APPENDIX A1

Water Quality Priorities Memorandum

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List of Acronyms

CEDEN	California Environmental Data Exchange Network
CIMP	Coordinated Integrated Monitoring Program
EWMP	Enhanced Watershed Management Program
LACDPW	Los Angeles County Department of Public Work
LACSD	Los Angeles County Sanitation District
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
PAH	Polycyclic Aromatic Hydrocarbon
RAA	Reasonable Assurance Analysis
SCR	Santa Clara River
SCRWMG	Santa Clara River Watershed Management Group
TMDL	Total Maximum Daily Load
WQBEL	Water Quality Based Effluent Limitation

A1-1 Introduction

The Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating for the City of Long Beach MS4 R4-2012-0175, NPDES No. CAS004001 (Permit) was adopted November 8, 2012 by the Los Angeles Regional Water Quality Control Board (Regional Board) and became effective December 28, 2012. The purpose of the Permit is to ensure the MS4 systems in Los Angeles County are not causing or contributing to exceedances of water quality objectives set to protect the beneficial uses of the receiving waters in the Los Angeles region. The purpose of this report is to identify the water quality priorities that will be addressed by the Enhanced Watershed Management Program (EWMP) for the Santa Clara River Watershed Management Group (SCRWMG). The identification of water quality priorities is required in Section VI.C.5 of Order R4-2012-0175 as part of the development of a Watershed Management Program or Enhanced Watershed Management Program.

The identification of water quality priorities is an important first step in the EWMP process. The water quality priorities provide the basis for prioritizing implementation and monitoring activities within the EWMP and Coordinated Integrated Monitoring Program (CIMP) and selection and scheduling of best management practices (BMPs) in the Reasonable Assurance Analysis (RAA). The Permit establishes a four-step process for identifying water quality priorities, including:

1. A water quality characterization (VI.C.5.a.i, pg. 58) based on available monitoring data, TMDLs, 303(d) lists, storm water annual reports, etc.;
2. A water body-pollutant classification (VI.C.5.a.i, pg. 59), to identify water body-pollutant combinations that fall into three Permit defined categories;
3. A source assessment (VI.C.5.a.i, pg. 59) for the water body-pollutant combinations in the three categories; and
4. Prioritization of the water body-pollutant combinations (VI.C.5.a.i, pg. 60).

This report fulfills the requirements of the Permit established process.

A1-2 Water Quality Prioritization Process

To meet the MS4 Permit requirements, a water quality prioritization process was developed**.** The first step of the prioritization process was to identify the water bodies and reaches within the EWMP area and downstream of the EWMP area. Then, for those reaches, water body pollutant combinations (WBPCs) for which water quality based effluent limitations (WQBELs) or receiving water limitations (RWLs) are defined in the permit to implement TMDL wasteload allocations (WLAs) were compiled from Attachment L and O of the Permit. Additionally, WBPCs on the 2010 Clean Water Act Section 303(d) List (303(d) List) within and downstream of the EWMP area were summarized.

For the next step, available monitoring data was compiled and screened to ensure validity and completeness of the data. The data was then sorted and all non-detected constituents were identified as not being water quality priorities and no further evaluation was conducted. Detected constituents were summarized in regards to the number of samples, number of detections, and number of exceedances by reach. For the constituents with exceedances, the number of exceedances was compared to the requirements in the Water Quality Control Policy for Developing California’s Clean Water Act Section 303(d) List (State’s Listing Policy) to determine if an impairment was indicated.

The monitoring data analysis, Attachment L and O of the Permit, and the 2010 303(d) list were then used to assign constituents to one of the three Permit specified categories. Category 1 includes those water body-pollutant combinations (WBPCs) with TMDL deadlines prior to or within the permit term. Category 2 encompasses 303(d) listings and potential 303(d) listings according to the State’s Listing Policy. Constituents with RWL exceedances not meeting the State’s Listing Policy for inclusion in category 2 were assigned to category 3. Additionally, the SCRWMG was consulted at this step of the process to determine if any additional constituents should be considered as part of the water quality prioritization process.

After compiling the list of constituents by category, a source assessment was performed to identify those category 2 and 3 pollutants that are likely associated with MS4 discharges, those that are clearly not associated with MS4 discharges and those that might require further source assessment to make a determination. Category 1 pollutants are presumably linked to MS4 discharges through TMDL development and as such did not require an initial source assessment. Prioritization into three levels was accomplished using the categorization and source assessment. These categories and sub-categories as defined in Table A1-1 make up the basis for fulfilling the water quality prioritization requirements and were used to guide the development of additional components of the EWMP and CIMP.

Table A1-1. Categorization for Water Body Pollutant Combinations

Category	Water Body-Pollutant Combinations (WBPCs)
1	**Category 1A:** WBPCs with past due or current Permit term TMDL deadlines with exceedances in the past 5 years.
	Category 1B: WBPCs with TMDL deadlines beyond the Permit term and with exceedances in the past 5 years.
	Category 1C: WBPCs addressed in USEPA TMDL without a Regional Board Adopted Implementation Plan.
	Category 1D: WBPCs with past due, current, or future Permit term TMDL deadlines without exceedances in the past 5 years.
	Category 1E: WBPCs with TMDLs for which MS4 discharges are not causing or contributing. [2]
2	**Category 2A:** 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements with exceedances in the past 5 years.
	Category 2B: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements that are not a “pollutant”[1] (i.e., toxicity).
	Category 2C: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements without exceedances in past 5 years or can be delisted.
	Category 2D: 303(d) Listed WBPCs for which MS4 discharges are not causing or contributing.[2]
3	**Category 3A:** All other WBPCs with exceedances in the past 5 years.
	Category 3B: All other WBPCs that are not a “pollutant”[1] (i.e., toxicity).
	Category 3C: All other WBPCs that have exceeded in the past 10 years, but not in past 5 years.
	Category 3D: WBPCs identified by the USCR EWMP Group Members.

1. While pollutants may be contributing to the impairment, it currently is not possible to identify the specific pollutant/stressor.
2. The Permit requires prioritization of all constituents with established WQBELs or RWLs, regardless of source. WBPCs in this category are for reaches without MS4 discharges. While urban areas may be within the drainage area, no point source MS4 discharges to the waterbody.
3. The Permit does not require prioritization of constituents for which data indicate water quality impairment in the receiving water, but where MS4 discharges are not causing or contributing to the impairment. Pollutants in this category are in reaches within the EWMP area that do not receive MS4 discharges.

A1-3 Water Quality Characterization and Water Body-Pollutant Categorization

This section provides a summary of the analysis conducted to generate the categorization of water body/pollutant combinations as outlined in the permit. The process, as summarized above, consisted of the following steps:

1. Gathering relevant data and information
2. Defining the EWMP area and identifying the water bodies within the EWMP area and downstream of the area that might be influenced by discharges from the EWMP area
3. Conducting a data analysis to identify constituents with exceedances of water quality objectives
4. Comparing the data analysis to the State's Listing Policy
5. Compiling WBPCs with TMDLs from Attachment L and O of the permit
6. Compiling 303(d) Listings from the 2010 303(d) List
7. Categorizing the WBPCs based on the data analysis into the three categories defined in the Permit
8. Identification of additional priorities from the EWMP group

Each of these steps and the results of the analysis are discussed in more depth in the following sections.

A1-3.1 DATA GATHERING

Data were obtained from numerous sources including, but not limited to, 303(d) listings, WQBELs, RWLs, SWAMP, annual report exceedances, and established TMDLs. A data request was submitted to the SCRWMG to gather information necessary to meet the water quality characterization and source assessment requirements outlined on page 58 and 59 of the permit. The information gathered for analysis included:

- Findings from the Permittees' Illicit Connections and Illicit Discharge Eliminations Programs
- Findings from the Permittees' Industrial/Commercial Facilities Programs
- Findings from the Permittees' Development Construction Programs
- Findings from the Permittees' Public Agency Activities Programs
- TMDL source investigations
- Findings from the Permittees' monitoring programs, including but not limited to TMDL compliance monitoring and receiving water monitoring
- 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 Santa Clara River Watershed Management Area (WMA) was received from the following sources:

- Los Angeles Department of Public Works (LACDPW) provided long-term monitoring data from the Santa Clara River Mass Emission station S29.
- Los Angeles County Sanitation Districts (LACSD) provided long-term receiving water monitoring data.
- Regional Water Quality Control Board Region 4 Santa Clara River Surface Water Ambient Monitoring Program

A total of 30,344 data records were compiled and reviewed as part of the water quality prioritization process. A summary of the data records can be found in **Table A1-2.**

Table A1-2. Summary of Monitoring Data

Monitoring Data Source	SCR Reach 4		SCR Reach 5		SCR Reach 6		SCR Reach 7		Bouquet Canyon Creek	
	Date Range	N	Date Range	N	Date Range	N	Date Range	N	Date Range	N
Los Angeles County Sanitation District	8/18/2009-12/21/2012	1,007	7/7/2009-12/21/2012	13,790	7/7/2009-12/21/2012	5,363	10/28/2010-4/19/2011	212		
Los Angeles County Flood Control Mass Emission Monitoring					10/10/2002-3/16/2012	9,919				
Regional Water Quality Control Board Surface Water Ambient Monitoring Program									8/5/2002-5/17/2003	53

A1-3.2 EWMP AREA

The EWMP area covers the portion of the Santa Clara River that is located in Los Angeles County and the small portion of the Los Angeles River watershed located in the City of Santa Clarita. The reaches (RWQCB reaches) and tributaries included in the EWMP area that were evaluated include:

- Santa Clara River Reach 5
- Santa Clara River Reach 6
- Santa Clara River Reach 7
- Santa Clara River Reach 8
- Santa Clara River tributaries to these reaches
- Lake Elizabeth

Although there are a number of lakes with 303(d) listings in the EWMP area, there are no MS4 discharges to those lakes. As a result, only Lake Elizabeth is included in the analysis. Likewise, there is no MS4 discharging to the Los Angeles River. However, effluent limits are assigned to the City of Santa Clarita for TMDLs in the Los Angeles River Watershed. As a result, the TMDLs for which the City has allocations are included in the analysis. Although it is located in Ventura County, data from Santa Clara Reach 4B was also reviewed in the analysis to evaluate potential downstream concerns**.** **Figure A1-1** shows the EWMP area, water bodies and the site locations for the monitoring data received and used for the water quality characterization process.

A1-3.3 DATA ANALYSIS

Compiled data meeting the QA/QC criteria for use were analyzed to determine constituents exceeding water quality objectives. The first step in the analysis was to develop a list of constituents that were never detected in any reach in the dataset and can therefore automatically be classified as not a priority (**Attachment A**).

Constituents that were detected in the dataset but never exceeded the water quality objective can be classified as not a priority and are summarized in **Attachment B**. **Table A1-3** summarizes all applicable receiving water limitations (RWLs) from the Los Angeles Region Basin Plan, California Toxics Rule, TMDLs, and applicable State Water Board plans and policies which were identified for comparison to the compiled water quality data.

Table A1-4 summarizes the number of samples, number of detections, and number of exceedances by reach. Summary statistics for those constituents identified during the data analysis process are presented in **Attachment C**.

