to $149,999	125,000	1,873	1.20	-4,126.22		
$150,000 to $199,999	175,000	1,574	0.86	-6,376.22		
$200,000 or more	200,000	1,419	0.75	-7,501.22		

Diamond Bar, CA

Population, 2013: 56,449

Poverty Rate, 2012: 5.2%

Median Household Income (MHI), 2012: $90,181

EPA Affordability Criteria
2% of MHI: $1,803.62
4.5% of MHI: $4,058.15

Current Average Cost per Household

Sewer	$ 198.79
Water	$ 902.26
Flood Control	$ 36.33
Total	$ 1,137.38

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 17,550*	*Percent of Households*	*CWA 2% MHI $1,803.62 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $4,058.15 as Percent of Actual Income*
Less than $10,000	10,000	395	2.3%	18.0	40.6
$10,000 to $14,999	12,500	243	1.4%	14.4	32.5
$15,000 to $24,999	20,000	730	4.2%	9.0	20.3
$25,000 to $34,999	30,000	1,093	6.2%	6.0	13.5
$35,000 to $49,999	42,500	1,684	9.6%	4.2	9.5
$50,000 to $74,999	62,500	3,246	18.5%	2.9	6.5
$75,000 to $99,999	87,500	2,373	13.5%	2.1	4.6
$100,000 to $149,999	125,000	3,779	21.5%	1.4	3.2
$150,000 to $199,999	175,000	2,081	11.9%	1.0	2.3
$200,000 or more	200,000	1,926	11.0%	0.9	2.0

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 17,550*	*Percent of Households*	*2% MHI $1,803.62 Percent of Actual Income*	*Sewer Bill $198.79 Percent of Actual Income*	*Water Bill $902.26 Percent of Actual Income*	*Flood Control Bill $36.33 Percent of Actual Income*	*Sewer & Water Bill $1,137.38 Percent of Actual Income*
Less than $10,000	10,000	395	2.3%	18.0	1.99	9.02	0.363	11.37
$10,000 to $14,999	12,500	243	1.4%	14.4	1.59	7.22	0.291	9.10
$15,000 to $24,999	20,000	730	4.2%	9.0	0.99	4.51	0.182	5.69
$25,000 to $34,999	30,000	1,093	6.2%	6.0	0.66	3.01	0.121	3.79
$35,000 to $49,999	42,500	1,684	9.6%	4.2	0.47	2.12	0.085	2.68
$50,000 to $74,999	62,500	3,246	18.5%	2.9	0.32	1.44	0.058	1.82
$75,000 to $99,999	87,500	2,373	13.5%	2.1	0.23	1.03	0.042	1.30
$100,000 to $149,999	125,000	3,779	21.5%	1.4	0.16	0.72	0.029	0.91
$150,000 to $199,999	175,000	2,081	11.9%	1.0	0.11	0.52	0.021	0.65
$200,000 or more	200,000	1,926	11.0%	0.9	0.10	0.45	0.018	0.57

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 17,550*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	395	11.37	687.38	271,515	2,715,151
$10,000 to $14,999	12,500	243	9.10	574.88	139,696	1,396,958
$15,000 to $24,999	20,000	730	5.69	237.38	173,287	1,732,874
$25,000 to $34,999	30,000	1,093	3.79	-212.62		
$35,000 to $49,999	42,500	1,684	2.68	-775.12		
$50,000 to $74,999	62,500	3,246	1.82	-1,675.12		
$75,000 to $99,999	87,500	2,373	1.30	-2,800.12		
$100,000 to $149,999	125,000	3,779	0.91	-4,487.62		
$150,000 to $199,999	175,000	2,081	0.65	-6,737.62		
$200,000 or more	200,000	1,926	0.57	-7,862.62		

Downey, CA

Population, 2013: 113,242

Poverty Rate, 2012: 12.1%

Median Household Income (MHI), 2012: $60,132

EPA Affordability Criteria
2% of MHI: $1,202.64
4.5% of MHI: $2,705.94

Current Average Cost per Household

Sewer	$ 216.18
Water	$ 891.72
Flood Control	$ 34.64
Total	$ 1,142.54

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 32,867*	*Percent of Households*	*CWA 2% MHI $1,202.64 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,705.94 as Percent of Actual Income*
Less than $10,000	10,000	1,248	3.8%	12.0	27.1
$10,000 to $14,999	12,500	1,328	4.0%	9.6	21.6
$15,000 to $24,999	20,000	3,403	10.4%	6.0	13.5
$25,000 to $34,999	30,000	3,435	10.5%	4.0	9.0
$35,000 to $49,999	42,500	4,192	12.8%	2.8	6.4
$50,000 to $74,999	62,500	7,060	21.5%	1.9	4.3
$75,000 to $99,999	87,500	4,483	13.6%	1.4	3.1
$100,000 to $149,999	125,000	4,806	14.6%	1.0	2.2
$150,000 to $199,999	175,000	1,865	5.7%	0.7	1.5
$200,000 or more	200,000	1,047	3.2%	0.6	1.4

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 32,867*	*Percent of Households*	*2% MHI $1,202.64 Percent of Actual Income*	*Sewer Bill $216.18 Percent of Actual Income*	*Water Bill $891.72 Percent of Actual Income*	*Flood Control Bill $34.64 Percent of Actual Income*	*Sewer & Water Bill $1,142.54 Percent of Actual Income*
Less than $10,000	10,000	1,248	3.8%	12.0	2.16	8.92	0.346	11.43
$10,000 to $14,999	12,500	1,328	4.0%	9.6	1.73	7.13	0.277	9.14
$15,000 to $24,999	20,000	3,403	10.4%	6.0	1.08	4.46	0.173	5.71
$25,000 to $34,999	30,000	3,435	10.5%	4.0	0.72	2.97	0.115	3.81
$35,000 to $49,999	42,500	4,192	12.8%	2.8	0.51	2.10	0.082	2.69
$50,000 to $74,999	62,500	7,060	21.5%	1.9	0.35	1.43	0.055	1.83
$75,000 to $99,999	87,500	4,483	13.6%	1.4	0.25	1.02	0.040	1.31
$100,000 to $149,999	125,000	4,806	14.6%	1.0	0.17	0.71	0.028	0.91
$150,000 to $199,999	175,000	1,865	5.7%	0.7	0.12	0.51	0.020	0.65
$200,000 or more	200,000	1,047	3.2%	0.6	0.11	0.45	0.017	0.57

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 32,867*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	1,248	11.43	692.54	864,290	8,642,899
$10,000 to $14,999	12,500	1,328	9.14	580.04	770,293	7,702,931
$15,000 to $24,999	20,000	3,403	5.71	242.54	825,364	8,253,636
$25,000 to $34,999	30,000	3,435	3.81	-207.46		
$35,000 to $49,999	42,500	4,192	2.69	-769.96		
$50,000 to $74,999	62,500	7,060	1.83	-1,669.96		
$75,000 to $99,999	87,500	4,483	1.31	-2,794.96		
$100,000 to $149,999	125,000	4,806	0.91	-4,482.46		
$150,000 to $199,999	175,000	1,865	0.65	-6,732.46		
$200,000 or more	200,000	1,047	0.57	-7,857.46		

Escondido, CA

Population, 2013: 148,738

Poverty Rate, 2012: 18.3%

Median Household Income (MHI), 2012: $49,787

EPA Affordability Criteria
2% of MHI: $995.74
4.5% of MHI: $2,240.22

Current Average Cost per Household

Sewer	$ 220.00
Water	$ 1,460.00
Flood Control	$ 50.00
Total	$ 1,730.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 44,474*	*Percent of Households*	*CWA 2% MHI $995.74 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,240.42 as Percent of Actual Income*
Less than $10,000	10,000	2,959	6.7%	10.0	22.4
$10,000 to $14,999	12,500	1,917	4.3%	8.0	17.9
$15,000 to $24,999	20,000	4,904	11.0%	5.0	11.2
$25,000 to $34,999	30,000	5,536	12.4%	3.3	7.5
$35,000 to $49,999	42,500	7,031	15.8%	2.3	5.3
$50,000 to $74,999	62,500	7,949	17.9%	1.6	3.6
$75,000 to $99,999	87,500	4,888	11.0%	1.1	2.6
$100,000 to $149,999	125,000	5,447	12.2%	0.8	1.8
$150,000 to $199,999	175,000	2,189	4.9%	0.6	1.3
$200,000 or more	200,000	1,654	3.7%	0.5	1.1

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 44,474*	*Percent of Households*	*2% MHI $995.74 Percent of Actual Income*	*Sewer Bill $220.00 Percent of Actual Income*	*Water Bill $1,460.00 Percent of Actual Income*	*Flood Control Bill $50.00 Percent of Actual Income*	*Sewer & Water Bill $1,730.00 Percent of Actual Income*
Less than $10,000	10,000	2,959	6.7%	10.0	2.20	14.60	0.500	17.30
$10,000 to $14,999	12,500	1,917	4.3%	8.0	1.76	11.68	0.400	13.84
$15,000 to $24,999	20,000	4,904	11.0%	5.0	1.10	7.30	0.250	8.65
$25,000 to $34,999	30,000	5,536	12.4%	3.3	0.73	4.87	0.167	5.77
$35,000 to $49,999	42,500	7,031	15.8%	2.3	0.52	3.44	0.118	4.07
$50,000 to $74,999	62,500	7,949	17.9%	1.6	0.35	2.34	0.080	2.77
$75,000 to $99,999	87,500	4,888	11.0%	1.1	0.25	1.67	0.057	1.98
$100,000 to $149,999	125,000	5,447	12.2%	0.8	0.18	1.17	0.040	1.38
$150,000 to $199,999	175,000	2,189	4.9%	0.6	0.13	0.83	0.029	0.99
$200,000 or more	200,000	1,654	3.7%	0.5	0.11	0.73	0.025	0.87

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 44,474*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	2,959	3.15	1,280	3,787,520	37,875,200
$10,000 to $14,999	12,500	1,917	2.52	1,168	2,238,098	22,380,975
$15,000 to $24,999	20,000	4,904	1.58	830	4,070,320	40,703,200
$25,000 to $34,999	30,000	5,536	1.05	380	2,103,680	21,036,800
$35,000 to $49,999	42,500	7,031	0.74	-183		
$50,000 to $74,999	62,500	7,949	0.50	-1,083		
$75,000 to $99,999	87,500	4,888	0.36	-2,208		
$100,000 to $149,999	125,000	5,447	0.25	-3,895		
$150,000 to $199,999	175,000	2,189	0.18	-6,145		
$200,000 or more	200,000	1,654	0.16	-7,270		

Glendora, CA

Population, 2013: 51,074

Poverty Rate, 2012: 7.9%

Median Household Income (MHI), 2012: $74,619

EPA Affordability Criteria
2% of MHI: $1,492.38
4.5% of MHI: $3,357.86

Current Average Cost per Household

Sewer	$ 152.00
Water	$ 967.50
Flood Control	$ 52.61
Total	$1,172.11

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 16,403*	*Percent of Households*	*CWA 2% MHI $1,492.38 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,357.86 as Percent of Actual Income*
Less than $10,000	10,000	599	3.7%	14.9	33.58
$10,000 to $14,999	12,500	504	3.1%	11.9	26.86
$15,000 to $24,999	20,000	958	5.8%	7.5	16.79
$25,000 to $34,999	30,000	1,272	7.8%	5.0	11.19
$35,000 to $49,999	42,500	1,869	11.4%	3.5	7.90
$50,000 to $74,999	62,500	3,049	18.6%	2.4	5.37
$75,000 to $99,999	87,500	2,490	15.2%	1.7	3.84
$100,000 to $149,999	125,000	3,092	18.9%	1.2	2.69
$150,000 to $199,999	175,000	1,294	7.9%	0.9	1.92
$200,000 or more	200,000	1,276	7.8%	0.7	1.68