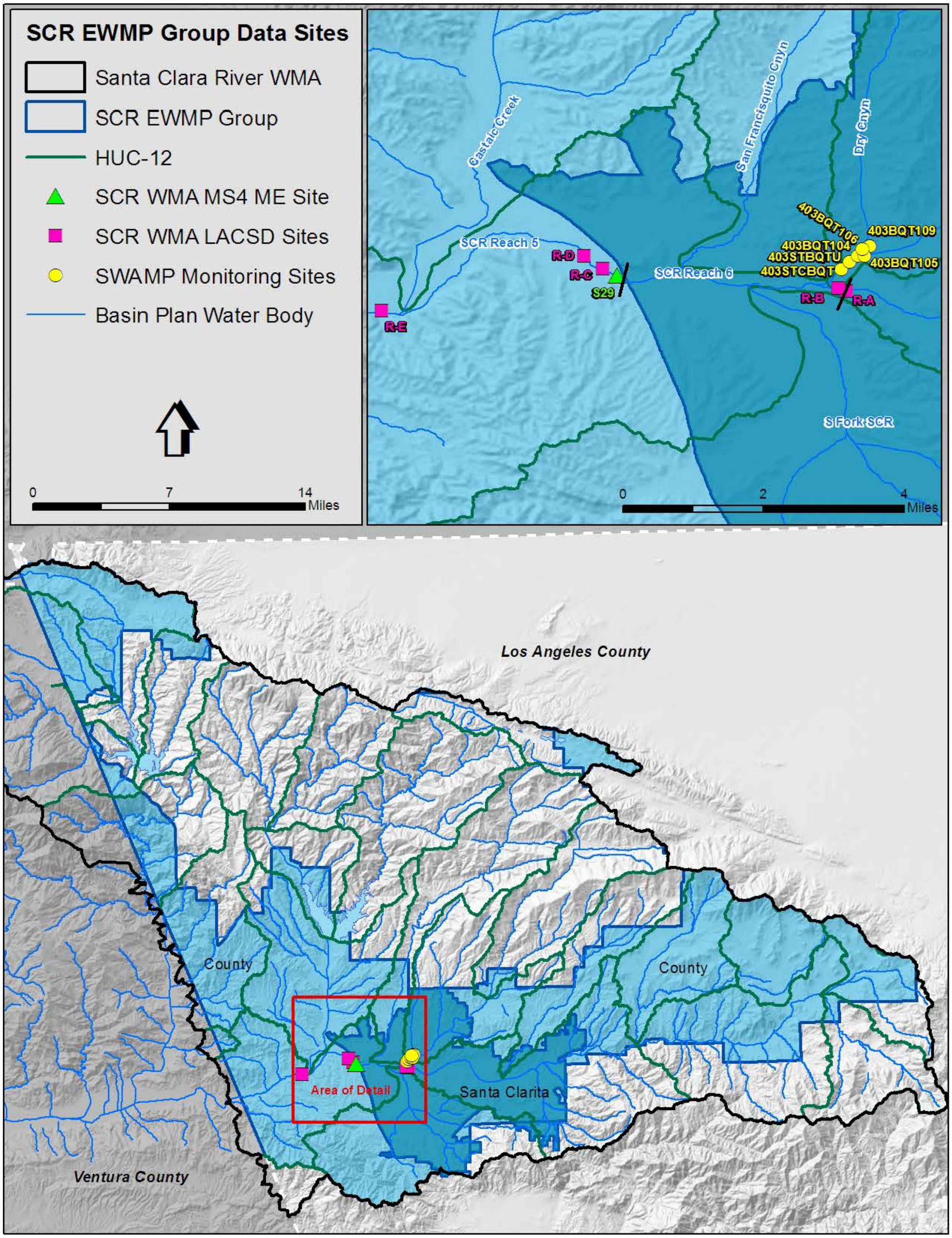

Figure A1-1. Santa Clara River WMA Monitoring Site Locations

Table A1-3. Applicable WQBELs and RWLs

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
1,1-Dichloroethane	µg/L			5 (e)
1,1-Dichloroethylene	µg/L		3.2 (a)	0.057 (d)
1,1,1-Trichloroethane	µg/L			200 (e)
1,1,2-Trichloro-1,2,2-Trifluoroethane	µg/L			1200 (e)
1,1,2-Trichloroethane	µg/L		42 (a)	0.6 (d)
1,1,2,2-Tetrachloroethane	µg/L		11 (a)	0.17 (d)
1,2-Dibromo-3-Chloropropane	µg/L			0.2 (e)
1,2-Dichlorobenzene	µg/L		17000 (a)	600 (e)
1,2-Dichloroethane	µg/L		99 (a)	0.38 (d)
1,2-Dichloropropane	µg/L		39 (a)	0.52 (d)
1,2-Diphenylhydrazine	µg/L		0.54 (a)	0.04 (d)
1,2-Trans-Dichloroethylene	µg/L		140000 (a)	10 (e)
1,2,4-Trichlorobenzene	µg/L			70 (e)
1,3-Dichlorobenzene	µg/L		2600 (a)	400 (d)
1,3-Dichloropropylene	µg/L		1700 (a)	0.5 (e)
1,4-Dichlorobenzene	µg/L		2600 (a)	5 (e)
2-Chloronaphthalene	µg/L		4300 (a)	1700 (d)
2-Chlorophenol	µg/L		400 (a)	120 (d)
2-Methyl-4,6-Dinitrophenol	µg/L		765 (a)	13.4 (d)
2,3,7,8-TCDD (Dioxin)	pg/L		0.014 (a)	0.013 (d)
2,4-D	µg/L			70 (e)
2,4-Dichlorophenol	µg/L		790 (a)	93 (d)
2,4-Dimethylphenol	µg/L		2300 (a)	540 (d)
2,4-Dinitrophenol	µg/L		14000 (a)	70 (d)
2,4-Dinitrotoluene	µg/L		9.1 (a)	0.11 (d)
2,4,5-TP	µg/L			50 (e)
2,4,6-Trichlorophenol	µg/L		6.5 (a)	2.1 (d)
3,3'-Dichlorobenzidine	µg/L		0.077 (a)	0.04 (d)
4,4'-DDD	µg/L		0.00084 (a)	0.00083 (d)
4,4'-DDE	µg/L		0.00059 (d)	0.00059 (d)
4,4'-DDT	µg/L		0.00059 (d)	0.00059 (d)
Acenaphthene	µg/L		2700 (a)	1200 (d)
Acrolein	µg/L		780 (a)	320 (d)
Acrylonitrile	µg/L		0.66 (a)	0.059 (d)
Alachlor	µg/L			2 (e)
Aldrin	µg/L		0.00014 (a)	0.00013 (d)
alpha-BHC	µg/L		0.013 (a)	0.0039 (d)
alpha-Endosulfan	µg/L		0.056 (b)	0.056 (b)
Aluminum	µg/L			1000 (e)
Ammonia as N	mg/L	1.8/5.2 (i)	(m)	(m)

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
Anthracene	µg/L		110000 (a)	9600 (d)
Antimony	µg/L		4300 (a)	6 (e)
Aroclors	µg/L		0.00007 (f)	0.00007 (f)
Arsenic	µg/L		150 (b)	50 (e)
Asbestos	MFL			7 (e)
Atrazine	µg/L			3 (e)
Barium	µg/L			1000 (e)
Bentazon	µg/L			18 (e)
Benzene	µg/L		71 (a)	1 (e)
Benzidine	µg/L		0.00054 (a)	0.00012 (d)
Benzo(a)Anthracene	µg/L		0.049 (a)	0.0044 (d)
Benzo(a)Pyrene	µg/L		0.049 (a)	0.0044 (d)
Benzo(b)Fluoranthene	µg/L		0.049 (a)	0.0044 (d)
Benzo(k)Fluoranthene	µg/L		0.049 (a)	0.0044 (d)
Beryllium	µg/L			4 (e)
beta-BHC	µg/L		0.046 (a)	0.014 (d)
beta-Endosulfan	µg/L		0.056 (b)	0.056 (b)
Bioaccumulation			(n)	(n)
Biostimulatory Substances			(n)	(n)
Bis(2-chloroethyl)Ether	µg/L		1.4 (a)	0.031 (d)
Bis(2-chloroisopropyl)Ether	µg/L		170000 (a)	1400 (d)
Bis(2-ethylhexyl)Adipate	µg/L			400 (e)
Bis(2-ethylhexyl)Phthalate	µg/L		5.9 (a)	1.8 (d)
BOD	mg/L		(n)	(n)
Boron	mg/L			1.0/1.5 (e) (o)
Bromoform	µg/L		360 (a)	4.3 (d)
Butylbenzyl Phthalate	µg/L		5200 (a)	3000 (d)
Cadmium	µg/L		HBC from CTR (p)	HBC from CTR (p)
Carbofuran	µg/L			18 (e)
Carbon Tetrachloride	µg/L		4.4 (a)	0.25 (d)
Chlordanes	µg/L		0.00059 (a)	0.00057 (d)
Chloride	mg/L	100 (j)	100 (f)	100 (f)
Chlorine (Total Residual)	µg/L			100 (e)
Chlorobenzene	µg/L		21000 (a)	70 (e)
Chlorodibromomethane	µg/L		34 (a)	0.41 (d)
Chlorpyrifos (l)	µg/L		0.041 (g)	0.041 (g)
Chromium	µg/L			50 (e)
Chromium (III)	µg/L		HBC from CTR (p)	HBC from CTR (p)
Chromium (VI)	µg/L		11 (b)	11 (b)
Chrysene	µg/L		0.049 (a)	0.0044 (d)
cis-1,2-Dichloroethylene	µg/L			6 (e)

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
Color			(n)	(n)
Copper	µg/L		HBC from CTR (p)	HBC from CTR (p)
Cyanide	µg/L		5.2 (b)	5.2 (b)
Dalapon	µg/L			200 (e)
Di-n-Butyl Phthalate	µg/L		12000 (a)	2700 (d)
Diazinon (l)	µg/L		0.17 (g)	0.17 (g)
Dibenzo(a,h)Anthracene	µg/L		0.049 (a)	0.0044 (d)
Dichlorobromomethane	µg/L		46 (a)	0.56 (d)
Dieldrin	µg/L		0.00014 (d)	0.00014 (d)
Diethyl Phthalate	µg/L		120000 (a)	23000 (d)
Dimethyl Phthalate	µg/L		2900000 (a)	313000 (d)
Dinoseb	µg/L			7 (e)
Diquat	µg/L			20 (e)
Dissolved Oxygen	mg/L		<5 (f)	<5 (f)
E. Coli	MPN/100mL	126/235 (k)	126 (h)	126 (h)
Endosulfan Sulfate	µg/L		240 (a)	110 (d)
Endothall	µg/L			100 (e)
Endrin	µg/L		0.036 (b)	0.036 (b)
Endrin Aldehyde	µg/L		0.81 (a)	0.76 (d)
Ethylbenzene	µg/L		29000 (a)	700 (e)
Ethylene Dibromide	µg/L			0.05 (e)
Exotic Vegetation			(n)	(n)
Fecal Coliform	MPN/100mL		200 (f)	200 (f)
Floating Material			(n)	(n)
Fluoranthene	µg/L		370 (a)	300 (d)
Fluorene	µg/L		14000 (a)	1300 (d)
Fluoride	mg/L			2 (e)
gamma-BHC (Lindane)	µg/L		0.063 (a)	0.019 (d)
Glyphosate	µg/L			700 (e)
Gross Alpha particle activity	pCi/L			15 (e)
Gross Beta particle activity	pCi/L			50 (e)
Heptachlor	µg/L		0.00021 (d)	0.00021 (d)
Heptachlor Epoxide	µg/L		0.00011 (a)	0.0001 (d)
Hexachlorobenzene	µg/L		0.00077 (a)	0.00075 (d)
Hexachlorobutadiene	µg/L		50 (a)	0.44 (d)
Hexachlorocyclopentadiene	µg/L		17000 (a)	50 (e)
Hexachloroethane	µg/L		8.9 (a)	1.9 (d)
Indeno(1,2,3-cd)Pyrene	µg/L		0.049 (a)	0.0044 (d)
Iron (l)	µg/L		1000 (g)	1000 (g)
Isophorone	µg/L		600 (a)	8.4 (d)
Lead	µg/L		HBC from CTR (p)	HBC from CTR (p)

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
MBAS	µg/L			500 (e)
Mercury	µg/L		0.051 (a)	0.05 (d)
Methoxychlor	µg/L			40 (e)
Methyl Bromide	µg/L		4000 (a)	48 (d)
Methylene Chloride	µg/L		1600 (a)	4.7 (d)
Molinate	µg/L			20 (e)
N-Nitrosodi-n-Propylamine	µg/L		1.4 (a)	0.005 (d)
N-Nitrosodimethylamine	µg/L		8.1 (a)	0.00069 (d)
N-Nitrosodiphenylamine	µg/L		16 (a)	5 (d)
Nickel	µg/L		HBC from CTR (p)	HBC from CTR (p)
Nitrate as N	mg/L			10 (e)
Nitrite as N	mg/L			1 (e)
Nitrobenzene	µg/L		1900 (a)	17 (d)
Nitrogen (NO3-N+NO2-N)	mg/L	6.8 (i)		5/10 (e) (o)
Oil + Grease	mg/L		(n)	(n)
Oxamyl	µg/L			200 (e)
PCBs	µg/L		0.00017 (d)	0.00017 (d)
Pentachlorophenol	µg/L		8.2 (a)	0.28 (d)
pH	pH Units		6.5 < pH < 8.5 (f)	6.5 < pH < 8.5 (f)
Phenol	µg/L		4600000 (a)	21000 (d)
Picloram	µg/L			500 (e)
Pyrene	µg/L		11000 (a)	960 (d)
Radium-226 + Radium-228	pCi/L			5 (e)
Selenium	µg/L		5 (b)	5 (b)
Silver	µg/L		HBC from CTR (p)	HBC from CTR (p)
Simazine	µg/L			4 (e)
Strontium-90	pCi/L			8 (e)
Styrene	µg/L			100 (e)
Sulfate	mg/L		100-650 (o)	100-650 (o)
Taste and Odor			(n)	(n)
TDS	mg/L		500-1300 (o)	500-1300 (o)
Temperature	°C		(n)	(n)
Tetrachloroethylene	µg/L		8.85 (a)	0.8 (d)
Thallium	µg/L		6.3 (a)	1.7 (d)
Thiobencarb	µg/L			70 (e)
Toluene	µg/L		200000 (a)	150 (e)
Total Coliform	MPN/100mL		70 (f)	70 (f)
Total Settleable Solids			(n)	(n)
Toxaphene	µg/L		0.0002 (b)	0.0002 (b)
Toxicity			(n)	(n)
Trichloroethylene	µg/L		81 (a)	2.7 (d)

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
Trichlorofluoromethane	µg/L			150 (e)
Tritium	pCi/L			20000 (e)
TSS	mg/L		(n)	(n)
Turbidity	NTU		(n)	(n)
Uranium	pCi/L			20 (e)
Vinyl Chloride	µg/L		525 (a)	0.5 (e)
Xylenes (Total)	µg/L			1750 (e)
Zinc	µg/L		HBC from CTR (p)	HBC from CTR (p)

1. CTR Human Health criterion, organisms only
2. CTR criteria continuous concentrations (CCC), aquatic life
3. CTR criteria maximum concentrations (CMCs)
4. CTR Human Health criterion, water and organisms
5. Basin Plan objective for waterbodies designated as MUN.
6. Basin Plan objective not associated with a specific beneficial use designation.
7. EPA 305(c) recommended criteria
8. TMDL receiving water limitation equal to the geometric mean objective and the designated allowable exceedance days for the single sample maximum objective.
9. WQBEL for Reach 5 of Santa Clara River
10. WQBEL for Reaches 5 and 6 of Santa Clara River
11. WQBEL for Reaches 5, 6 and 7 of Santa Clara River. Single sample objective is 235 MPN/100mL. Geometric mean objective is 126 MPN/100mL and compliance is calculated based on a 30-day geometric mean of at least 5 samples. If less than 5 samples are available, then the geometric mean is not calculated and the objectives are not exceeded.
12. EPA recommended criteria are not RWLs, but are included here because these constituents are on the 303(d) list. The values were selected for comparison to the Listing Policy to assess whether or not impairments remain.
13. Ammonia objectives in the Basin Plan are pH and temperature dependent. For reaches not covered by the TMDL, ammonia objectives were calculated using the pH and temperature of the sample.
14. Narrative objective in Basin Plan.
15. Waterbody-specific objective from the Basin Plan. The range of values for the objective is shown.
16. Hardness based aquatic life criteria (HBC) from the California Toxics Rule (CTR). Criteria calculated for each sample result based on the sample hardness.
17. Applies to all reaches in the USCR EWMP area with no MUN designation or with the MUN designations of E*, P* and I*. This includes reaches 4B, 5, 6, and 7 of the Santa Clara River, Mint Canyon Creek Reach 2, Agua Dulce Canyon Creek, Aliso Canyon Creek, Munz Lake, South Fork Santa Clara River,
18. Applies to reaches within the USCR EWMP area with MUN designations of E, I or P. Includes Bouqut Canyon, Dry Canyon, Dry Canyon Reservoir, Bouquet Reservoir, Mint Canyon Creek Reach 1, Lake Hughes, Lake Elizabeth, Castaic Lak, Castaic Creek, San Franciscquite Canyon

Table A1-4. Summary Information for Detected Constituents with Exceedences

Constituent	Santa Clara Reach 4B			Santa Clara Reach 5			Santa Clara Reach 6			Santa Clara Reach 7			Bouquet Canyon Creek		
	NS	ND	NE	NS	ND	NE	NS	ND	NE	NS	ND	NE	NS	ND	NE
Bis(2-ethylhexyl)Phthalate				41	7	0	68	5	5						
Chloride	148	148	126	525	525	454	370	370	320	9	9	0			
Chlorpyrifos				39	0	0	74	0	0	1	0	0	26	8	8
Copper	1	1	0	215	215	2	146	135	33	2	2	1			
Cyanide				41	28	0	104	52	18	2	2	1			
Diazinon				39	0	0	74	11	3	1	0	0	26	26	25
Dissolved Oxygen	158	158	1	516	516	65	335	335	81	9	9	1			
E. Coli[1]				516	454	46	172	27	0	9	9	9			
Iron	1	1	0	215	203	11	194	149	42	4	4	3			
Mercury				215	96	5	146	16	4	2	2	1			
Nitrate-N + Nitrite-N[2]	30	30	0	923	923	1	414	414	0	16	16	0			
pH	169	169	0	516	516	0	328	328	1	9	9	7			
Selenium	1	1	0	215	215	1	146	88	4	2	2	0			
TDS	26	26	0	125	125	3	112	112	0	2	2	0			
Zinc				35	35	0	146	138	5	2	2	1			

NS – Number of samples

ND – Number of detections

NE – Number of exceedances

1. Exceedances calculated based on a 30-day geometric mean of at least 5 samples. If less than 5 samples are available, then the geometric mean is not calculated and the objectives are not exceeded.
2. Exceedances based on comparison to the WQBELs. Exceedances of the TMDL targets.

A1-3.4 WATER BODY-POLLUTANT COMBINATION CATEGORIZATION

Based on available information and data analysis, water body-pollutant combinations were classified in one of the three Permit categories, as described in the table below.

Table A1-5. Water Body-Pollutant Classification Categories

Category	Water Body-Pollutant Combinations (WBPCs) Included
1 Highest Priority	WBPCs for which TMDL WQBELs and/or RWLs are established in Part VI.E and Attachments L and O 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 receiving water limitations contained in the MS4 Permit and for which MS4 discharges may be causing or contributing to the exceedance.

A1-3.4.1 Category 1 Analysis: WBPCs Subject to TMDL

Waterbody-pollutant combinations where water quality based effluent limitations or receiving water limitations are established through TMDLs established in Order R4-2012-0175 were identified using Attachment L and O in the Permit. The constituents in the Category 1 classification and the location where the WQBELs apply are summarized in **Table A1-6**. All TMDLs with WQBELs that apply to jurisdictions within the EWMP area are identified in the table.

Table A1-6. Category 1 Waterbody-Pollutants with WQBELs

TMDL	Constituent	Santa Clara River Reach			Mint Canyon Reach 1	Elizabeth Lake
		5	6	7		
Salts	Chloride	E	E			
Bacteria	*E. coli*	R/E	R/E	R/E		
Nutrients	Ammonia	E				
	Nitrate and Nitrite	E			E(1)	
Trash	Trash					E

1. The Nitrogen TMDL addresses Mint Canyon; however there are no MS4 WLAs that apply.

R - Receiving water limit established by a TMDL.

E - Effluent limit established based on a TMDL.

To further prioritize these category 1 constituents, the available monitoring data was evaluated to determine the status of TMDL attainment. Although effluent limits are assigned to the portion of the City of Santa Clarita located in the Los Angeles River Watershed for the Los Angeles River TMDLs, the City does not have a MS4 discharge to the Los Angeles River. Additionally, there are no data available for the Los Angeles River tributary in the EWMP area. As a result, no further data analysis was done for the Los Angeles River TMDL constituents.

Table A1-7. Category 1 Data Summary

Constituent	Santa Clara Reach 4B			Santa Clara Reach 5			Santa Clara Reach 6			Santa Clara Reach 7		
	ND	NE	TMDL Attained	ND	NE	TMDL Attained	ND	NE	TMDL Attained	ND	NE	TMDL Attained
Ammonia	1	0	Y	203	0	Y	224	0	Y	7	0	Y
Nitrate and Nitrite	30	0	Y	923	1	Y	414	0	Y	16	0	Y
E. Coli	-	-	-	454	46	**N**	27	0	Y	9	9	**N**
Chloride	148	126	**N**	525	454	**N**	370	320	**N**	9	9	**N**
Trash	N/A			N/A			N/A			N/A		

ND – Number of detections
NE – Number of exceedances

A1-3.4.2 Category 2 Analysis: 303(d) Listings and Potential Listings

Waterbody-pollutant combinations listed on the State's 2010 Clean Water Act Section 303(d) List that are not already addressed by a TMDL or other action were summarized. The 303(d) listing and the location of the listing are listed in **Table A1-8.** All listings within the EWMP area were identified and included. Because there are no MS4 discharges to the Los Angeles River watershed, the 303(d) listings for the Los Angeles River are not included in the table.

Table A1-8. 303(d) Listings for Potential Category 2 Classification

Constituent	Santa Clara River Reach			Elizabeth Lake
	5	6	7	
Iron	L	L		
Copper		L		
Chlorpyrifos		L		
Diazinon		L		
Toxicity		L		
pH				L
Eutrophic				L
Organic Enrichment/ Low DO				L

L - Listed on 2010 303(d) List.