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 16,403*	*Percent of Households*	*2% MHI $1,492.38 Percent of Actual Income*	*Sewer Bill $152.00 Percent of Actual Income*	*Water Bill $967.50 Percent of Actual Income*	*Flood Control Bill $52.61 Percent of Actual Income*	*Sewer & Water Bill $1,172.11 Percent of Actual Income*
Less than $10,000	10,000	599	3.7%	14.9	1.52	9.68	0.526	11.72
$10,000 to $14,999	12,500	504	3.1%	11.9	1.22	7.74	0.421	9.38
$15,000 to $24,999	20,000	958	5.8%	7.5	0.76	4.84	0.263	5.86
$25,000 to $34,999	30,000	1,272	7.8%	5.0	0.51	3.23	0.175	3.91
$35,000 to $49,999	42,500	1,869	11.4%	3.5	0.36	2.28	0.124	2.76
$50,000 to $74,999	62,500	3,049	18.6%	2.4	0.24	1.55	0.084	1.88
$75,000 to $99,999	87,500	2,490	15.2%	1.7	0.17	1.11	0.060	1.34
$100,000 to $149,999	125,000	3,092	18.9%	1.2	0.12	0.77	0.042	0.94
$150,000 to $199,999	175,000	1,294	7.9%	0.9	0.09	0.55	0.030	0.67
$200,000 or more	200,000	1,276	7.8%	0.7	0.08	0.48	0.026	0.59

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 16,403*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	599	11.72	722.11	432,544	4,325,439
$10,000 to $14,999	12,500	504	9.38	609.61	307,243	3,072,434
$15,000 to $24,999	20,000	958	5.86	272.11	260,681	2,606,814
$25,000 to $34,999	30,000	1,272	3.91	-177.89		
$35,000 to $49,999	42,500	1,869	2.76	-740.39		
$50,000 to $74,999	62,500	3,049	1.88	-1,640.39		
$75,000 to $99,999	87,500	2,490	1.34	-2,765.39		
$100,000 to $149,999	125,000	3,092	0.94	-4,452.89		
$150,000 to $199,999	175,000	1,294	0.67	-6,702.89		
$200,000 or more	200,000	1,276	0.59	-7,827.89		

Inglewood, CA

Population, 2013: 111,542

Poverty Rate, 2012: 20.1

Median Household Income (MHI), 2012: $44,558

EPA Affordability Criteria
2% of MHI: $891.16
4.5% of MHI:$2,005.11

Current Average Cost per Household

Sewer	$ 90.00
Water	$ 860.00
Flood Control	$ 58.00
Total	$1,008.00[1]

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Arcadia Household Income Distribution	*Household Income*	*Number of Households 36,681*	*Percent of Households*	*CWA 2% MHI $891.16 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,005.11 as Percent of Actual Income*
Less than $10,000	10,000	2,393	6.5%	8.91	20.05
$10,000 to $14,999	12,500	2,600	7.1%	7.13	16.04
$15,000 to $24,999	20,000	4,932	13.4%	4.46	10.03
$25,000 to $34,999	30,000	5,012	13.7%	2.97	6.68
$35,000 to $49,999	42,500	5,138	14.0%	2.10	4.72
$50,000 to $74,999	62,500	6,908	18.8%	1.43	3.21
$75,000 to $99,999	87,500	4,363	11.9%	1.02	2.29
$100,000 to $149,999	125,000	3,680	10.0%	0.71	1.60
$150,000 to $199,999	175,000	986	2.7%	0.51	1.15
$200,000 or more	200,000	669	1.8%	0.45	1.00

1. Water and sewer averages are based on 14 units of consumption which may be high for lower income households, (Ray Yeghyayan, City if Inglewood, CA., September 2014); due to the limited number of hook-ups in Inglewood that are serviced by the city it is too complex to match cost per household to hook-ups that represent the entire city, which is why Tables 2 and 3 were not done.

La Canada Flintridge, CA

Population, 2013: 20,553

Poverty Rate, 2012: 2.1%

Median Household Income (MHI), 2012: $154,947

EPA Affordability Criteria
2% of MHI: $3,098.04
4.5% of MHI: $6,972.62

Current Average Cost per Household

Sewer	$ 330.00
Water	$ 2,245.00
Flood Control	$ 65.00
Total	$ 2,640.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 6,751*	*Percent of Households*	*CWA 2% MHI $3,098.04 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $6,972.62 as Percent of Actual Income*
Less than $10,000	10,000	81	1.2%	31.0	69.7
$10,000 to $14,999	12,500	69	1.0%	24.8	55.8
$15,000 to $24,999	20,000	227	3.4%	15.5	34.9
$25,000 to $34,999	30,000	264	3.9%	10.3	23.2
$35,000 to $49,999	42,500	352	5.2%	7.3	16.4
$50,000 to $74,999	62,500	537	8.0%	5.0	11.2
$75,000 to $99,999	87,500	462	6.8%	3.5	8.0
$100,000 to $149,999	125,000	1,294	19.2%	2.5	5.6
$150,000 to $199,999	175,000	857	12.7%	1.8	4.0
$200,000 or more	200,000	2,608	38.6%	1.5	3.5

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 6,751*	*Percent of Households*	*2% MHI $3,098.04 Percent of Actual Income*	*Sewer Bill $330 Percent of Actual Income*	*Water Bill $2,245 Percent of Actual Income*	*Flood Control Bill $65 Percent of Actual Income*	*Sewer & Water Bill $2,640 Percent of Actual Income*
Less than $10,000	10,000	81	1.2%	31.0	3.30	22.45	0.650	26.40
$10,000 to $14,999	12,500	69	1.0%	24.8	2.64	17.96	0.520	21.12
$15,000 to $24,999	20,000	227	3.4%	15.5	1.65	11.23	0.325	13.20
$25,000 to $34,999	30,000	264	3.9%	10.3	1.10	7.48	0.217	8.80
$35,000 to $49,999	42,500	352	5.2%	7.3	0.78	5.28	0.153	6.21
$50,000 to $74,999	62,500	537	8.0%	5.0	0.53	3.59	0.104	4.22
$75,000 to $99,999	87,500	462	6.8%	3.5	0.38	2.57	0.074	3.02
$100,000 to $149,999	125,000	1,294	19.2%	2.5	0.26	1.80	0.052	2.11
$150,000 to $199,999	175,000	857	12.7%	1.8	0.19	1.28	0.037	1.51
$200,000 or more	200,000	2,608	38.6%	1.5	0.17	1.12	0.033	1.32

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 6,751*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	81	26.40	2,190.00	177,390	1,773,900
$10,000 to $14,999	12,500	69	21.12	2,077.50	143,348	1,433,475
$15,000 to $24,999	20,000	227	13.20	1,740.00	394,980	3,949,800
$25,000 to $34,999	30,000	264	8.80	1,290.00	340,560	3,405,600
$35,000 to $49,999	42,500	352	6.21	727.50	256,080	2,560,800
$50,000 to $74,999	62,500	537	4.22	-172.50		
$75,000 to $99,999	87,500	462	3.02	-1,297.50		
$100,000 to $149,999	125,000	1,294	2.11	-2,985.00		
$150,000 to $199,999	175,000	857	1.51	-5,235.00		
$200,000 or more	200,000	2,608	1.32	-6,360.00		

La Mirada, CA

Population, 2013: 49,133

Poverty Rate, 2012: 6.2%

Median Household Income (MHI), 2012: $81,319

EPA Affordability Criteria
2% of MHI: $1,626.38
4.5% of MHI: $3,659.36

Current Average Cost per Household

Sewer	$ 189.50
Water	$ 995.75
Flood Control	$ 28.39
Total	$ 1,213.64

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 14,152*	*Percent of Households*	*CWA 2% MHI $1,626.38 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,659.36 as Percent of Actual Income*
Less than $10,000	10,000	373	2.64	16.26	36.59
$10,000 to $14,999	12,500	418	2.95	13.01	29.27
$15,000 to $24,999	20,000	1,194	8.44	8.13	18.30
$25,000 to $34,999	30,000	1,120	7.91	5.42	12.20
$35,000 to $49,999	42,500	1,378	9.74	3.83	8.61
$50,000 to $74,999	62,500	2,047	14.46	2.60	5.85
$75,000 to $99,999	87,500	2,142	15.14	1.86	4.18
$100,000 to $149,999	125,000	3,286	23.22	1.30	2.93
$150,000 to $199,999	175,000	1,445	10.21	0.93	2.09
$200,000 or more	200,000	749	5.29	0.81	1.83

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 14,152*	*Percent of Households*	*2% MHI $1,626.38 Percent of Actual Income*	*Sewer Bill $354.52 Percent of Actual Income*	*Water Bill $1,089.26 Percent of Actual Income*	*Flood Control Bill $50.00 Percent of Actual Income*	*Sewer & Water Bill $1,213.64 Percent of Actual Income*
Less than $10,000	10,000	373	2.64	16.26	1.90	9.96	0.28	12.14
$10,000 to $14,999	12,500	418	2.95	13.01	1.52	7.97	0.23	9.71
$15,000 to $24,999	20,000	1,194	8.44	8.13	0.95	4.98	0.14	6.07
$25,000 to $34,999	30,000	1,120	7.91	5.42	0.63	3.32	0.09	4.05
$35,000 to $49,999	42,500	1,378	9.74	3.83	0.45	2.34	0.07	2.86
$50,000 to $74,999	62,500	2,047	14.46	2.60	0.30	1.59	0.05	1.94
$75,000 to $99,999	87,500	2,142	15.14	1.86	0.22	1.14	0.03	1.39
$100,000 to $149,999	125,000	3,286	23.22	1.30	0.15	0.80	0.02	0.97
$150,000 to $199,999	175,000	1,445	10.21	0.93	0.11	0.57	0.02	0.69
$200,000 or more	200,000	749	5.29	0.81	0.09	0.50	0.01	0.61

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 14,152*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	373	12.14	763.64	284,838	2,848,377
$10,000 to $14,999	12,500	418	9.71	651.14	272,177	2,721,765
$15,000 to $24,999	20,000	1,194	6.07	313.64	374,486	3,744,862
$25,000 to $34,999	30,000	1,120	4.05	-136.36		
$35,000 to $49,999	42,500	1,378	2.86	-698.86		
$50,000 to $74,999	62,500	2,047	1.94	-1,598.86		
$75,000 to $99,999	87,500	2,142	1.39	-2,723.86		
$100,000 to $149,999	125,000	3,286	0.97	-4,411.36		
$150,000 to $199,999	175,000	1,445	0.69	-6,661.36		
$200,000 or more	200,000	749	0.61	-7,786.36		

La Verne, CA

Population, 2013: 31,868

Poverty Rate, 2012: 7.3%

Median Household Income (MHI), 2012: $76,519

EPA Affordability Criteria
2% of MHI: $1,530
4.5% of MHI: $3,443

Current Average Cost per Household

Sewer	$ 245.00
Water	$ 1,661.12
Flood Control	$ 29.96
Total	$ 1,936.08

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 10,854*	*Percent of Households*	*CWA 2% MHI $1,530 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,443 as Percent of Actual Income*
Less than $10,000	10,000	390	3.6%	15.3	34.43
$10,000 to $14,999	12,500	431	4.0%	12.2	27.55
$15,000 to $24,999	20,000	934	8.6%	7.7	17.22
$25,000 to $34,999	30,000	664	6.1%	5.1	11.48
$35,000 to $49,999	42,500	1,411	13.0%	3.6	8.10
$50,000 to $74,999	62,500	1,549	14.3%	2.4	5.51
$75,000 to $99,999	87,500	1,489	13.7%	1.7	3.94
$100,000 to $149,999	125,000	2,053	18.9%	1.2	2.75
$150,000 to $199,999	175,000	1,127	10.4%	0.9	1.97
$200,000 or more	200,000	806	7.4%	0.8	1.72