After identifying the 303(d) listed pollutants, the exceedance information was used to evaluate if the listings were still valid or if the constituents could potentially be delisted. Additionally, other constituents exceeding objectives were identified to determine if the number of exceedances would result in a potential 303(d) listing based on the State's Listing Policy. The constituents that are either already on the 303(d) list or could potentially be listed were categorized in Category 2 and summarized in **Table A1-9.** No data are available for comparison to the listings for Lake Elizabeth. As a result, all of the WBPCs for the Lakes are maintained in Category 2.

Table A1-9. Category 2 Constituents Data Analysis

Constituent	Santa Clara Reach 4B			Santa Clara Reach 5			Santa Clara Reach 6			Santa Clara Reach 7			Lake Elizabeth
	NS	NE	List	NS	NE	List	NS	NE	List	NS	NE	List	
Copper	1	0	N	215	2	N	146	33	C	2	1	N	
Chlorpyrifos				39	0	N	74	0	D	1	0	N	
Cyanide				41	0	N	104	18	Y	2	1	N	
Diazinon				39	0	N	74	3	D	1	0	N	
Dissolved Oxygen	158	1	N	516	65	N	335	81	Y	9	1	N	Y
Iron	1	0	N	215	11	D	194	42	C	4	3	N	
Lead				35	0	N	146	27	Y	2	2	Y	
pH	169	0	N	516	0	N	328	1	N	9	7	Y	Y
Toxicity				5	0	N	10	1	N	2	0	N	
Eutrophic													Y

NS – Number of Samples
NE – Number of Exceedances
Y – Meets State's Listing Policy criteria to list
N – Does not meet State's Listing Policy criteria to list
D – Meets State's Listing Policy criteria to delist
C – Listing is confirmed

A1-3.4.3 Category 3 Analysis: Other Receiving Water Limit Exceedances

Category 3 consists of constituents that have exceeded water quality objectives in the dataset, but do not qualify for listing under the State's Listing Policy. The Category 3 WBPCs are summarized in **Table A1-10.**

Table A1-10. RWL Exceedances Not Meeting the State's Listing Policy for Impairment

Constituent	Santa Clara Reach 4B			Santa Clara Reach 5			Santa Clara Reach 6			Santa Clara Reach 7		
	NS	NE	List	NS	NE	List	NS	NE	List	NS	NE	List
Bis(2-ethylhexyl)Phthalate				41	0	N	68	5	N			
Mercury				215	5	N	146	4	N	2	1	N
Nickel				71	0	N	146	0	N	2	1	N
Selenium	1	0	N	215	1	N	146	4	N	2	0	N
TDS	26	0	N	125	3	N	112	0	N	2	0	N
Zinc				35	0	N	146	5	N	2	1	N

NS – Number of Samples
NE – Number of Exceedances
N – Does not meet State's Listing Policy criteria to list

A1-3.4.4 Other Potential EWMP Priorities

In addition to the data analysis, the SCRWMG was consulted to identify any other potential constituents of concern that should be considered during the EWMP and CIMP development. Based on this discussion, pyrethroid pesticides in Bouquet Canyon were identified as a WBPC that could warrant consideration in the EWMP process.

A1-4 Source Assessment

A source assessment was conducted as required in the MS4 permit as part of the EWMP development process, to identify potential MS4 sources for the waterbody-pollutant combinations (WBPCs) in Categories 1-3 from the water quality priorities characterization process.

A1-4.1 INFORMATION REVIEWED

In order to identify potential sources for water quality priorities from MS4 discharges, a review of available data and information was conducted, including the following sources:

1. Findings from the Permittee’s Illicit Connections and Illicit Discharge Programs
2. Findings from the Permittee’s Industrial/Commercial Facilities Programs
3. Findings from the Permittee’s Development Construction Programs
4. Findings from the Permittee’s Public Agency Activities Programs
5. TMDL source investigations
6. Watershed model results
7. Findings from the Permittee’s monitoring programs
8. Other pertinent data and information

As required in the MS4 permit, the City and County each submit an Individual Annual Report Form (Annual Report) to the Regional Board for each fiscal year. The Annual Report contains details pertaining to the City and County’s activities under the Industrial/Commercial Facilities Program, Development Construction Program, Public Agency Activities Program and Illicit Connection and Illicit Discharge (IC/ID) Elimination program (items 1-4 in the list above), as well as other MS4 permit requirements. The annual reports include details on inspections and enforcement activities, as well as findings on BMP implementation. As part of the IC/ID program, the City and County produce annual maps showing the locations and type of illicit connections and illicit discharges found during the fiscal year. Available Annual Reports and IC/ID maps were reviewed in this assessment.

Four TMDLs are pertinent to MS4s in the Upper Santa Clara River watershed: The Upper Santa Clara River Chloride TMDL, The Santa Clara River Nitrogen Compounds TMDL, The Lake Elizabeth, Munz Lake, and Lake Hughes Trash TMDL, and The Santa Clara River Estuary and Reaches 3, 5, 6, and 7 Indicator Bacteria TMDL. Findings from source assessments from each TMDL are incorporated into this assessment.

Data from the Permittee’s monitoring programs mostly consist of receiving water monitoring, and little data is available to characterize MS4 discharges. However, these data were used to evaluate the location and timing of exceedances to inform this source assessment. Additional information and data reviewed included POTW effluent data, other TMDL source assessments from watersheds in the Los Angeles Region, and other studies and reports pertaining to the EWMP area or water quality priorities.

A1-4.2 FINDINGS FROM INFORMATION REVIEW

The results of source assessments for WBPCs in Categories 1-3 are shown below in **Table A1-11.** WBPCs in category IE and 2D are not included. These are WBPCs that have either TMDLs or 303(d) listings, but there are no MS4 discharges to these waterbodies by the Permittees in the EWMP area. Category 2B constituents, 303(d) Listed WBPCs that are not a "pollutant", are addressed through source assessments for other constituents. Eutrophic conditions, low dissolved oxygen and changes in pH are all potentially the result of excess algae growth which is typically caused by elevated nutrient levels. Toxicity is most likely caused by pesticides.

Table A1-11. MS4 Sources of Water Quality Priorities

Class	Constituent	Reaches/ Waterbodies	MS4 Potential Sources

Bacteria[1,5]	*E. coli*	4B[2], 5, 6, 7	- Dry- and wet- weather urban runoff
			  - Animal wastes, including those from pets, wildlife and birds
			  - Trash
			- Direct human discharges
			- Sanitary sewer overflows
			- Leaking septic systems
			- Illicit discharge of sewage and wastewater

Nitrogen Compounds[5]	Ammonia, Nitrate/
	Nitrite
		4B[2], 5, 6, 7	- Atmospheric deposition
			- Leaf litter and debris
			- Runoff from over-fertilized landscaping
			- Improper storage or disposal of fertilizers and ammonia
			- Soil concentrations
			- Leaking septic systems
			- Groundwater concentrations
			- Industrial and commercial sources including:
			  - Landscaping businesses
			  - Nurseries

Salts	Chloride, TDS	4B[2], 5, 6, 7	- Naturally occurring salts in water supply - Saltwater swimming pool discharges
Pesticides	Pyrethroids	Bouquet Canyon	- Residential and professional use of pyrethroids as an insecticide, often to control Argentine ants[3]
	Diazinon and chlopyrifos	6	- Professional pesticide applications

Class	Constituent	Reaches/ Waterbodies	MS4 Potential Sources
Metals[2,5]	All (Copper, Iron, Mercury, Selenium, Zinc)	5,6,7	- Atmospheric deposition - Water supply - Commercial and municipal vehicle sources - Gas stations, service stations and car washes - Dealerships - Municipal maintenance and storage yards - Soil concentrations, release of sediment during: - Construction activities - Gravel mining
	Copper	5,6,7	- Automotive sources - Brake pad debris - Vehicle fluids - Wear on vehicle exterior and engine - Tailpipe emissions - Architectural copper - Corrosion of copper pipes - Runoff of atmospheric deposition - Copper-containing pesticides and algaecides - Industrial uses including electroplating, metal finishing and semiconductor manufacturing
	Mercury	5,6,7	- Runoff of atmospheric deposition - Mercury containing products including batteries, dental amalgam, fluorescent lamps, jewelry, paint, thermometers and thermostats - Vehicle sources such as mercury switches and emissions that contribute to atmospheric deposition - Industrial uses including semiconductor manufacturing
	Selenium	6	- Nursery runoff - Groundwater concentrations - Mining and oil extraction
	Zinc	6	- Galvanized metal[4] - Vehicle sources such as tires
Other	Cyanide[6]	7	- Industrial uses including metal finishing, electroplating, plastics manufacturing, animal control and fumigation
Trash	Trash	Lake Elizabeth	- Litter from adjacent areas and roadways - Direct dumping

1. Los Angeles Regional Water Quality Control Board (RWQCB), 2010. Los Angeles River Watershed Bacterial TMDL. Adopted by the RWQCB on July 9, 2010.
2. Reach 4B is located in Ventura County but was considered for the purposes of understanding downstream water quality.
3. Castaic Lake Water Agency (CWLA), 2013. The Santa Clarita Valley 2013 Water Quality Report.
4. Larry Walker Associates (LWA), 2009. Urban Water Quality Management Plan for Copper, Mercury, Nickel, and Selenium in Calleguas Creek Watershed. March 25, 2009.
5. California Stormwater Quality Association (CASQA), 2014. Draft Effectiveness Assessment Guidance. May 2014.
6. California Regional Water Quality Control Board, San Francisco Bay Region, 2006. Staff Report on Proposed Site-Specific Water Quality Objectives for Cyanide for San Francisco Bay. December 4, 2006.

A1-4.2.1 Bacteria

The Santa Clara River Estuary and Reaches 3, 5, 6, and 7 Indicator Bacteria TMDL source assessment states that dry- and wet-weather urban runoff discharges from stormwater conveyances are the most significant sources of bacteria to the Santa Clara River. This conclusion was based on data from storm drains and channels with urban drainage areas showing high levels of bacteria, as compared to data from natural landscapes in the region showing that open space is not a significant source of bacteria. Furthermore, data from the Los Angeles Region demonstrate that bacteria concentrations are significantly higher in urban drainages. Typical sources of bacteria in stormwater include animal wastes from pets, wildlife and birds, trash, direct human discharges, leaking or faulty septic systems and sanitary sewer overflows.[1, 2] Maps produced as part of the City's IC/ID program include reported illicit discharges of sewage and waste water on occasion, which could also be a source of bacteria in stormwater.

A1-4.2.2 Nitrogen Compounds

The Santa Clara River Nitrogen Compounds TMDL found the Saugus and Valencia WRPs to be the principal sources of ammonia, nitrite and nitrate in the Upper Santa Clara EWMP area. Stormwater discharge was identified as a source of nitrogen compounds by the TMDL source analysis along with agricultural runoff and groundwater discharge, however water quality models used in the development of the TMDL demonstrated that discharges from the WRPs were the primary contributors to nutrient loading in comparison to other sources. Sources of nitrogen compounds in stormwater discharge include atmospheric deposition, runoff from fertilized landscaping and nurseries, leaf debris, and improper storage or disposal of fertilizers and ammonia.