Table 2: Cost per Household for Current Water Service Components

Arcadia Household Income Distribution	*Household Income*	*Number of Households 10,854*	*Percent of Households*	*2% MHI $1,530.38 Percent of Actual Income*	*Sewer Bill $245.00 Percent of Actual Income*	*Water Bill $1,661.12 Percent of Actual Income*	*Flood Control Bill $29.96 Percent of Actual Income*	*Sewer & Water Bill $1,936.08 Percent of Actual Income*
Less than $10,000	10,000	390	3.6%	15.3	2.45	16.61	0.300	19.36
$10,000 to $14,999	12,500	431	4.0%	12.2	1.96	13.29	0.240	15.49
$15,000 to $24,999	20,000	934	8.6%	7.7	1.23	8.31	0.150	9.68
$25,000 to $34,999	30,000	664	6.1%	5.1	0.82	5.54	0.100	6.45
$35,000 to $49,999	42,500	1,411	13.0%	3.6	0.58	3.91	0.070	4.56
$50,000 to $74,999	62,500	1,549	14.3%	2.4	0.39	2.66	0.048	3.10
$75,000 to $99,999	87,500	1,489	13.7%	1.7	0.28	1.90	0.034	2.21
$100,000 to $149,999	125,000	2,053	18.9%	1.2	0.20	1.33	0.024	1.55
$150,000 to $199,999	175,000	1,127	10.4%	0.9	0.14	0.95	0.017	1.11
$200,000 or more	200,000	806	7.4%	0.8	0.12	0.83	0.015	0.97

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 10,854*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	390	19.36	1,486.08	579,571	5,795,712
$10,000 to $14,999	12,500	431	15.49	1,373.58	592,013	5,920,130
$15,000 to $24,999	20,000	934	9.68	1,036.08	967,699	9,676,987
$25,000 to $34,999	30,000	664	6.45	586.08	389,157	3,891,571
$35,000 to $49,999	42,500	1,411	4.56	23.58	33,271	332,714
$50,000 to $74,999	62,500	1,549	3.10			
$75,000 to $99,999	87,500	1,489	2.21			
$100,000 to $149,999	125,000	2,053	1.55			
$150,000 to $199,999	175,000	1,127	1.11			
$200,000 or more	200,000	806	0.97			

Lakewood, CA

Population, 2013: 81,121

Poverty Rate, 2012: 7.6%

Median Household Income (MHI), 2012: $78,876

EPA Affordability Criteria
2% of MHI: $1,577.42
4.5% of MHI: $3,549.42

Current Average Cost per Household

Sewer	$ 201.50
Water	$ 491.73
Flood Control	$ 50.23
Total	$ 743.46

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 26,172*	*Percent of Households*	*CWA 2% MHI $1,577.42 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,549.42 as Percent of Actual Income*
Less than $10,000	10,000	816	3.1%	15.8	35.5
$10,000 to $14,999	12,500	593	2.3%	12.6	28.4
$15,000 to $24,999	20,000	1,377	5.3%	7.9	17.7
$25,000 to $34,999	30,000	1,802	6.9%	5.3	11.8
$35,000 to $49,999	42,500	2,936	11.2%	3.7	8.4
$50,000 to $74,999	62,500	4,954	18.9%	2.5	5.7
$75,000 to $99,999	87,500	4,320	16.5%	1.8	4.1
$100,000 to $149,999	125,000	6,008	23.0%	1.3	2.8
$150,000 to $199,999	175,000	2,415	9.2%	0.9	2.0
$200,000 or more	200,000	951	3.6%	0.8	1.8

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 26,172*	*Percent of Households*	*2% MHI $1,577.42 Percent of Actual Income*	*Sewer Bill $201.50 Percent of Actual Income*	*Water Bill $491.73 Percent of Actual Income*	*Flood Control Bill $50.23 Percent of Actual Income*	*Sewer & Water Bill $743.46 Percent of Actual Income*
Less than $10,000	10,000	816	3.1%	15.8	2.02	4.92	0.502	7.43
$10,000 to $14,999	12,500	593	2.3%	12.6	1.61	3.93	0.402	5.95
$15,000 to $24,999	20,000	1,377	5.3%	7.9	1.01	2.46	0.251	3.72
$25,000 to $34,999	30,000	1,802	6.9%	5.3	0.67	1.64	0.167	2.48
$35,000 to $49,999	42,500	2,936	11.2%	3.7	0.47	1.16	0.118	1.75
$50,000 to $74,999	62,500	4,954	18.9%	2.5	0.32	0.79	0.080	1.19
$75,000 to $99,999	87,500	4,320	16.5%	1.8	0.23	0.56	0.057	0.85
$100,000 to $149,999	125,000	6,008	23.0%	1.3	0.16	0.39	0.040	0.59
$150,000 to $199,999	175,000	2,415	9.2%	0.9	0.12	0.28	0.029	0.42
$200,000 or more	200,000	951	3.6%	0.8	0.10	0.25	0.025	0.37

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 26,172*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	816	7.43	293.46	239,463	2,394,634
$10,000 to $14,999	12,500	593	5.95	180.96	107,309	1,073,093
$15,000 to $24,999	20,000	1,377	3.72	-156.54		
$25,000 to $34,999	30,000	1,802	2.48	-606.54		
$35,000 to $49,999	42,500	2,936	1.75	-1,169.04		
$50,000 to $74,999	62,500	4,954	1.19	-2,069.04		
$75,000 to $99,999	87,500	4,320	0.85	-3,194.04		
$100,000 to $149,999	125,000	6,008	0.59	-4,881.54		
$150,000 to $199,999	175,000	2,415	0.42	-7,131.54		
$200,000 or more	200,000	951	0.37	-8,256.54		

Lomita, CA

Population, 2013: 20,596

Poverty Rate, 2012: 11.3%

Median Household Income (MHI), 2012: $62,899

EPA Affordability Criteria
2% of MHI: $1,257.98
4.5% of MHI: $2,830.46

Current Average Cost per Household

Sewer	$ 258.20
Water	$ 1,000.56
Flood Control	$ 36.45
Total	$ 1,295.21

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 7,894*	*Percent of Households*	*CWA 2% MHI $1,257.98 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,830.46 as Percent of Actual Income*
Less than $10,000	10,000	464	12.95	12.6	28.3
$10,000 to $14,999	12,500	520	10.36	10.1	22.6
$15,000 to $24,999	20,000	784	6.48	6.3	14.2
$25,000 to $34,999	30,000	594	4.32	4.2	9.4
$35,000 to $49,999	42,500	885	3.05	3.0	6.7
$50,000 to $74,999	62,500	1,644	2.07	2.0	4.5
$75,000 to $99,999	87,500	878	1.48	1.4	3.2
$100,000 to $149,999	125,000	1,284	1.04	1.0	2.3
$150,000 to $199,999	175,000	506	0.74	0.7	1.6
$200,000 or more	200,000	335	0.65	0.6	1.4

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 7,894*	*Percent of Households*	*2% MHI $1,257.98 Percent of Actual Income*	*Sewer Bill $258.20 Percent of Actual Income*	*Water Bill $1,000.56 Percent of Actual Income*	*Flood Control Bill $36.45 Percent of Actual Income*	*Sewer & Water Bill $1,295.21 Percent of Actual Income*
Less than $10,000	10,000	464	12.95	12.6	2.58	10.01	0.365	12.95
$10,000 to $14,999	12,500	520	10.36	10.1	2.07	8.00	0.292	10.36
$15,000 to $24,999	20,000	784	6.48	6.3	1.29	5.00	0.182	6.48
$25,000 to $34,999	30,000	594	4.32	4.2	0.86	3.34	0.122	4.32
$35,000 to $49,999	42,500	885	3.05	3.0	0.61	2.35	0.086	3.05
$50,000 to $74,999	62,500	1,644	2.07	2.0	0.41	1.60	0.058	2.07
$75,000 to $99,999	87,500	878	1.48	1.4	0.30	1.14	0.042	1.48
$100,000 to $149,999	125,000	1,284	1.04	1.0	0.21	0.80	0.029	1.04
$150,000 to $199,999	175,000	506	0.74	0.7	0.15	0.57	0.021	0.74
$200,000 or more	200,000	335	0.65	0.6	0.13	0.50	0.018	0.65

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 7,894*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	464	12.95	845.98	392,535	3,925,347
$10,000 to $14,999	12,500	520	10.36	733.48	381,410	3,814,096
$15,000 to $24,999	20,000	784	6.48	395.98	310,448	3,104,483
$25,000 to $34,999	30,000	594	4.32	-54.02		
$35,000 to $49,999	42,500	885	3.05	-616.52		
$50,000 to $74,999	62,500	1,644	2.07	-1,516.52		
$75,000 to $99,999	87,500	878	1.48	-2,641.52		
$100,000 to $149,999	125,000	1,284	1.04	-4,329.02		
$150,000 to $199,999	175,000	506	0.74	-6,579.02		
$200,000 or more	200,000	335	0.65	-7,704.02		

Manhattan Beach, CA

Population, 2013: 35,726

Poverty Rate, 2012: 2.9%

Median Household Income (MHI), 2012: $134,445

EPA Affordability Criteria
2% of MHI: $2,688.90
4.5% of MHI: $6,050.03

Current Average Cost per Household

Sewer	$ 284.00
Water	$ 1,126.00
Flood Control	$ 19.12
Total	$ 1,429.12

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 14,089*	*Percent of Households*	*CWA 2% MHI $2,688.90 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $6,050.03 as Percent of Actual Income*
Less than $10,000	10,000	286	2.0%	26.7	60.5
$10,000 to $14,999	12,500	265	1.9%	21.4	48.4
$15,000 to $24,999	20,000	403	2.9%	13.3	30.3
$25,000 to $34,999	30,000	582	4.1%	8.9	20.2
$35,000 to $49,999	42,500	756	5.4%	6.3	14.2
$50,000 to $74,999	62,500	1,549	11.0%	4.3	9.7
$75,000 to $99,999	87,500	1,220	8.7%	3.1	6.9
$100,000 to $149,999	125,000	2,803	19.9%	2.1	4.8
$150,000 to $199,999	175,000	1,886	13.4%	1.5	3.5
$200,000 or more	200,000	4,339	30.8%	1.3	3.0

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 14,089*	*Percent of Households*	*2% MHI $2,688.03 Percent of Actual Income*	*Sewer Bill $284 Percent of Actual Income*	*Water Bill $1,126 Percent of Actual Income*	*Flood Control Bill $19.12 Percent of Actual Income*	*Sewer & Water Bill $1,429.12 Percent of Actual Income*
Less than $10,000	10,000	286	2.0%	26.7	2.84	11.26	0.191	14.29
$10,000 to $14,999	12,500	265	1.9%	21.4	2.27	9.01	0.153	11.43
$15,000 to $24,999	20,000	403	2.9%	13.3	1.42	5.63	0.096	7.15
$25,000 to $34,999	30,000	582	4.1%	8.9	0.95	3.75	0.064	4.76
$35,000 to $49,999	42,500	756	5.4%	6.3	0.67	2.65	0.045	3.36
$50,000 to $74,999	62,500	1,549	11.0%	4.3	0.45	1.80	0.031	2.29
$75,000 to $99,999	87,500	1,220	8.7%	3.1	0.32	1.29	0.022	1.63
$100,000 to $149,999	125,000	2,803	19.9%	2.1	0.23	0.90	0.015	1.14
$150,000 to $199,999	175,000	1,886	13.4%	1.5	0.16	0.64	0.011	0.82
$200,000 or more	200,000	4,339	30.8%	1.3	0.14	0.56	0.010	0.71