Mobilization of sediment containing nitrogen compounds can also be a source of nutrients in stormwater.[2] Disturbance of sediment can occur through landscaping, construction, and other activities. According to information collected during inspections as part of the City's Development Construction Program, violations continue to be found each year for off-site discharge of sediment from constructions sites, though these violations have occurred at a small percentage of inspected sites. A review of maps produced as part of the City's IC/ID program has revealed that illicit connections and discharges of soil, sand and mud are occurring sporadically.

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[1] Los Angeles Regional Water Quality Control Board (RWQCB), 2010. Los Angeles River Watershed Bacteria TMDL. Adopted by the RWQCB on July 9, 2010.

[2] California Stormwater Quality Assocation (CASQA), 2014. Draft Effectiveness Assessment Guidance. May 2014

A1-4.2.3 Salts

The Upper Santa Clara River Chloride TMDL identified Saugus WRP and Valencia WRP as the primary contributors to the chloride loading in Reaches 5 and 6. The two facilities are estimated to contribute about 70% of the chloride load in these Reaches.

Water supply is the primary contributor to chloride and TDS loading from MS4s to the Upper Santa Clara River. Water used for landscape irrigation and other outdoor residential, commercial or industrial uses could be a source of these constituents in MS4 discharges. The Castaic Lake Water Agency (CLWA) is the purveyor of water in urban areas in the Upper Santa Clara River Watershed. According to the Santa Clarita Valley 2013 Water Quality Report, published by CLWA, naturally occurring salts, including chloride, are found in groundwater supplies, which make up approximately 50% of the water supply.[3]

A1-4.2.4 Trash

The Lake Elizabeth Trash TMDL source analysis identifies litter from adjacent land areas, roadways and direct dumping/deposition to be sources of trash for Lake Elizabeth, in addition to point sources such as storm drains.

A1-4.2.5 Metals

Sources of copper, iron, mercury selenium and zinc in the Upper Santa Clara River EWMP area include natural concentrations of metals in soils, construction activities, commercial and industrial sources, and vehicles. Natural metals concentrations or those resulting from groundwater contamination in the water supply may contribute to metals loading to the MS4 from runoff due to outdoor water use. Atmospheric deposition is also a potential contributor to metals loading in urban runoff, and is typically a very significant source of mercury. Products containing metals, industrial, commercial and municipal sources, most notably in the automotive sector, are listed in **Table A1-11.** [4]

Naturally occurring metals in soils and groundwater are a source for most metals in stormwater discharge. Iron exceedances were mostly collected during wet weather events, suggesting that mobilization of sediment containing iron during wet weather runoff is a major source of iron in stormwater discharges. Soils disturbed by construction activities could also be contributing to high levels of metals in MS4 runoff. According to information collected during inspections as part of the City's Development Construction Program, violations continue to be found each year for off-site discharge of sediment from constructions sites, though these violations have occurred at a small percentage of inspected sites.

A review of maps produced as part of the City's IC/ID program has revealed that illicit connections and discharges are present sporadically for certain substances that may contribute to MS4 sources of metals including soil, sand and mud, automotive fluids, and concrete waste.

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[3] Castaic Lake Water Agency (CWLA), 2013. The Santa Clarita Valley 2013 Water Quality Report.

[4] Larry Walker Associates (LWA), 2009. Urban Water Quality Management Plan for Copper, Mercury, Nickel, and Selenium in Calleguas Creek Watershed. March 25, 2009.

Sand and gravel mining activities in the watershed are a potential source of metals discharge due to natural concentrations of metals in sediment. In-river mining activities have been active historically in the Saugus-Newhall production-consumption region (PCR)[5], which is within the EWMP area. In-river aggregate extraction methods increase sediment transport, potentially releasing metals downstream.[6]

A1-4.2.6 Pesticides

Pesticide use in urban areas that can contribute to stormwater concentrations include outdoor pesticide use in structural pest control, landscaping and right-of-way maintenance, biocides in swimming pools, spas, or fountains and preservatives for building materials. Insecticides to control invasive Argentine ants, which are a common pest control problem in Southern California, are typically a major source of pesticides in stormwater.[2,7]

According to findings from the City's Public Agency Activities program, banned pesticides are not stored at or used on any City-owned landscaping or recreational facilities. Additional sources of these pesticides in MS4 discharges are likely minimal as the water quality priorities analysis found that both chlorpyrifos and diazinon in Reach 6 could be removed from the 303(d) List. MS4 sources for remaining toxicity in Reach 6 could be the result of the application of other pesticides that have not been banned, such as pyrethroids.

The stakeholder group has identified pyrethroids in Bouquet Canyon as a water quality priority to be evaluated in the EMWP process. Residential uses of pyrethroids as a pesticide could be a potential source in MS4 discharges. Optional special study monitoring, as outlined in the Coordinated Integrated Monitoring Plan (CIMP), may be conducted to further evaluate sources of pyrethroids in Bouquet Canyon.

A1-4.2.7 Cyanide

Effluent monitoring data from the Saugus WRP, which is upstream of the location where most samples exceeding water quality objectives were collected, demonstrates that cyanide is present in effluent from the plant. In addition, a staff report produced by the San Francisco Regional Water Quality Control Board identified POTWs as a main source of cyanide loading, due to the breakdown of thiocyanate used for industrial gasification processes to free cyanide during the disinfection stages in wastewater treatment. Additional potential sources of cyanide from MS4 discharges are from industrial uses in plastics manufacturing, metal finishing, electroplating, animal control and fumigation.[8]

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[5] The Saugus-Newhall production-consumption region is an area within which gravel is mined and used, classified by the California Geological Survey. One in-river gravel mine was active in the region as of 2005, per the SCREMP.

[6] AMEC Earth and Environmental, 2005. Santa Clara River Enhancement and Management Plan (SCREMP). May 2005.

[7] Wu, Jasmin, 2011. Findings May Control Invasive Argentine Ants in California. The UCSD Guardian. February 17, 2011.

[8] California Regional Water Quality Control Board, San Francisco Bay Region, 2006. Staff Report on Proposed Site-Specific Water Quality Objectives for Cyanide for San Francisco Bay. December 4, 2006.

Concerns with artificial increases in measurements of cyanide concentrations resulting from analytical and preservation methods have been identified by the Los Angeles County Sanitation District (District) and other laboratories. Consequently, some or all of the cyanide exceedances could be the result of these methods. Through a review of the cyanide data used in the analysis of water quality priorities, it was determined that all but one of the samples with exceedances were collected from the MS4 mass emission station and were not analyzed by the District, therefore they were potentially processed using methods that could result in artificially high cyanide concentrations. Implementation of the CIMP will include laboratory methods that address this potential source of contamination to determine if MS4s are contributing to cyanide exceedances in the receiving waters.

A1-4.2.8 Bis (2-ethylhexyl) phthalate

MS4s are not identified as likely sources of bis(2-ethlhexyl)phthalate. Bis(2-ethylhexyl)phthalate is widely known to be potential laboratory contaminant. The most recent exceedances of bis(2-ethylhexyl)pthalate were observed in samples collected in 2003 and 2004, prior to widespread recognition of the potential for laboratory contamination. No exceedances have been observed in the past 10 years, indicating that MS4 discharges are not a likely source of bis(2-ethylhexyl)phthalate.

A1-4.2.9 Modeled Source Loads by Jurisdiction and Land Use

Information from the model developed for the Reasonable Assurance Analysis was utilized as part of the source assessment. Summaries of the relative loading from the various land uses to the EWMP area are provided in the following tables and figures. **Table A1-12** lists the total constituent loads by jurisdiction for the modeled land uses. Following the summary table are a series of pie charts that demonstrate the percent contribution of each of the loads by land use for each jurisdiction.

Table A1-12. Modeled Loadings for Priority Pollutants by Jurisdiction

Jurisdiction	Area for Modeled Land Uses (acres)[1]	Sediment Load (tons/year)	Total Lead (lbs/year)	Total Copper (lbs/year)	Total Zinc (lbs/year)	Fecal coliform (#/year)
City of Santa Clarita	31,997.8	4,077.2	923.2	1,457.8	4,245.2	$8.56x10^{15}$
County of Los Angeles	163,111.1	12,719.6	775.8	1,363.2	3,558.5	$6.56x10^{15}$
Total	*195,108.9*	*16,796.8*	*1,699.0*	*2,820.9*	*7,803.6*	*$1.51x10^{16}$*

1. Land uses considered include: high density residential, low density residential, multi-family residential, commercial, institutional, industrial, transportation, secondary roads, urban grass, agriculture, and vacant land.

The most predominant land uses within the City of Santa Clarita include vacant land, urban grass, high density residential, industrial, secondary roads, and commercial. Within the County's jurisdiction, vacant land, urban grass, and agriculture are the major land use types. All other land uses consist of less than one percent each of the County's land area (**Figure A1-2).**

Sediment loads from developed land uses (with the exception of high density residential) make up a substantially greater proportion of the total load as compared to the land areas they represent (**Figure A1-3).**

Total lead contributions from vacant lands and agriculture are much lower than the proportional area they make up within the City and County's jurisdictions. Within the City, the greatest contributors of total lead include secondary roads (23.2%), urban grass (22.4%), commercial (20.4%), and multi-family residential (11.8%). The County's major lead contributors differ, with 27% of the load coming from urban grass, followed by transportation (22%), commercial (16.3%), and secondary roads (13.9%) (**Figure A1-4).**

The majority of the urbanized land uses contribute significantly more copper, proportionally, than their relative land areas. The greatest contributors of total copper are similar between the City and County. The top three copper contributors within the City are urban grass, secondary roads, and commercial. Within the County, the major copper loads come from urban grass, transportation, and commercial (**Figure A1-5).**

Total zinc loads are spread somewhat evenly across the various land uses, considering their vast differences in total area. For both the City and County, major loadings of zinc come from road/transportation areas, as well as commercial and urban grass (**Figure A1-6).**

Commercial areas are the greatest contributors of fecal coliform within both jurisdictions (**Figure A1-7).** Both low- and high-density residential are the next largest sources for the City of Santa Clarita. As a less developed land area, the County's second and third largest fecal coliform loads come from urban grass and agriculture.