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 14,089*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	286	14.29	979.12	280,028	2,800,283
$10,000 to $14,999	12,500	265	11.43	866.62	229,654	2,296,543
$15,000 to $24,999	20,000	403	7.15	529.12	213,235	2,132,354
$25,000 to $34,999	30,000	582	4.76	79.12	46,048	460,478
$35,000 to $49,999	42,500	756	3.36	-483.38		
$50,000 to $74,999	62,500	1,549	2.29	-1,383.38		
$75,000 to $99,999	87,500	1,220	1.63	-2,508.38		
$100,000 to $149,999	125,000	2,803	1.14	-4,195.88		
$150,000 to $199,999	175,000	1,886	0.82	-6,445.88		
$200,000 or more	200,000	4,339	0.71	-7,570.88		

Monrovia, CA

Population, 2013: 37,101

Poverty Rate, 2012: 9.6%

Median Household Income (MHI), 2012: $69,449

EPA Affordability Criteria
2% of MHI: $1,388.98
4.5% of MHI: $3,125.21

Current Average Cost per Household

Sewer	$ 60.00
Water	$ 400.00
Flood Control	$ 42.00
Total	$ 502.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 13,428*	*Percent of Households*	*CWA 2% MHI $1,388.98 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,125.21 as Percent of Actual Income*
Less than $10,000	10,000	641	4.77	13.89	31.25
$10,000 to $14,999	12,500	621	4.62	11.11	25.00
$15,000 to $24,999	20,000	1,204	8.97	6.94	15.63
$25,000 to $34,999	30,000	968	7.21	4.63	10.42
$35,000 to $49,999	42,500	1,352	10.07	3.27	7.35
$50,000 to $74,999	62,500	2,503	18.64	2.22	5.00
$75,000 to $99,999	87,500	1,666	12.41	1.59	3.57
$100,000 to $149,999	125,000	2,557	19.04	1.11	2.50
$150,000 to $199,999	175,000	1,141	8.50	0.79	1.79
$200,000 or more	200,000	775	5.77	0.69	1.56

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 13,428*	*Percent of Households*	*2% MHI $1,388.98 Percent of Actual Income*	*Sewer Bill $60.00 Percent of Actual Income*	*Water Bill $400.00 Percent of Actual Income*	*Flood Control Bill $42.00 Percent of Actual Income*	*Sewer & Water Bill $502.00 Percent of Actual Income*
Less than $10,000	10,000	641	4.77	13.89	0.600	4.00	0.420	5.020
$10,000 to $14,999	12,500	621	4.62	11.11	0.480	3.20	0.336	4.016
$15,000 to $24,999	20,000	1,204	8.97	6.94	0.300	2.00	0.210	2.510
$25,000 to $34,999	30,000	968	7.21	4.63	0.200	1.33	0.140	1.673
$35,000 to $49,999	42,500	1,352	10.07	3.27	0.141	0.94	0.099	1.181
$50,000 to $74,999	62,500	2,503	18.64	2.22	0.096	0.64	0.067	0.803
$75,000 to $99,999	87,500	1,666	12.41	1.59	0.069	0.46	0.048	0.574
$100,000 to $149,999	125,000	2,557	19.04	1.11	0.048	0.32	0.034	0.402
$150,000 to $199,999	175,000	1,141	8.50	0.79	0.034	0.23	0.024	0.287
$200,000 or more	200,000	775	5.77	0.69	0.030	0.20	0.021	0.251

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 13,428*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	641	5.020	52.00	33,332	333,320
$10,000 to $14,999	12,500	621	4.016			
$15,000 to $24,999	20,000	1,204	2.510			
$25,000 to $34,999	30,000	968	1.673			
$35,000 to $49,999	42,500	1,352	1.181			
$50,000 to $74,999	62,500	2,503	0.803			
$75,000 to $99,999	87,500	1,666	0.574			
$100,000 to $149,999	125,000	2,557	0.402			
$150,000 to $199,999	175,000	1,141	0.287			
$200,000 or more	200,000	775	0.251			

Monterey Park, CA

Population, 2013: 61,085

Poverty Rate, 2012: 14.5%

Median Household Income (MHI), 2012: $55,800

EPA Affordability Criteria
2% of MHI: $1,116
4.5% of MHI: $2,511

Current Average Cost per Household

Sewer	$ 12.00
Water	$ 360.00
Flood Control	$ 40.00
Total	$ 412.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 18,735*	*Percent of Households*	*CWA 2% MHI $1,116 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,511 as Percent of Actual Income*
Less than $10,000	10,000	1,022	5.5%	11.2	25.1
$10,000 to $14,999	12,500	1,263	6.7%	8.9	20.1
$15,000 to $24,999	20,000	2,157	11.5%	5.6	12.6
$25,000 to $34,999	30,000	1,709	9.1%	3.7	8.4
$35,000 to $49,999	42,500	2,407	12.8%	2.6	5.9
$50,000 to $74,999	62,500	3,096	16.5%	1.8	4.0
$75,000 to $99,999	87,500	2,437	13.0%	1.3	2.9
$100,000 to $149,999	125,000	2,453	13.1%	0.9	2.0
$150,000 to $199,999	175,000	1,428	7.6%	0.6	1.4
$200,000 or more	200,000	763	4.1%	0.6	1.3

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 18,735*	*Percent of Households*	*2% MHI $1,116 Percent of Actual Income*	*Sewer Bill $12 Percent of Actual Income*	*Water Bill $360 Percent of Actual Income*	*Flood Control Bill $40 Percent of Actual Income*	*Sewer & Water Bill $412 Percent of Actual Income*
Less than $10,000	10,000	1,022	5.5%	11.2	0.12	3.60	0.400	4.12
$10,000 to $14,999	12,500	1,263	6.7%	8.9	0.10	2.88	0.320	3.30
$15,000 to $24,999	20,000	2,157	11.5%	5.6	0.06	1.80	0.200	2.06
$25,000 to $34,999	30,000	1,709	9.1%	3.7	0.04	1.20	0.133	1.37
$35,000 to $49,999	42,500	2,407	12.8%	2.6	0.03	0.85	0.094	0.97
$50,000 to $74,999	62,500	3,096	16.5%	1.8	0.02	0.58	0.064	0.66
$75,000 to $99,999	87,500	2,437	13.0%	1.3	0.01	0.41	0.046	0.47
$100,000 to $149,999	125,000	2,453	13.1%	0.9	0.01	0.29	0.032	0.33
$150,000 to $199,999	175,000	1,428	7.6%	0.6	0.01	0.21	0.023	0.24
$200,000 or more	200,000	763	4.1%	0.6	0.01	0.18	0.020	0.21

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 18,735*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	1,022	4.12	0	0	0
$10,000 to $14,999	12,500	1,263	3.30			
$15,000 to $24,999	20,000	2,157	2.06			
$25,000 to $34,999	30,000	1,709	1.37			
$35,000 to $49,999	42,500	2,407	0.97			
$50,000 to $74,999	62,500	3,096	0.66			
$75,000 to $99,999	87,500	2,437	0.47			
$100,000 to $149,999	125,000	2,453	0.33			
$150,000 to $199,999	175,000	1,428	0.24			
$200,000 or more	200,000	763	0.21			

Norwalk, CA

Population, 2013: 106,589

Poverty Rate, 2012: 12.3%

Median Household Income (MHI), 2012: $60,485

EPA Affordability Criteria
2% of MHI: $1,209.70
4.5% of MHI: $2,721.83

Current Average Cost per Household

Sewer	$ 240.48
Water	$ 1,000.00
Flood Control	$ 50.00
Total	$ 1,290.48

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 26,972*	*Percent of Households*	*CWA 2% MHI $1,209.70 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,721.83 as Percent of Actual Income*
Less than $10,000	10,000	1,306	4.8%	12.1	27.2
$10,000 to $14,999	12,500	1,204	4.5%	9.7	21.8
$15,000 to $24,999	20,000	2,084	7.7%	6.0	13.6
$25,000 to $34,999	30,000	2,135	7.9%	4.0	9.1
$35,000 to $49,999	42,500	3,713	13.8%	2.8	6.4
$50,000 to $74,999	62,500	6,119	22.7%	1.9	4.4
$75,000 to $99,999	87,500	4,218	15.6%	1.4	3.1
$100,000 to $149,999	125,000	4,562	16.9%	1.0	2.2
$150,000 to $199,999	175,000	1,151	4.3%	0.7	1.6
$200,000 or more	200,000	480	1.8%	0.6	1.4

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 26,972*	*Percent of Households*	*2% MHI $1,209.70 Percent of Actual Income*	*Sewer Bill $240.48 Percent of Actual Income*	*Water Bill $1,000.00 Percent of Actual Income*	*Flood Control Bill $50.00 Percent of Actual Income*	*Sewer & Water Bill $1,290.48 Percent of Actual Income*
Less than $10,000	10,000	1,306	4.8%	12.1	2.40	10.00	0.500	12.90
$10,000 to $14,999	12,500	1,204	4.5%	9.7	1.92	8.00	0.400	10.32
$15,000 to $24,999	20,000	2,084	7.7%	6.0	1.20	5.00	0.250	6.45
$25,000 to $34,999	30,000	2,135	7.9%	4.0	0.80	3.33	0.167	4.30
$35,000 to $49,999	42,500	3,713	13.8%	2.8	0.57	2.35	0.118	3.04
$50,000 to $74,999	62,500	6,119	22.7%	1.9	0.38	1.60	0.080	2.06
$75,000 to $99,999	87,500	4,218	15.6%	1.4	0.27	1.14	0.057	1.47
$100,000 to $149,999	125,000	4,562	16.9%	1.0	0.19	0.80	0.040	1.03
$150,000 to $199,999	175,000	1,151	4.3%	0.7	0.14	0.57	0.029	0.74
$200,000 or more	200,000	480	1.8%	0.6	0.12	0.50	0.025	0.65

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 26,972*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	1,306	12.90	840.48	1,097,667	10,976,669
$10,000 to $14,999	12,500	1,204	10.32	727.98	876,488	8,764,879
$15,000 to $24,999	20,000	2,084	6.45	390.48	813,760	8,137,603
$25,000 to $34,999	30,000	2,135	4.30	-59.52		
$35,000 to $49,999	42,500	3,713	3.04	-622.02		
$50,000 to $74,999	62,500	6,119	2.06	-1,522.02		
$75,000 to $99,999	87,500	4,218	1.47	-2,647.02		
$100,000 to $149,999	125,000	4,562	1.03	-4,334.52		
$150,000 to $199,999	175,000	1,151	0.74	-6,584.52		
$200,000 or more	200,000	480	0.65	-7,709.52		

Paramount, CA

Population, 2013: 54,980

Poverty Rate, 2012: 21.9%

Median Household Income (MHI), 2012: $44,167

EPA Affordability Criteria
2% of MHI: $883.34
4.5% of MHI: $1,987.52

Current Average Cost per Household

Sewer	$ 197.50
Water	$ 1,218.26
Flood Control	$ 23.43
Total	$ 1,439.19

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 13,669*	*Percent of Households*	*CWA 2% MHI $883.34 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $1,987.52 as Percent of Actual Income*
Less than $10,000	10,000	901	6.6%	8.8	19.9
$10,000 to $14,999	12,500	689	5.0%	7.1	15.9
$15,000 to $24,999	20,000	1,959	14.3%	4.4	9.9
$25,000 to $34,999	30,000	1,839	13.5%	2.9	6.6
$35,000 to $49,999	42,500	2,228	16.3%	2.1	4.7
$50,000 to $74,999	62,500	2,796	20.5%	1.4	3.2
$75,000 to $99,999	87,500	1,723	12.6%	1.0	2.3
$100,000 to $149,999	125,000	1,234	9.0%	0.7	1.6
$150,000 to $199,999	175,000	219	1.6%	0.5	1.1
$200,000 or more	200,000	81	0.6%	0.4	1.0