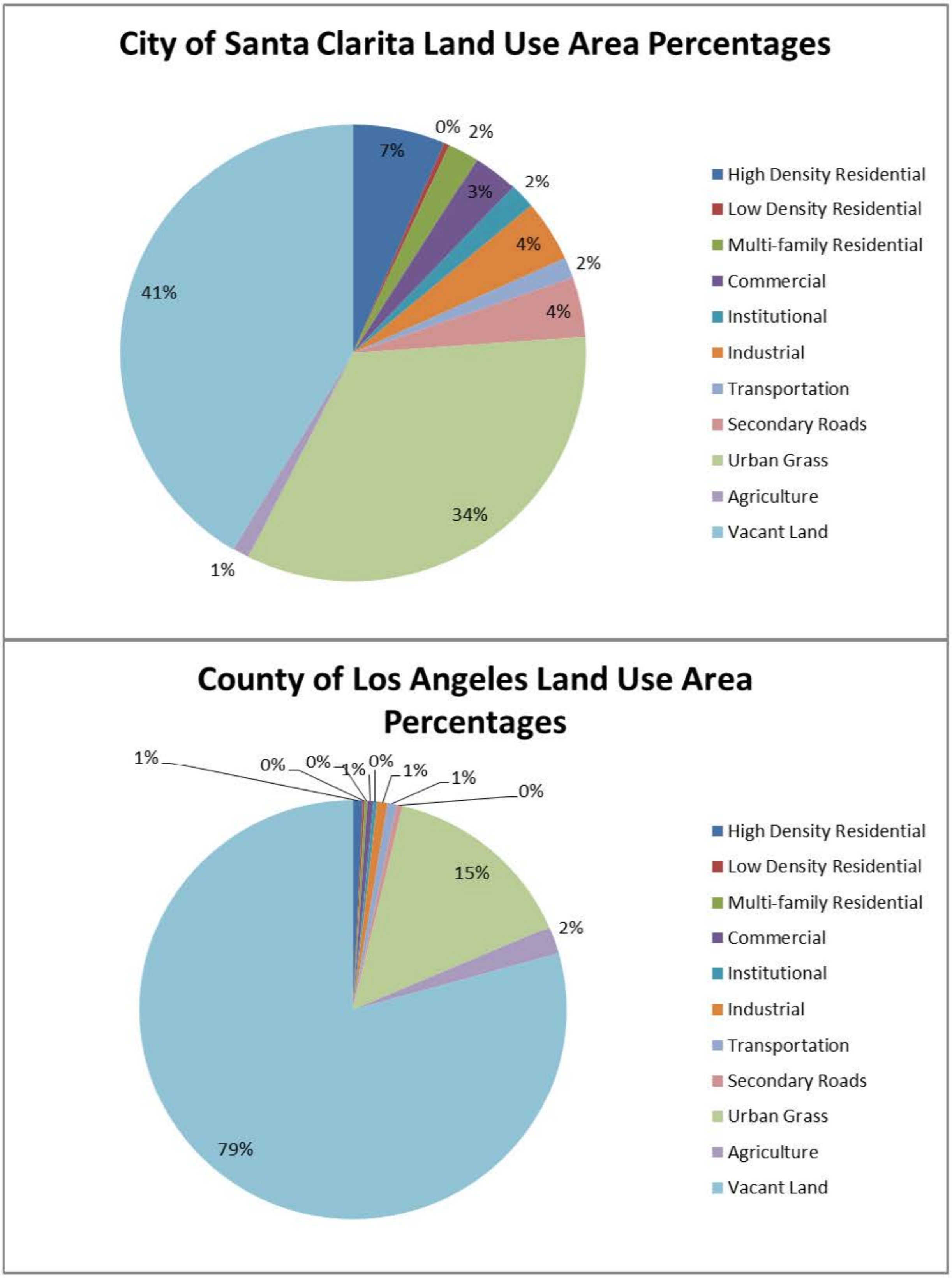


Figure A1-2. Land Use Area Percentages for each Jurisdiction

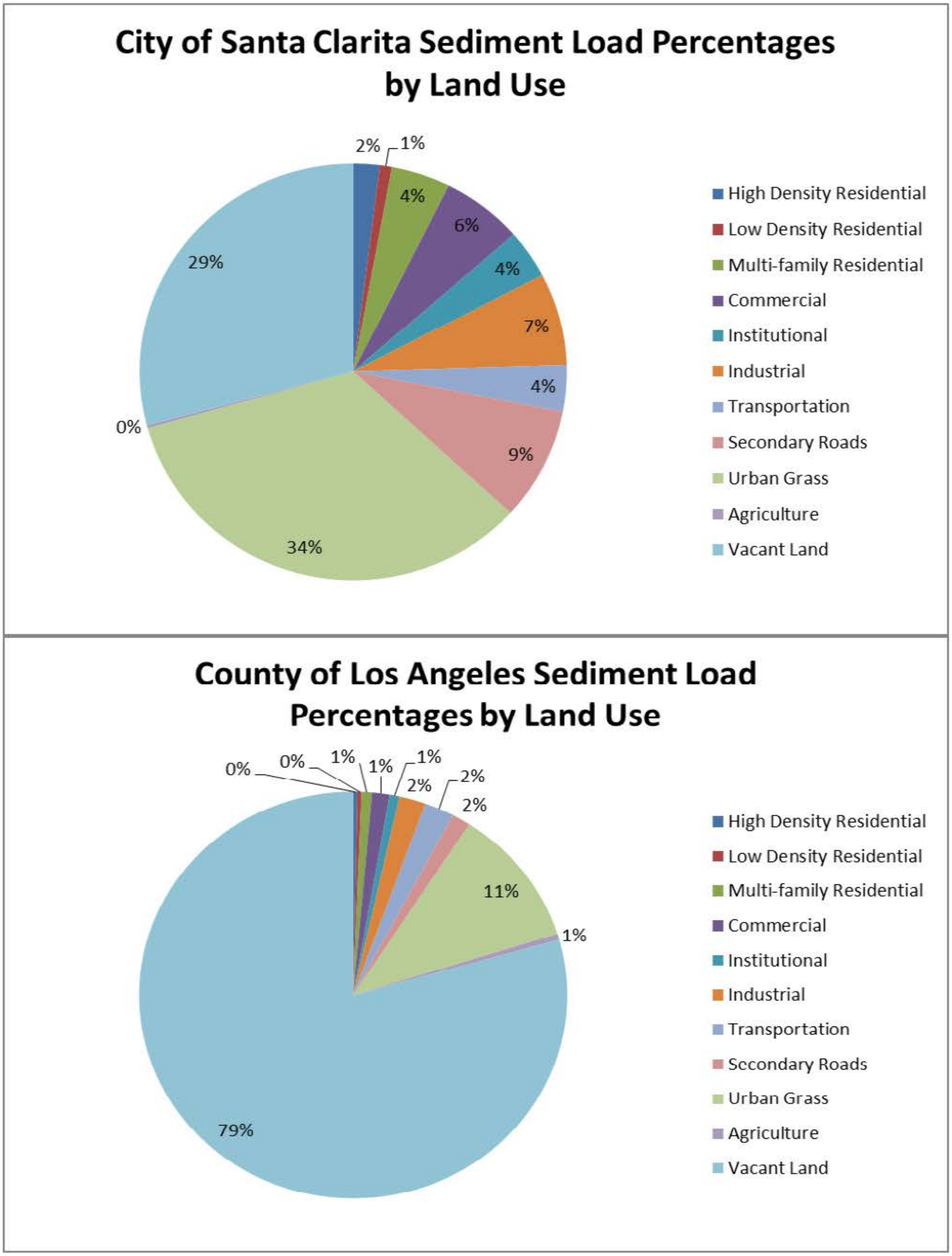


Figure A1-3. Sediment Load Percentages for each Jurisdiction

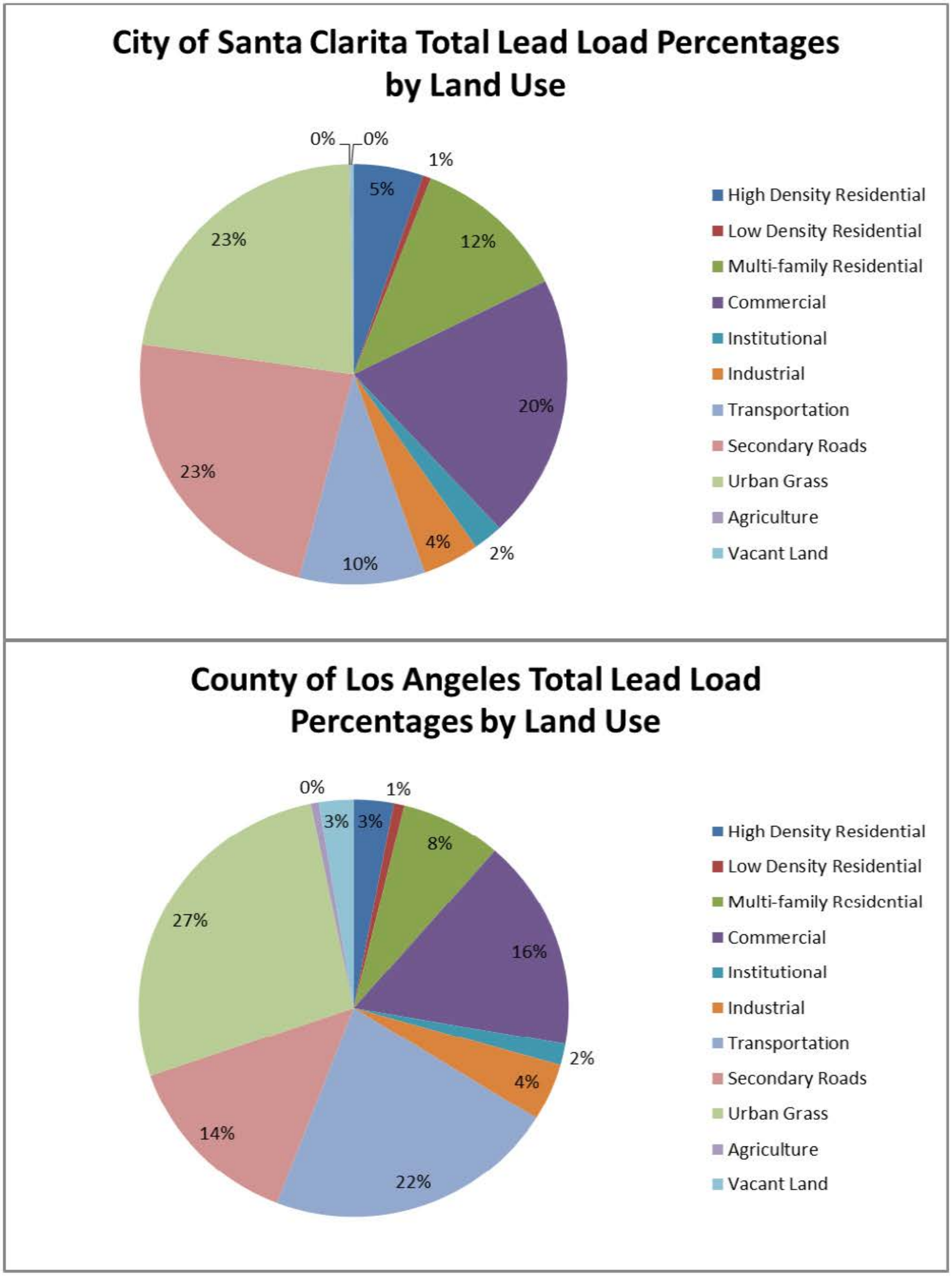


Figure A1-4. Total Lead Load Percentages for each Jurisdiction

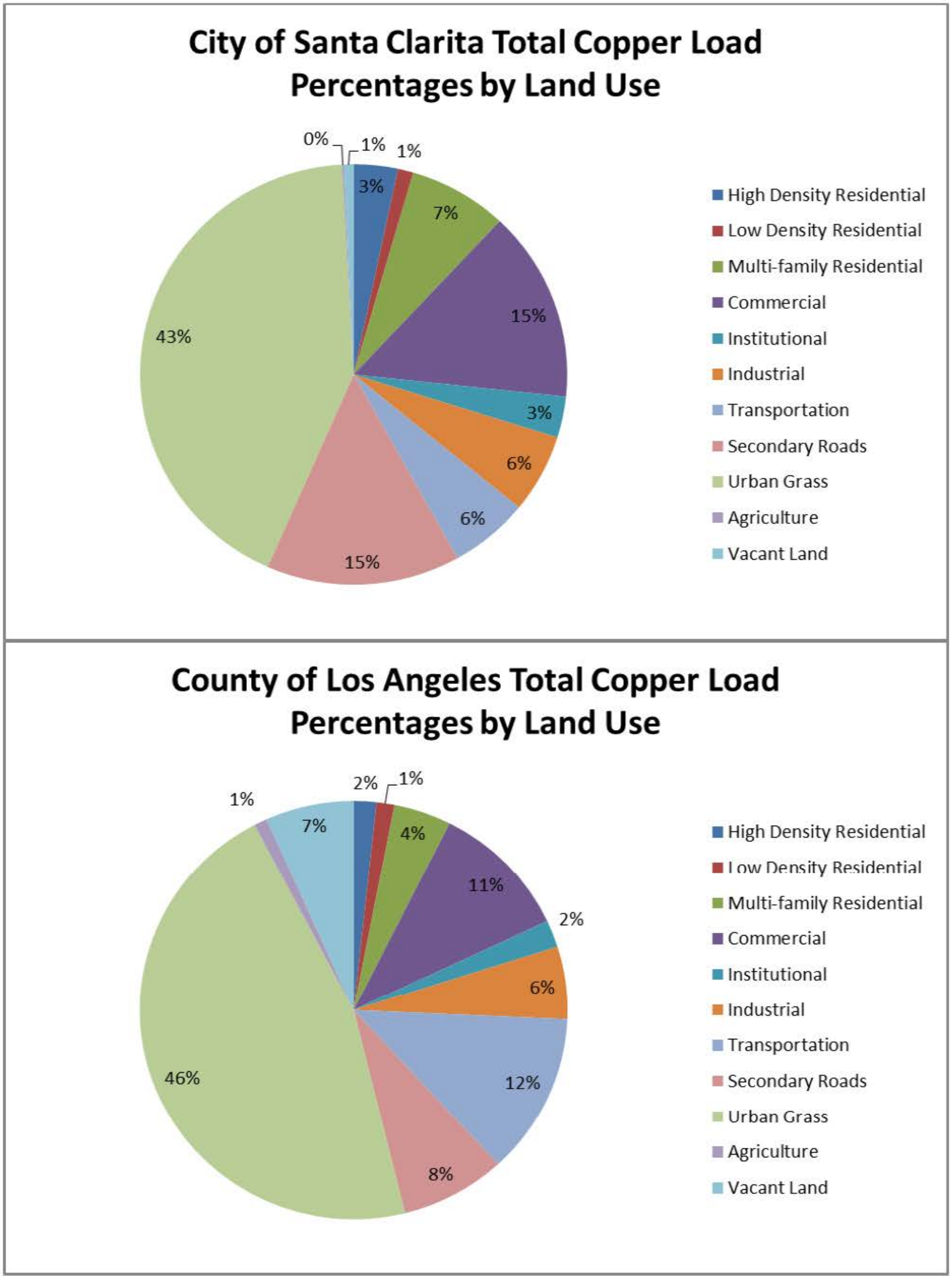


Figure A1-5. Total Copper Load Percentages for each Jurisdiction

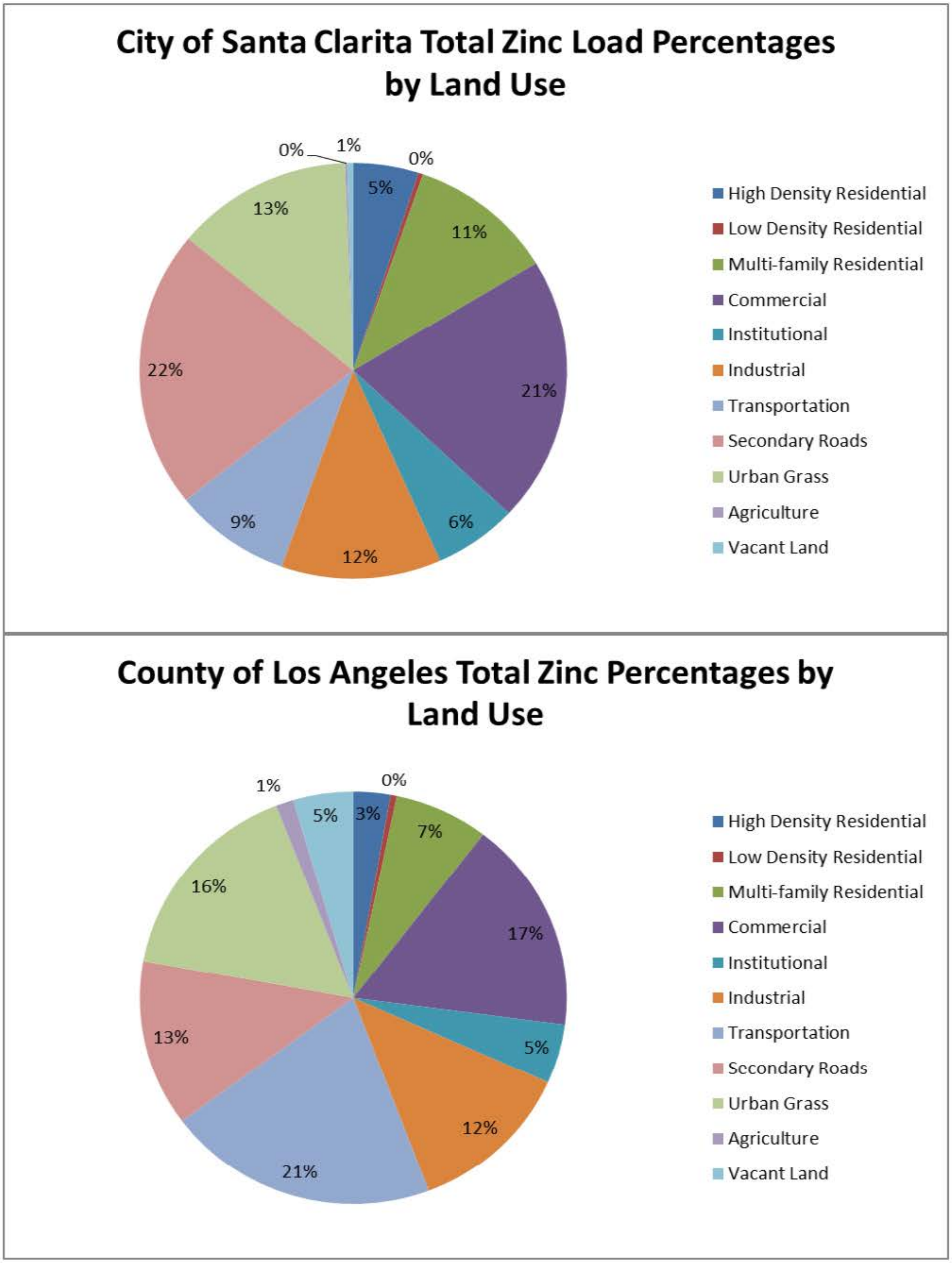


Figure A1-6. Total Zinc Load Percentages for each Jurisdiction

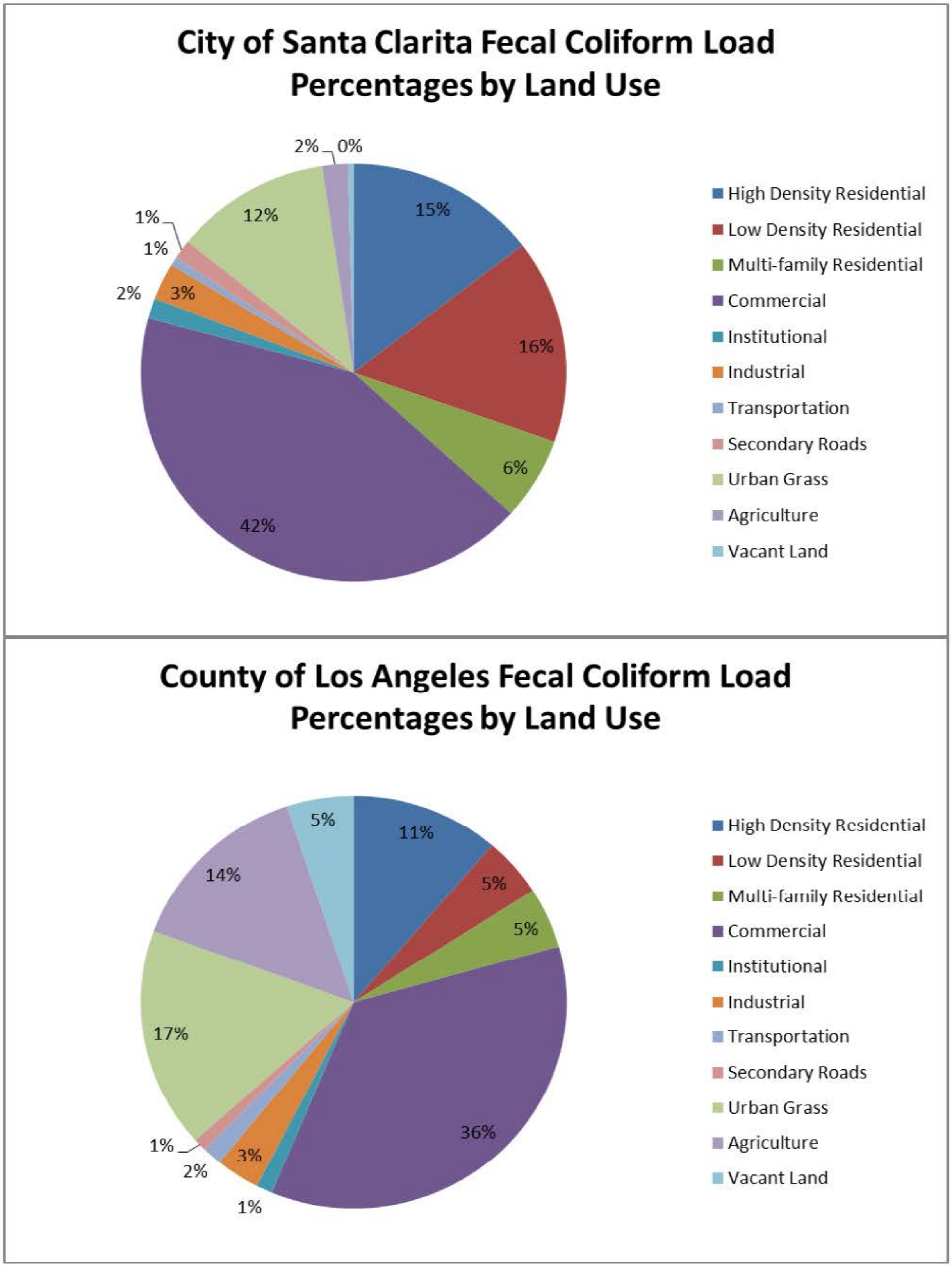


Figure A1-7. Fecal Coliform Load Percentages for each Jurisdiction

A1-4.3 LOCATIONS OF OUTFALLS AND STRUCTURAL CONTROLS

The locations of MS4 major outfalls were considered in the identification of sources of the water quality priorities. A major outfall is defined in Attachment A to the Permit as an outfall that discharges from a pipe with an inside diameter of 36 inches or more. In addition, Attachment A states that, for MS4s that receive stormwater from lands zoned for industrial activity, a major outfall is an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage of 2 acres or more). It is unlikely that there are many instances within the EWMP area where a non-circular outfall drains industrial land uses, and those outfalls were not identified within the EWMP area. The MS4 major outfalls are shown in **Figure A1-8.** There are no structural controls within the EWMP area; thus, structural controls were not taken into consideration.