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 13,669*	*Percent of Households*	*2% MHI $883.34 Percent of Actual Income*	*Sewer Bill $197.50 Percent of Actual Income*	*Water Bill $1,218.26 Percent of Actual Income*	*Flood Control Bill $23.43 Percent of Actual Income*	*Sewer & Water Bill $1,439.19 Percent of Actual Income*
Less than $10,000	10,000	901	6.6%	8.8	1.98	12.18	0.234	14.39
$10,000 to $14,999	12,500	689	5.0%	7.1	1.58	9.75	0.187	11.51
$15,000 to $24,999	20,000	1,959	14.3%	4.4	0.99	6.09	0.117	7.20
$25,000 to $34,999	30,000	1,839	13.5%	2.9	0.66	4.06	0.078	4.80
$35,000 to $49,999	42,500	2,228	16.3%	2.1	0.46	2.87	0.055	3.39
$50,000 to $74,999	62,500	2,796	20.5%	1.4	0.32	1.95	0.037	2.30
$75,000 to $99,999	87,500	1,723	12.6%	1.0	0.23	1.39	0.027	1.64
$100,000 to $149,999	125,000	1,234	9.0%	0.7	0.16	0.97	0.019	1.15
$150,000 to $199,999	175,000	219	1.6%	0.5	0.11	0.70	0.013	0.82
$200,000 or more	200,000	81	0.6%	0.4	0.10	0.61	0.012	0.72

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 13,669*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	901	14.39	989.19	891,260	8,912,602
$10,000 to $14,999	12,500	689	11.51	876.69	604,039	6,040,394
$15,000 to $24,999	20,000	1,959	7.20	539.19	1,056,273	10,562,732
$25,000 to $34,999	30,000	1,839	4.80	89.19	164,020	1,640,204
$35,000 to $49,999	42,500	2,228	3.39	-473.31		
$50,000 to $74,999	62,500	2,796	2.30	-1,373.31		
$75,000 to $99,999	87,500	1,723	1.64	-2,498.31		
$100,000 to $149,999	125,000	1,234	1.15	-4,185.81		
$150,000 to $199,999	175,000	219	0.82	-6,435.81		
$200,000 or more	200,000	81	0.72	-7,560.81		

Pomona, CA

Population, 2013: 151,348

Poverty Rate, 2012: 20.4%

Median Household Income (MHI), 2012: $48,864

EPA Affordability Criteria
2% of MHI: $977.28
4.5% of MHI: $2,198.88

Current Average Cost per Household

Sewer	$ 158.90
Water	$ 580.50
Flood Control	$ 2.40
Total	$ 741.80

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 38,474*	*Percent of Households*	*CWA 2% MHI $977.28 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,198.88 as Percent of Actual Income*
Less than $10,000	10,000	2,235	5.8%	9.8	21.99
$10,000 to $14,999	12,500	2,194	5.7%	7.8	17.59
$15,000 to $24,999	20,000	4,762	12.4%	4.9	10.99
$25,000 to $34,999	30,000	4,485	11.7%	3.3	7.33
$35,000 to $49,999	42,500	5,973	15.5%	2.3	5.17
$50,000 to $74,999	62,500	7,472	19.4%	1.6	3.52
$75,000 to $99,999	87,500	5,058	13.1%	1.1	2.51
$100,000 to $149,999	125,000	4,368	11.4%	0.8	1.76
$150,000 to $199,999	175,000	1,206	3.1%	0.6	1.26
$200,000 or more	200,000	721	1.9%	0.5	1.10

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 38,474*	*Percent of Households*	*2% MHI $977.28 Percent of Actual Income*	*Sewer Bill $158.90 Percent of Actual Income*	*Water Bill $580.50 Percent of Actual Income*	*Flood Control Bill $2.40 Percent of Actual Income*	*Sewer & Water Bill $741.80 Percent of Actual Income*
Less than $10,000	10,000	2,235	5.8%	9.8	1.59	5.81	0.024	7.42
$10,000 to $14,999	12,500	2,194	5.7%	7.8	1.27	4.64	0.019	5.93
$15,000 to $24,999	20,000	4,762	12.4%	4.9	0.79	2.90	0.012	3.71
$25,000 to $34,999	30,000	4,485	11.7%	3.3	0.53	1.94	0.008	2.47
$35,000 to $49,999	42,500	5,973	15.5%	2.3	0.37	1.37	0.006	1.75
$50,000 to $74,999	62,500	7,472	19.4%	1.6	0.25	0.93	0.004	1.19
$75,000 to $99,999	87,500	5,058	13.1%	1.1	0.18	0.66	0.003	0.85
$100,000 to $149,999	125,000	4,368	11.4%	0.8	0.13	0.46	0.002	0.59
$150,000 to $199,999	175,000	1,206	3.1%	0.6	0.09	0.33	0.001	0.42
$200,000 or more	200,000	721	1.9%	0.5	0.08	0.29	0.001	0.37

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 38,474*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	2,235	7.42	291.80	652,173	6,521,730
$10,000 to $14,999	12,500	2,194	5.93	179.30	393,384	3,933,842
$15,000 to $24,999	20,000	4,762	3.71	-158.20		
$25,000 to $34,999	30,000	4,485	2.47	-608.20		
$35,000 to $49,999	42,500	5,973	1.75	-1,170.70		
$50,000 to $74,999	62,500	7,472	1.19	-2,070.70		
$75,000 to $99,999	87,500	5,058	0.85	-3,195.70		
$100,000 to $149,999	125,000	4,368	0.59	-4,883.20		
$150,000 to $199,999	175,000	1,206	0.42	-7,133.20		
$200,000 or more	200,000	721	0.37	-8,258.20		

Redondo Beach, CA

Population, 2013: 67,815

Poverty Rate, 2012: 5.9%

Median Household Income (MHI), 2012: $98,816

EPA Affordability Criteria
2% of MHI: $1,976.32
4.5% of MHI: $4,446.72

Current Average Cost per Household

Sewer	$ 331.00
Water	$ 1,110.66
Flood Control	$ 32.55
Total	$ 1,474.21

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 28,769*	*Percent of Households*	*CWA 2% MHI $1,976.32 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $4,446.72 as Percent of Actual Income*
Less than $10,000	10,000	876	3.0%	19.8	44.47
$10,000 to $14,999	12,500	888	3.1%	15.8	35.57
$15,000 to $24,999	20,000	1,933	6.7%	9.9	22.23
$25,000 to $34,999	30,000	1,365	4.7%	6.6	14.82
$35,000 to $49,999	42,500	2,311	8.0%	4.7	10.46
$50,000 to $74,999	62,500	3,952	13.7%	3.2	7.11
$75,000 to $99,999	87,500	3,167	11.0%	2.3	5.08
$100,000 to $149,999	125,000	5,712	19.9%	1.6	3.56
$150,000 to $199,999	175,000	3,920	13.6%	1.1	2.54
$200,000 or more	200,000	4,645	16.1%	1.0	2.22

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 28,769*	*Percent of Households*	*2% MHI $1,976.32 Percent of Actual Income*	*Sewer Bill $331.00 Percent of Actual Income*	*Water Bill $1,110.66 Percent of Actual Income*	*Flood Control Bill $32.55 Percent of Actual Income*	*Sewer & Water Bill $1,474.21 Percent of Actual Income*
Less than $10,000	10,000	876	3.0%	19.8	3.31	11.11	0.326	14.74
$10,000 to $14,999	12,500	888	3.1%	15.8	2.65	8.89	0.260	11.79
$15,000 to $24,999	20,000	1,933	6.7%	9.9	1.66	5.55	0.163	7.37
$25,000 to $34,999	30,000	1,365	4.7%	6.6	1.10	3.70	0.109	4.91
$35,000 to $49,999	42,500	2,311	8.0%	4.7	0.78	2.61	0.077	3.47
$50,000 to $74,999	62,500	3,952	13.7%	3.2	0.53	1.78	0.052	2.36
$75,000 to $99,999	87,500	3,167	11.0%	2.3	0.38	1.27	0.037	1.68
$100,000 to $149,999	125,000	5,712	19.9%	1.6	0.26	0.89	0.026	1.18
$150,000 to $199,999	175,000	3,920	13.6%	1.1	0.19	0.63	0.019	0.84
$200,000 or more	200,000	4,645	16.1%	1.0	0.17	0.56	0.016	0.74

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 28,769*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	876	14.74	1,024.21	897,208	8,972,080
$10,000 to $14,999	12,500	888	11.79	911.71	809,598	8,095,985
$15,000 to $24,999	20,000	1,933	7.37	574.21	1,109,948	11,099,479
$25,000 to $34,999	30,000	1,365	4.91	124.21	169,547	1,695,467
$35,000 to $49,999	42,500	2,311	3.47			
$50,000 to $74,999	62,500	3,952	2.36			
$75,000 to $99,999	87,500	3,167	1.68			
$100,000 to $149,999	125,000	5,712	1.18			
$150,000 to $199,999	175,000	3,920	0.84			
$200,000 or more	200,000	4,645	0.74			

Sacramento, CA

Population, 2013: 479,686

Poverty Rate, 2012: 20.2%

Median Household Income (MHI), 2012: $50,661

EPA Affordability Criteria
2% of MHI: $1,013.22
4.5% of MHI: $2,279.75

Current Average Cost per Household

Sewer	$ 653.00
Water	$ 549.00
Flood Control	$ 136.00
Total	$ 1,338.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	Household Income	Number of Households 176,061	Percent of Households	CWA 2% MHI $1,013.22 as Percent of Actual Income	CWA & SDWA 4.5% MHI $2,279.75 as Percent of Actual Income
Less than $10,000	10,000	11,869	6.7%	10.1	22.8
$10,000 to $14,999	12,500	13,358	7.6%	8.1	18.2
$15,000 to $24,999	20,000	19,345	11.0%	5.1	11.4
$25,000 to $34,999	30,000	18,711	10.6%	3.4	7.6
$35,000 to $49,999	42,500	23,707	13.5%	2.4	5.4
$50,000 to $74,999	62,500	33,710	19.1%	1.6	3.6
$75,000 to $99,999	87,500	20,509	11.6%	1.2	2.6
$100,000 to $149,999	125,000	21,175	12.0%	0.8	1.8
$150,000 to $199,999	175,000	7,893	4.5%	0.6	1.3
$200,000 or more	200,000	5,784	3.3%	0.5	1.1

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	Household Income	Number of Households 176,061	Percent of Households	2% MHI $1,013.22 Percent of Actual Income	Sewer Bill $653.00 Percent of Actual Income	Water Bill $549.00 Percent of Actual Income	Flood Control Bill $136.00 Percent of Actual Income	Sewer & Water Bill $1,338.00 Percent of Actual Income
Less than $10,000	10,000	11,869	6.7%	10.1	6.53	5.49	1.360	13.38
$10,000 to $14,999	12,500	13,358	7.6%	8.1	5.22	4.39	1.088	10.70
$15,000 to $24,999	20,000	19,345	11.0%	5.1	3.27	2.75	0.680	6.69
$25,000 to $34,999	30,000	18,711	10.6%	3.4	2.18	1.83	0.453	4.46
$35,000 to $49,999	42,500	23,707	13.5%	2.4	1.54	1.29	0.320	3.15
$50,000 to $74,999	62,500	33,710	19.1%	1.6	1.04	0.88	0.218	2.14
$75,000 to $99,999	87,500	20,509	11.6%	1.2	0.75	0.63	0.155	1.53
$100,000 to $149,999	125,000	21,175	12.0%	0.8	0.52	0.44	0.109	1.07
$150,000 to $199,999	175,000	7,893	4.5%	0.6	0.37	0.31	0.078	0.76
$200,000 or more	200,000	5,784	3.3%	0.5	0.33	0.27	0.068	0.67

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	Household Income	Number of Households 176,061	2014 Average Total Water Cost per Household As % of Actual Income	2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income	Cost per Household Income Category in Excess of 4.5% of Actual Income $	10-Year Impact $
Less than $10,000	10,000	11,869	13.38	888.00	10,539,672	105,396,720
$10,000 to $14,999	12,500	13,358	10.70	775.50	10,359,129	103,591,290
$15,000 to $24,999	20,000	19,345	6.69	438.00	8,473,110	84,731,100
$25,000 to $34,999	30,000	18,711	4.46	-12.00		
$35,000 to $49,999	42,500	23,707	3.15	-574.50		
$50,000 to $74,999	62,500	33,710	2.14	-1,474.50		
$75,000 to $99,999	87,500	20,509	1.53	-2,599.50		
$100,000 to $149,999	125,000	21,175	1.07	-4,287.00		
$150,000 to $199,999	175,000	7,893	0.76	-6,537.00		
$200,000 or more	200,000	5,784	0.67	-7,662.00		

San Dimas, CA

Population, 2013: 33,840

Poverty Rate, 2012: 7.0%

Median Household Income (MHI), 2012: $ 76,454

EPA Affordability Criteria
2% of MHI: $ 1,529.08
4.5% of MHI: $3,440.43

Current Average Cost per Household

Sewer	$ 199.50
Water	$ 631.19
Flood Control	$ 65.51
Total	$ 896.20

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 11,663*	*Percent of Households*	*CWA 2% MHI $1,529.08 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,440.43 as Percent of Actual Income*
Less than $10,000	10,000	612	5.2%	15.3	34.40
$10,000 to $14,999	12,500	286	2.5%	12.2	27.52
$15,000 to $24,999	20,000	816	7.0%	7.6	17.20
$25,000 to $34,999	30,000	794	6.8%	5.1	11.47
$35,000 to $49,999	42,500	1,082	9.3%	3.6	8.10
$50,000 to $74,999	62,500	2,099	18.0%	2.4	5.50
$75,000 to $99,999	87,500	1,729	14.8%	1.7	3.93
$100,000 to $149,999	125,000	2,186	18.7%	1.2	2.75
$150,000 to $199,999	175,000	978	8.4%	0.9	1.97
$200,000 or more	200,000	1,081	9.3%	0.8	1.72

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 11,663*	*Percent of Households*	*2% MHI $1,529.08 Percent of Actual Income*	*Sewer Bill $199.50 Percent of Actual Income*	*Water Bill $631.19 Percent of Actual Income*	*Flood Control Bill $65.51 Percent of Actual Income*	*Sewer & Water Bill $896.20 Percent of Actual Income*
Less than $10,000	10,000	612	5.2%	15.3	2.00	6.31	0.655	8.96
$10,000 to $14,999	12,500	286	2.5%	12.2	1.60	5.05	0.524	7.17
$15,000 to $24,999	20,000	816	7.0%	7.6	1.00	3.16	0.328	4.48
$25,000 to $34,999	30,000	794	6.8%	5.1	0.67	2.10	0.218	2.99
$35,000 to $49,999	42,500	1,082	9.3%	3.6	0.47	1.49	0.154	2.11
$50,000 to $74,999	62,500	2,099	18.0%	2.4	0.32	1.01	0.105	1.43
$75,000 to $99,999	87,500	1,729	14.8%	1.7	0.23	0.72	0.075	1.02
$100,000 to $149,999	125,000	2,186	18.7%	1.2	0.16	0.50	0.052	0.72
$150,000 to $199,999	175,000	978	8.4%	0.9	0.11	0.36	0.037	0.51
$200,000 or more	200,000	1,081	9.3%	0.8	0.10	0.32	0.033	0.45

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 11,663*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	612	5.2%	446.20	273,074	2,730,744
$10,000 to $14,999	12,500	286	2.5%	333.70	95,438	954,382
$15,000 to $24,999	20,000	816	7.0%	-3.80		
$25,000 to $34,999	30,000	794	6.8%	-453.80		
$35,000 to $49,999	42,500	1,082	9.3%	-1,016.30		
$50,000 to $74,999	62,500	2,099	18.0%	-1,916.30		
$75,000 to $99,999	87,500	1,729	14.8%	-3,041.30		
$100,000 to $149,999	125,000	2,186	18.7%	-4,728.80		
$150,000 to $199,999	175,000	978	8.4%	-6,978.80		
$200,000 or more	200,000	1,081	9.3%	-8,103.80		

San Gabriel, CA

Population, 2013: 40,275

Poverty Rate, 2012: 12.4%

Median Household Income (MHI), 2012: $ 56,260

EPA Affordability Criteria
2% of MHI: $ 1,125.20
4.5% of MHI: $ 2,531.70

Current Average Cost per Household

Sewer	$ 267.00
Water	$ 412.00
Flood Control	$
Total	$ 679.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 12,276*	*Percent of Households*	*CWA 2% MHI $1,125.20 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,531.70 as Percent of Actual Income*
Less than $10,000	10,000	488	4.0%	11.3	25.32
$10,000 to $14,999	12,500	485	4.0%	9.0	20.25
$15,000 to $24,999	20,000	1,532	12.5%	5.6	12.66
$25,000 to $34,999	30,000	1,182	9.6%	3.8	8.44
$35,000 to $49,999	42,500	1,895	15.4%	2.6	5.96
$50,000 to $74,999	62,500	2,105	17.1%	1.8	4.05
$75,000 to $99,999	87,500	1,417	11.5%	1.3	2.89
$100,000 to $149,999	125,000	1,826	14.9%	0.9	2.03
$150,000 to $199,999	175,000	754	6.1%	0.6	1.45
$200,000 or more	200,000	592	4.8%	0.6	1.27

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 12,276*	*Percent of Households*	*2% MHI $1,125.20 Percent of Actual Income*	*Sewer Bill $267 Percent of Actual Income*	*Water Bill $412 Percent of Actual Income*	*Flood Control Bill NA Percent of Actual Income*	*Sewer & Water Bill $679 Percent of Actual Income*
Less than $10,000	10,000	488	4.0%	11.3	2.67	4.12		6.79
$10,000 to $14,999	12,500	485	4.0%	9.0	2.14	3.30		5.43
$15,000 to $24,999	20,000	1,532	12.5%	5.6	1.34	2.06		3.40
$25,000 to $34,999	30,000	1,182	9.6%	3.8	0.89	1.37		2.26
$35,000 to $49,999	42,500	1,895	15.4%	2.6	0.63	0.97		1.60
$50,000 to $74,999	62,500	2,105	17.1%	1.8	0.43	0.66		1.09
$75,000 to $99,999	87,500	1,417	11.5%	1.3	0.31	0.47		0.78
$100,000 to $149,999	125,000	1,826	14.9%	0.9	0.21	0.33		0.54
$150,000 to $199,999	175,000	754	6.1%	0.6	0.15	0.24		0.39
$200,000 or more	200,000	592	4.8%	0.6	0.13	0.21		0.34

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 12,276*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	488	6.79	229.00	111,752	1,117,520
$10,000 to $14,999	12,500	485	5.43	116.50	56,503	565,025
$15,000 to $24,999	20,000	1,532	3.40	-221.00		
$25,000 to $34,999	30,000	1,182	2.26	-671.00		
$35,000 to $49,999	42,500	1,895	1.60	-1,233.50		
$50,000 to $74,999	62,500	2,105	1.09	-2,133.50		
$75,000 to $99,999	87,500	1,417	0.78	-3,258.50		
$100,000 to $149,999	125,000	1,826	0.54	-4,946.00		
$150,000 to $199,999	175,000	754	0.39	-7,196.00		
$200,000 or more	200,000	592	0.34	-8,321.00		

San Marino, CA

Population, 2013: 13,327

Poverty Rate, 2012: 4.6%

Median Household Income (MHI), 2012: $ 139,122

EPA Affordability Criteria
2% of MHI: $ 2,782.44
4.5% of MHI: $ 6,260.49

Current Average Cost per Household

Sewer	$ 211.00
Water	$ 115.91
Flood Control	$ 40.00
Total	$ 366.91

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 4,396*	*Percent of Households*	*CWA 2% MHI $2,782.44 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $6,260.49 as Percent of Actual Income*
Less than $10,000	10,000	178	4.0%	27.8	62.60
$10,000 to $14,999	12,500	58	1.3%	22.3	50.08
$15,000 to $24,999	20,000	151	3.4%	13.9	31.30
$25,000 to $34,999	30,000	175	4.0%	9.3	20.87
$35,000 to $49,999	42,500	188	4.3%	6.5	14.73
$50,000 to $74,999	62,500	314	7.1%	4.5	10.02
$75,000 to $99,999	87,500	504	11.5%	3.2	7.15
$100,000 to $149,999	125,000	699	15.9%	2.2	5.01
$150,000 to $199,999	175,000	605	13.8%	1.6	3.58
$200,000 or more	200,000	1,524	34.7%	1.4	3.13

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 4,396*	*Percent of Households*	*2% MHI $2,782.44 Percent of Actual Income*	*Sewer Bill $211.00 Percent of Actual Income*	*Water Bill $115.91 Percent of Actual Income*	*Flood Control Bill $40.00 Percent of Actual Income*	*Sewer & Water Bill $366.91 Percent of Actual Income*
Less than $10,000	10,000	178	4.0%	27.8	2.11	1.16	0.400	3.67
$10,000 to $14,999	12,500	58	1.3%	22.3	1.69	0.93	0.320	2.94
$15,000 to $24,999	20,000	151	3.4%	13.9	1.06	0.58	0.200	1.83
$25,000 to $34,999	30,000	175	4.0%	9.3	0.70	0.39	0.133	1.22
$35,000 to $49,999	42,500	188	4.3%	6.5	0.50	0.27	0.094	0.86
$50,000 to $74,999	62,500	314	7.1%	4.5	0.34	0.19	0.064	0.59
$75,000 to $99,999	87,500	504	11.5%	3.2	0.24	0.13	0.046	0.42
$100,000 to $149,999	125,000	699	15.9%	2.2	0.17	0.09	0.032	0.29
$150,000 to $199,999	175,000	605	13.8%	1.6	0.12	0.07	0.023	0.21
$200,000 or more	200,000	1,524	34.7%	1.4	0.11	0.06	0.020	0.18

Santa Barbara, CA

Population, 2013: 90,412

Poverty Rate, 2012:14.7%

Median Household Income (MHI), 2012; $63,758

EPA Affordability Criteria
2% of MHI: $1,275.16
4.5% of MHI: $2,869.11

Current Average Cost per Household

Sewer	$ 516.00
Water	$ 941.52
Flood Control	$ 22.81
Total	$ 1,480.33

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 34,900*	*Percent of Households*	*CWA 2% MHI $1,275.16 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,869.11 as Percent of Actual Income*
Less than $10,000	10,000	1,578	4.5%	12.8	28.7
$10,000 to $14,999	12,500	1,697	4.9%	10.2	23.0
$15,000 to $24,999	20,000	3,302	9.5%	6.4	14.3
$25,000 to $34,999	30,000	3,173	9.1%	4.3	9.6
$35,000 to $49,999	42,500	4,264	12.2%	3.0	6.8
$50,000 to $74,999	62,500	6,053	17.3%	2.0	4.6
$75,000 to $99,999	87,500	4,154	11.9%	1.5	3.3
$100,000 to $149,999	125,000	4,866	13.9%	1.0	2.3
$150,000 to $199,999	175,000	2,885	8.3%	0.7	1.6
$200,000 or more	200,000	2,928	8.4%	0.6	1.4

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 34,900*	*Percent of Households*	*2% MHI $1,275.16 Percent of Actual Income*	*Sewer Bill $516.00 Percent of Actual Income*	*Water Bill $941.52 Percent of Actual Income*	*Flood Control Bill $22.81 Percent of Actual Income*	*Sewer & Water Bill $1,480.33 Percent of Actual Income*
Less than $10,000	10,000	1,578	4.5%	12.8	5.16	9.42	0.228	14.80
$10,000 to $14,999	12,500	1,697	4.9%	10.2	4.13	7.53	0.182	11.84
$15,000 to $24,999	20,000	3,302	9.5%	6.4	2.58	4.71	0.114	7.40
$25,000 to $34,999	30,000	3,173	9.1%	4.3	1.72	3.14	0.076	4.93
$35,000 to $49,999	42,500	4,264	12.2%	3.0	1.21	2.22	0.054	3.48
$50,000 to $74,999	62,500	6,053	17.3%	2.0	0.83	1.51	0.036	2.37
$75,000 to $99,999	87,500	4,154	11.9%	1.5	0.59	1.08	0.026	1.69
$100,000 to $149,999	125,000	4,866	13.9%	1.0	0.41	0.75	0.018	1.18
$150,000 to $199,999	175,000	2,885	8.3%	0.7	0.29	0.54	0.013	0.85
$200,000 or more	200,000	2,928	8.4%	0.6	0.26	0.47	0.011	0.74

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 34,900*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	1,578	14.80	1,030.33	1,625,861	16,258,607
$10,000 to $14,999	12,500	1,697	11.84	917.83	1,557,558	15,575,575
$15,000 to $24,999	20,000	3,302	7.40	580.33	1,916,250	19,162,497
$25,000 to $34,999	30,000	3,173	4.93	130.33	413,537	4,135,371
$35,000 to $49,999	42,500	4,264	3.48	-432.17		
$50,000 to $74,999	62,500	6,053	2.37	-1,332.17		
$75,000 to $99,999	87,500	4,154	1.69	-2,457.17		
$100,000 to $149,999	125,000	4,866	1.18	-4,144.67		
$150,000 to $199,999	175,000	2,885	0.85	-6,394.67		
$200,000 or more	200,000	2,928	0.74	-7,519.67		

Sierra Madre, CA

Population, 2013: 11,056

Poverty Rate, 2012: 9.6%

Median Household Income (MHI), 2012: $90,321

EPA Affordability Criteria
2% of MHI: $ 1,806.42
4.5% of MHI: $ 4,064.45

Current Average Cost per Household

Sewer	$ 738.00
Water	$ 1,189.00
Flood Control	$ 113.00
Total	$ 2,040.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 4,569*	*Percent of Households*	*CWA 2% MHI $1,806.42 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $4,064.45 as Percent of Actual Income*
Less than $10,000	10,000	145	3.2%	18.1	40.64
$10,000 to $14,999	12,500	190	4.2%	14.5	32.52
$15,000 to $24,999	20,000	251	5.5%	9.0	20.32
$25,000 to $34,999	30,000	246	5.4%	6.0	13.55
$35,000 to $49,999	42,500	359	7.9%	4.3	9.56
$50,000 to $74,999	62,500	677	14.8%	2.9	6.50
$75,000 to $99,999	87,500	782	17.1%	2.1	4.65
$100,000 to $149,999	125,000	929	20.3%	1.4	3.25
$150,000 to $199,999	175,000	392	8.6%	1.0	2.32
$200,000 or more	200,000	598	13.1%	0.9	2.03

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 4,569*	*Percent of Households*	*2% MHI $1,806.42 Percent of Actual Income*	*Sewer Bill $738 Percent of Actual Income*	*Water Bill $1,189 Percent of Actual Income*	*Flood Control Bill $113 Percent of Actual Income*	*Sewer & Water Bill $2,040 Percent of Actual Income*
Less than $10,000	10,000	145	3.2%	18.1	7.38	11.89	1.13	20.40
$10,000 to $14,999	12,500	190	4.2%	14.5	5.90	9.51	0.90	16.32
$15,000 to $24,999	20,000	251	5.5%	9.0	3.69	5.95	0.57	10.20
$25,000 to $34,999	30,000	246	5.4%	6.0	2.46	3.96	0.38	6.80
$35,000 to $49,999	42,500	359	7.9%	4.3	1.74	2.80	0.27	4.80
$50,000 to $74,999	62,500	677	14.8%	2.9	1.18	1.90	0.18	3.26
$75,000 to $99,999	87,500	782	17.1%	2.1	0.84	1.36	0.13	2.33
$100,000 to $149,999	125,000	929	20.3%	1.4	0.59	0.95	0.09	1.63
$150,000 to $199,999	175,000	392	8.6%	1.0	0.42	0.68	0.06	1.17
$200,000 or more	200,000	598	13.1%	0.9	0.37	0.59	0.06	1.02

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 4,569*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	145	20.40	1,590.00	230,550	2,305,500
$10,000 to $14,999	12,500	190	16.32	1,477.50	280,725	2,807,250
$15,000 to $24,999	20,000	251	10.20	1,140.00	286,140	2,861,400
$25,000 to $34,999	30,000	246	6.80	690.00	169,740	1,697,400
$35,000 to $49,999	42,500	359	4.80	127.50	45,773	457,725
$50,000 to $74,999	62,500	677	3.26	-772.50	-522,983	
$75,000 to $99,999	87,500	782	2.33	-1,897.50	-1,483,845	
$100,000 to $149,999	125,000	929	1.63	-3,585.00	-3,330,465	
$150,000 to $199,999	175,000	392	1.17	-5,835.00	-2,287,320	
$200,000 or more	200,000	598	1.02	-6,960.00	-4,162,080	

Signal Hill, CA

Population, 2013: 11,332

Poverty Rate, 2012: 14.0%

Median Household Income (MHI), 2012: $ 65,741

EPA Affordability Criteria
2% of MHI: $ 1,314.82
4.5% of MHI: $ 2,958.35

Current Average Cost per Household

Sewer	$ 407.70
Water	$ 331.50
Flood Control	$ 57.49
Total	$ 769.69

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 4,106*	*Percent of Households*	*CWA 2% MHI $1,314.82 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $2,958.35 as Percent of Actual Income*
Less than $10,000	10,000	241	5.87	13.15	29.58
$10,000 to $14,999	12,500	228	5.55	10.52	23.67
$15,000 to $24,999	20,000	455	11.08	6.57	14.79
$25,000 to $34,999	30,000	153	3.73	4.38	9.86
$35,000 to $49,999	42,500	415	10.11	3.09	6.96
$50,000 to $74,999	62,500	782	19.05	2.10	4.73
$75,000 to $99,999	87,500	692	16.85	1.50	3.38
$100,000 to $149,999	125,000	529	12.88	1.05	2.37
$150,000 to $199,999	175,000	363	8.84	0.75	1.69
$200,000 or more	200,000	248	6.04	0.66	1.48

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 4,106*	*Percent of Households*	*2% MHI $1,314.82 Percent of Actual Income*	*Sewer Bill $407.70 Percent of Actual Income*	*Water Bill $331.50 Percent of Actual Income*	*Flood Control Bill $57.49 Percent of Actual Income*	*Sewer & Water Bill $769.69 Percent of Actual Income*
Less than $10,000	10,000	241	5.87	13.15	4.08	3.32	0.57	7.97
$10,000 to $14,999	12,500	228	5.55	10.52	3.26	2.65	0.46	6.37
$15,000 to $24,999	20,000	455	11.08	6.57	2.04	1.66	0.29	3.98
$25,000 to $34,999	30,000	153	3.73	4.38	1.36	1.11	0.19	2.66
$35,000 to $49,999	42,500	415	10.11	3.09	0.96	0.78	0.14	1.87
$50,000 to $74,999	62,500	782	19.05	2.10	0.65	0.53	0.09	1.27
$75,000 to $99,999	87,500	692	16.85	1.50	0.47	0.38	0.07	0.91
$100,000 to $149,999	125,000	529	12.88	1.05	0.33	0.27	0.05	0.64
$150,000 to $199,999	175,000	363	8.84	0.75	0.23	0.19	0.03	0.46
$200,000 or more	200,000	248	6.04	0.66	0.20	0.17	0.03	0.40

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 4,106*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	241	7.97	346.69	83,552.29	835,522.90
$10,000 to $14,999	12,500	228	6.37	234.19	53,395.32	533,953.20
$15,000 to $24,999	20,000	455	3.98	-103.31		
$25,000 to $34,999	30,000	153	2.66	-553.31		
$35,000 to $49,999	42,500	415	1.87	-1,115.81		
$50,000 to $74,999	62,500	782	1.27	-2,015.81		
$75,000 to $99,999	87,500	692	0.91	-3,140.81		
$100,000 to $149,999	125,000	529	0.64	-4,828.31		
$150,000 to $199,999	175,000	363	0.46	-7,078.31		
$200,000 or more	200,000	248	0.40	-8,203.31		

South Gate, CA

Population, 2013: 95,677

Poverty Rate, 2012: 20.6

Median Household Income (MHI), 2012: $41,851

EPA Affordability Criteria
2% of MHI: $837.02
4.5% of MHI: $1,883.30

Current Average Cost per Household

Sewer	$ 210.00
Water	$ 610.00
Flood Control	$ 351.00
Total	$ 1,171.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 23,925*	*Percent of Households*	*CWA 2% MHI $837.02 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $1,883.30 as Percent of Actual Income*
Less than $10,000	10,000	1,419	5.9%	8.4	18.8
$10,000 to $14,999	12,500	1,867	7.8%	6.7	15.1
$15,000 to $24,999	20,000	3,033	12.7%	4.2	9.4
$25,000 to $34,999	30,000	3,237	13.5%	2.8	6.3
$35,000 to $49,999	42,500	4,277	17.9%	2.0	4.4
$50,000 to $74,999	62,500	4,540	19.0%	1.3	3.0
$75,000 to $99,999	87,500	2,642	11.0%	1.0	2.2
$100,000 to $149,999	125,000	2,298	9.6%	0.7	1.5
$150,000 to $199,999	175,000	402	1.7%	0.5	1.1
$200,000 or more	200,000	210	0.9%	0.4	0.9

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 23,925*	*Percent of Households*	*2% MHI $837.02 Percent of Actual Income*	*Sewer Bill $210.00 Percent of Actual Income*	*Water Bill $610.00 Percent of Actual Income*	*Flood Control Bill $351.00 Percent of Actual Income*	*Sewer & Water Bill $1,171.00 Percent of Actual Income*
Less than $10,000	10,000	1,419	5.9%	8.4	2.10	6.10	3.51	11.71
$10,000 to $14,999	12,500	1,867	7.8%	6.7	1.68	4.88	2.81	9.37
$15,000 to $24,999	20,000	3,033	12.7%	4.2	1.05	3.05	1.76	5.86
$25,000 to $34,999	30,000	3,237	13.5%	2.8	0.70	2.03	1.17	3.90
$35,000 to $49,999	42,500	4,277	17.9%	2.0	0.49	1.44	0.83	2.76
$50,000 to $74,999	62,500	4,540	19.0%	1.3	0.34	0.98	0.56	1.87
$75,000 to $99,999	87,500	2,642	11.0%	1.0	0.24	0.70	0.40	1.34
$100,000 to $149,999	125,000	2,298	9.6%	0.7	0.17	0.49	0.28	0.94
$150,000 to $199,999	175,000	402	1.7%	0.5	0.12	0.35	0.20	0.67
$200,000 or more	200,000	210	0.9%	0.4	0.11	0.31	0.18	0.59

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 23,925*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	1,419	11.71	721.00	1,023,099	10,230,990
$10,000 to $14,999	12,500	1,867	9.37	608.50	1,136,070	11,360,695
$15,000 to $24,999	20,000	3,033	5.86	271.00	821,943	8,219,430
$25,000 to $34,999	30,000	3,237	3.90	-179.00		
$35,000 to $49,999	42,500	4,277	2.76	-741.50		
$50,000 to $74,999	62,500	4,540	1.87	-1,641.50		
$75,000 to $99,999	87,500	2,642	1.34	-2,766.50		
$100,000 to $149,999	125,000	2,298	0.94	-4,454.00		
$150,000 to $199,999	175,000	402	0.67	-6,704.00		
$200,000 or more	200,000	210	0.59	-7,829.00		

South Pasadena, CA

Population, 2013: 25,959

Poverty Rate, 2012: 7.6%

Median Household Income (MHI), 2012: $84,185

EPA Affordability Criteria
2% of MHI: $1,683.70
4.5% of MHI: $3,788.33

Current Average Cost per Household

Sewer	$ 154.98
Water	$ 1,230.00
Flood Control	$ 0.00
Total	$ 1,385.00

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 10,354*	*Percent of Households*	*CWA 2% MHI $1,683.70 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,788.33 as Percent of Actual Income*
Less than $10,000	10,000	479	4.6%	16.8	37.9
$10,000 to $14,999	12,500	291	2.8%	13.5	30.3
$15,000 to $24,999	20,000	515	5.0%	8.4	18.9
$25,000 to $34,999	30,000	504	4.9%	5.6	12.6
$35,000 to $49,999	42,500	898	8.7%	4.0	8.9
$50,000 to $74,999	62,500	1,857	17.9%	2.7	6.1
$75,000 to $99,999	87,500	1,412	13.6%	1.9	4.3
$100,000 to $149,999	125,000	1,790	17.3%	1.3	3.0
$150,000 to $199,999	175,000	1,078	10.4%	1.0	2.2
$200,000 or more	200,000	1,530	14.8%	0.8	1.9

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 10,354*	*Percent of Households*	*2% MHI $1,683.70 Percent of Actual Income*	*Sewer Bill $154.98 Percent of Actual Income*	*Water Bill $1,230.00 Percent of Actual Income*	*Flood Control Bill NA Percent of Actual Income*	*Sewer & Water Bill $1,385.00 Percent of Actual Income*
Less than $10,000	10,000	479	4.6%	16.8	2.55	12.30		13.85
$10,000 to $14,999	12,500	291	2.8%	13.5	2.04	9.84		11.08
$15,000 to $24,999	20,000	515	5.0%	8.4	1.27	6.15		6.92
$25,000 to $34,999	30,000	504	4.9%	5.6	0.85	4.10		4.62
$35,000 to $49,999	42,500	898	8.7%	4.0	0.60	2.89		3.26
$50,000 to $74,999	62,500	1,857	17.9%	2.7	0.41	1.97		2.22
$75,000 to $99,999	87,500	1,412	13.6%	1.9	0.29	1.41		1.58
$100,000 to $149,999	125,000	1,790	17.3%	1.3	0.20	0.98		1.11
$150,000 to $199,999	175,000	1,078	10.4%	1.0	0.15	0.70		0.79
$200,000 or more	200,000	1,530	14.8%	0.8	0.13	0.62		0.69

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 10,354*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	479	13.85	1,034.98	495,755	4,957,554
$10,000 to $14,999	12,500	291	11.08	922.48	268,442	2,684,417
$15,000 to $24,999	20,000	515	6.92	584.98	301,265	3,012,647
$25,000 to $34,999	30,000	504	4.62	134.98	68,030	680,299
$35,000 to $49,999	42,500	898	3.26	-427.52		
$50,000 to $74,999	62,500	1,857	2.22	-1,327.52		
$75,000 to $99,999	87,500	1,412	1.58	-2,452.52		
$100,000 to $149,999	125,000	1,790	1.11	-4,140.02		
$150,000 to $199,999	175,000	1,078	0.79	-6,390.02		
$200,000 or more	200,000	1,530	0.69	-7,515.02		

Torrance, CA

Population, 2013: 147,478

Poverty Rate, 2012: 7.4%

Median Household Income (MHI), 2012: $ 76,082

EPA Affordability Criteria
2% of MHI: $ 1,521.64
4.5% of MHI: $ 3,423.69

Current Average Cost per Household

Sewer (collection only)	$ 52.08
Water	$ 643.56
Flood Control	$
Total	$ 695.64

Table 1: EPA Water & Sewer Affordability Thresholds as a Percent of Actual Household Income

Household Income Distribution	*Household Income*	*Number of Households 55,340*	*Percent of Households*	*CWA 2% MHI $1,521.64 as Percent of Actual Income*	*CWA & SDWA 4.5% MHI $3,423.69 as Percent of Actual Income*
Less than $10,000	10,000	2,484	4.5%	15.2	34.2
$10,000 to $14,999	12,500	1,939	3.5%	12.2	27.4
$15,000 to $24,999	20,000	3,978	7.2%	7.6	17.1
$25,000 to $34,999	30,000	3,491	6.3%	5.1	11.4
$35,000 to $49,999	42,500	5,584	10.1%	3.6	8.1
$50,000 to $74,999	62,500	9,763	17.6%	2.4	5.5
$75,000 to $99,999	87,500	8,046	14.5%	1.7	3.9
$100,000 to $149,999	125,000	10,975	19.8%	1.2	2.7
$150,000 to $199,999	175,000	4,974	9.0%	0.9	2.0
$200,000 or more	200,000	4,106	7.4%	0.8	1.7

Table 2: Cost per Household for Current Water Service Components

Household Income Distribution	*Household Income*	*Number of Households 55,340*	*Percent of Households*	*2% MHI $1,521.64 Percent of Actual Income*	*Sewer Bill $52.08 Percent of Actual Income*	*Water Bill $643.56 Percent of Actual Income*	*Flood Control Bill NA Percent of Actual Income*	*Sewer & Water Bill $695.64 Percent of Actual Income*
Less than $10,000	10,000	2,484	4.5%	15.2	0.52	6.44		6.96
$10,000 to $14,999	12,500	1,939	3.5%	12.2	0.42	5.15		5.57
$15,000 to $24,999	20,000	3,978	7.2%	7.6	0.26	3.22		3.48
$25,000 to $34,999	30,000	3,491	6.3%	5.1	0.17	2.15		2.32
$35,000 to $49,999	42,500	5,584	10.1%	3.6	0.12	1.51		1.64
$50,000 to $74,999	62,500	9,763	17.6%	2.4	0.08	1.03		1.11
$75,000 to $99,999	87,500	8,046	14.5%	1.7	0.06	0.74		0.80
$100,000 to $149,999	125,000	10,975	19.8%	1.2	0.04	0.51		0.56
$150,000 to $199,999	175,000	4,974	9.0%	0.9	0.03	0.37		0.40
$200,000 or more	200,000	4,106	7.4%	0.8	0.03	0.32		0.35

Table 3: Cost per Household and Household Income Category in Excess of 4.5% of Actual Income

Household Income Distribution	*Household Income*	*Number of Households 55,340*	*2014 Average Total Water Cost per Household As % of Actual Income*	*2014 Average Total Water Cost per Household in Excess of 4.5% of Actual Income*	*Cost per Household Income Category in Excess of 4.5% of Actual Income $*	*10-Year Impact $*
Less than $10,000	10,000	2,484	6.96	245.64	610,170	6,101,698
$10,000 to $14,999	12,500	1,939	5.57	133.14	258,158	2,581,585
$15,000 to $24,999	20,000	3,978	3.48	-204.36		
$25,000 to $34,999	30,000	3,491	2.32	-654.36		
$35,000 to $49,999	42,500	5,584	1.64	-1,216.86		
$50,000 to $74,999	62,500	9,763	1.11	-2,116.86		
$75,000 to $99,999	87,500	8,046	0.80	-3,241.86		
$100,000 to $149,999	125,000	10,975	0.56	-4,929.36		
$150,000 to $199,999	175,000	4,974	0.40	-7,179.36		
$200,000 or more	200,000	4,106	0.35	-8,304.36		

Vernon, CA

Population, 2013: 112

Poverty Rate, 2012: NA

Median Household Income (MHI), 2012: NA

EPA Affordability Criteria
2% of MHI: NA
4.5% of MHI: NA

Current Average Cost per Household

Sewer	$	158.00
Water	$	422.00
Flood Control	$	
Total	$	580.00

Appendix B *Bias, Estimation and Uncertainty*

Generally speaking, the estimates developed in this study are accurate and reliable. All studies, however, are subject to several forms of error and uncertainty. This Appendix is intended to address some of the potential for estimation error regarding this study method and application.

Data Bias:

- Data on population, Median Household Income and number of households for income deciles is taken directly from the latest Census reports at Census.Gov. These data enjoy the accuracy achieved by the Census survey data techniques; and they suffer the same deficiencies of such.
- Cities participating in the survey are self-selected for whatever reason they chose to participate. This introduces an element of bias because not all cities are included. Therefore, the findings may be somewhat indicative of all California cities but are best seen as representing the survey cities involved rather than all California cities.

Estimation:

- Estimating the dollar amount of Median Household Income at 2.0% and at 4.5% is straightforward arithmetic and not subject to estimation error, other than the inherent error involved with the Census' calculation of estimated Median Household Income for each city involved.

- Estimating the percent of households impacted by cost per household and comparisons to current costs and affordability criteria is also straightforward arithmetic, but has several factors that are identified as possibly introducing estimation error.

  ◊ In order to estimate the percentage of households that spend in excess of 4.5% of their actual income on public water the analysis applied relies on some assumptions

- This research relies on city expertise to provide cost per household data for sewer, water and flood control. Cities have a practical advantage in knowing these residential costs by virtue of their recurring experience with water and sewer billing over time, and an intimate knowledge of their customer base.

- Local expertise is involved in matching number of households to local service hook-ups. These figures often do not match, primarily because in multi-household dwellings a single hook up may service a small to large number of households that reside in the units. Again, local expertise is relied on to confirm the accuracy of the estimates.

- In one city, Inglewood, the local expertise of a city official intimate with system operations asserted that the difference between household number and hook-ups could not be easily resolved. This is the case because many households in Inglewood are served by another regional system. Therefore, the data for Inglewood exhibited in the results are limited to the cost per household provided by the city, and the estimation of 2.0% and 4.5% of Median Household Income. That same Inglewood representative also cautioned that the consumption rates for the poorer households might be overestimated.

Error:

Systemic error may affect the calculation of estimates when using number of households, but there are countervailing factors that may minimize the importance of error in this instance. For example, the lowest and highest income deciles are, respectively, $10,000 or less a year, and $200,000 or more a year. The convention used for the purposes of this study was to assign all households in this category to an assumed income of $10,000, when some households in this category might make less. Similarly, for the highest income category $200,000 annual income was used although these households might make more than that.

The other income deciles were utilized by specifying the mid-point of income for each category. Thus, the second lowest income decile $10,000 to $14,999 is represented for purposes of calculation as $12,500.

An additional error concern is the fact that some cities could not determine cost per household when their households were served by multiple water or sewer systems. Cities were asked to apply local expertise in these cases.

Mayors Water Council

The Mayors Water Council (MWC) provides a forum for Mayors to discuss issues impacting how they provide safe, adequate and affordable water and wastewater services and infrastructure in America's Principal Cities in the 21st Century. It is open to all Mayors, focusing on water resource issues, including: watershed management; water supply planning; surface and sub-surface water infrastructure financing and rehabilitation; water conservation, Public-Private Partnerships; and asset management.

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