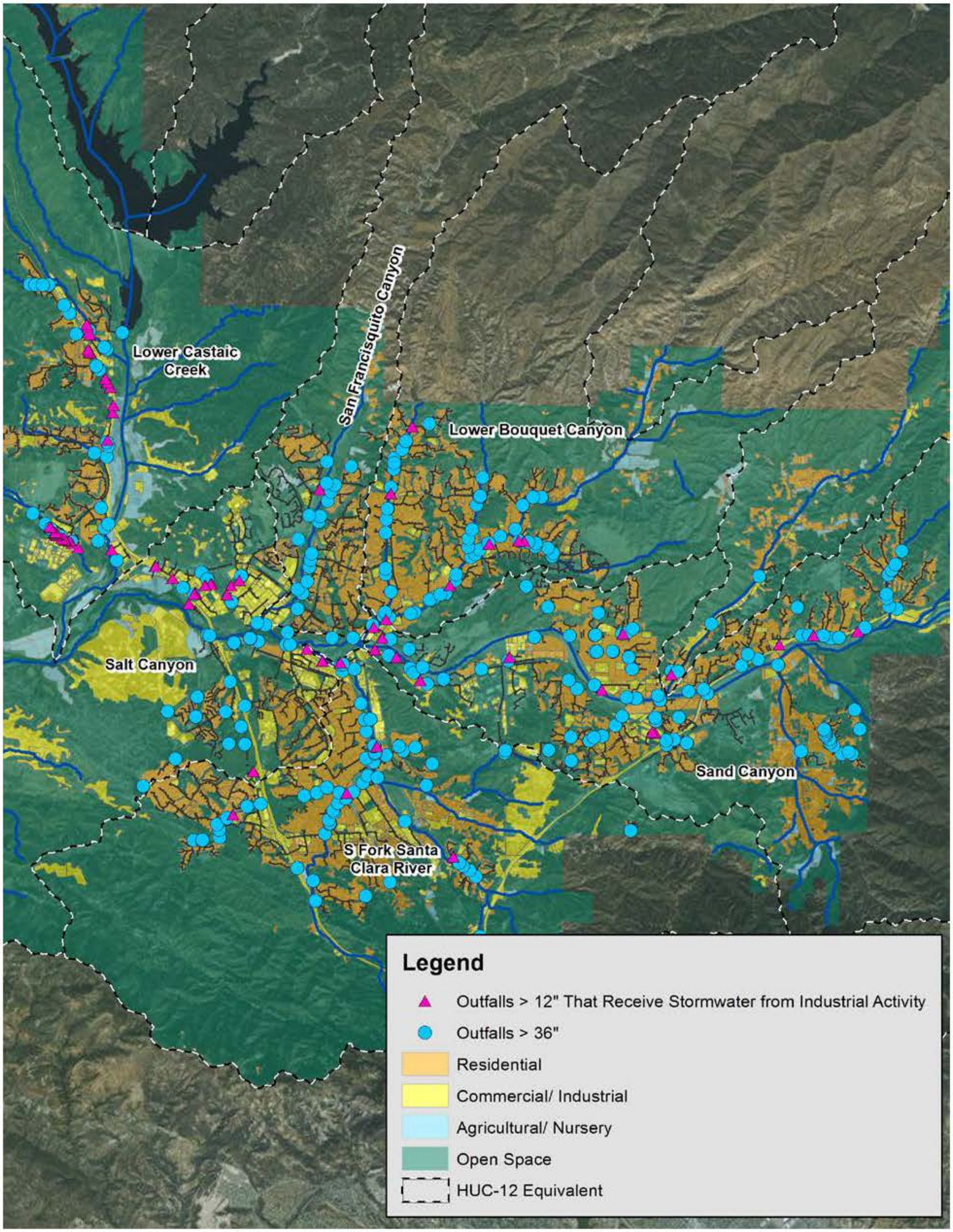


Figure A1-8. Location of MS4 Major Outfalls

A1-5 Waterbody/Pollutant Combination Categorization

Based on the data analysis and source assessment, priority waterbody/pollutant combinations were placed into the categories shown in **Table A1-1.** The water quality priority categorization is shown in **Table A1-13.** As the monitoring progresses, source investigations occur, and BMP implementation begins, constituents may change subcategories. If a constituent that is currently not a priority begins to exceed objectives, then the constituent will be reevaluated using the prioritization procedure.

Table A1-13. Summary of Santa Clara River Watershed Water Body-Pollutant Categories.

Class(1)	Constituent	Santa Clara River Reach				Bouquet Canyon	Lake Elizabeth	Mint Canyon	Piru Creek	Munz Lake	Lake Hughes	Castaic Lake	Pyramid Lake	Los Angeles River
		4B[2]	5	6	7									
Category 1A: WBPCs with past due or current term TMDL deadlines with exceedances in the past 5 years.														
Bacteria	*E. Coli* (dry)[3]	I	I		I									
Salts	Chloride	F	F	F										
Category 1B: WBPCs with TMDL deadlines beyond the current Permit term and with exceedances in the past 5 years.														
Bacteria	*E. Coli* (wet and dry)[3]	F	F		F									
Category 1D: WBPCs with past due or current term deadlines without exceedances in the past 5 years.														
Nutrients	Ammonia	F	F											
	Nitrate and Nitrite	F	F											
Trash	Trash						F							
Bacteria	*E. Coli* (wet and dry)[3]			I/F										
Category 1E: WBPCs with TMDLs for which MS4 discharges are not causing or contributing														
Trash	Trash									TMDL	TMDL			F
Nutrients	Ammonia													F
Nutrients	Nitrate and Nitrite							TMDL[4]						F
Bacteria	E. Coli													I
Metals	Cadmium													I
Metals	Copper													I
Metals	Lead													I
Metals	Selenium													I
Metals	Zinc													I

Class(1)	Constituent	Santa Clara River Reach				Bouquet Canyon	Lake Elizabeth	Mint Canyon	Piru Creek	Munz Lake	Lake Hughes	Castaic Lake	Pyramid Lake	Los Angeles River
		4B[2]	5	6	7									
Category 2A: 303(d) Listed WBPCs with exceedances in the past 5 years.														
Metals	Copper			303 (d)										
	Iron		D	303 (d)										
Metals	Cyanide			L										
Category 2B: 303(d) Listed WBPCs that are not a "pollutant" (i.e., toxicity).														
Toxicity	Toxicity			303 (d)										
Other	pH				L		303(d)							
Other	Eutrophic						303(d)							
Other	Organic Enrichment/Low DO						303(d)							
Category 2C: 303(d) Listed WBPCs without exceedances in past 5 years or that could be delisted.														
Pesticides	Chlorpyrifos			D										
Pesticides	Diazinon			D										
Category 2D: 303(d) Listed WBPCs for which MS4 discharges are not causing or contributing.														
Metals	Mercury											303(d)	303(d)	
Other	Eutrophic									303(d)	303(d)			
Other	Fish Kills										303(d)			
Other	Odor										303(d)			
Other	Algae										303(d)			
Other	pH								303(d)					
Salts	Chloride								303(d)					

Class$^{(1)}$	Constituent	Santa Clara River Reach				Bouquet Canyon	Lake Elizabeth	Mint Canyon	Piru Creek	Munz Lake	Lake Hughes	Castaic Lake	Pyramid Lake	Los Angeles River
		4B^{2}	5	6	7									
Category 3A: All other WBPCs with exceedances in the past 5 years.														
Metals	Copper		X		X									
	Mercury		X	X	X									
	Selenium			X										
	Zinc			X										
Metals	Cyanide				X									
Salts	TDS		X											
Category 3C: All other WBPCs with exceedances in the past 10 years, but without exceedances in past 5 years.														
Phthalates	Bis-2 Ethylhexyl phthalate			X										
Category 3D: Other EWMP Priorities														
Pesticides	Pyrethroids					X								

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 Watershed Management Program for the TMDL.
2. Reach 4B is located in Ventura County but was considered for the purposes of understanding downstream water quality.
3. Interim limits for dry *E. Coli* during permit term, interim limits for wet *E. Coli* past permit term, final limits for dry and wet past permit term.
4. Mint Canyon is included in the Nutrients TMDL, but no WLAs for MS4 discharges are assigned for the reach in the TMDL.

I=Interim TMDL WQBEL or Receiving Water Limit

F=Final TMDL WQBEL or Receiving Water Limit

D=303(d) listing that could now be delisted and has no exceedances in last 5 years

303(d)=Confirmed 303(d) Listing

L=WBPC that meets the listing criteria, but is not currently on the 303(d) list

TMDL=TMDL that does not contain MS4 allocations for the reach

Other=used for conditions (pH and dissolved oxygen) that are not pollutants.

A1-6 Prioritization

Based on the WBPC categorization and the source analysis, water quality priorities were identified in accordance with the permit. Section VI.C.5.a.iv of the Permit identifies the minimum priorities to be considered for the first permit term (2012 to 2017) covered by the EWMP. The minimum priorities are:

- **Priority 1 (TMDLs):** TMDLs for which there are WQBELs and/or RWLs with interim or final compliance deadlines within the Permit term, or TMDL compliance deadlines that have already passed and limitations have not been achieved. This priority corresponds to WBPC categories 1A.
- **Priority 2 (Other Receiving Water Considerations):** WBPCs where data indicate impairment or exceedances of RWLs in the receiving water and the findings from the source assessment implicate discharges from the MS4. This priority corresponds to WBPC categories 2A and 3A.

In addition to the two priorities identified in the permit, Category 1B, TMDLs with deadlines beyond the current permit term was determined to be a priority for the USCR EWMP group and are considered Priority 1. The prioritized WBPCs are shown in **Table A1-14.**

Table A1-14. Prioritized WBPCs

Class	Constituent	Santa Clara River Reach			
		4B[1]	5	6	7
Priority 1: TMDLs					
Bacteria	*E. Coli* (wet and dry)	X	X	X	X
Salts	Chloride	X	X	X	
Priority 2: Other Receiving Water Considerations					
Metals	Copper		X[2]	X	X[4]
	Iron		X	X	
	Mercury		X[2]	X[3]	X[4]
	Zinc			X[3]	
Selenium	Selenium			X[3]	
Cyanide	Cyanide			X[3]	X[4]
Salts	TDS		X[2]		

7. Reach 4B is in Ventura County but was considered for the purposes of understanding downstream water quality.
8. Copper, mercury and TDS have been observed as exceeding applicable water quality objectives in Reach 5, and are prioritized as “other receiving water considerations” per Permit Provision 5.a.iv.2.a.
9. Mercury, zinc, selenium and cyanide have been observed as exceeding applicable water quality objectives in Reach 6, and are prioritized as “other receiving water considerations” per Permit Provision 5.a.iv.2.a.
10. Copper, mercury and cyanide have been observed as exceeding applicable water quality objectives in Reach 7, and are prioritized as “other receiving water considerations” per Permit Provision 5.a.iv.2.a.

Categories without recent exceedances and WBPCs located in areas where MS4s are not a source contributing to the exceedances (categories 1D, 1E, 2C, 2D, 3C) are not considered to be priorities for the EWMP. Constituents within these categories have not had exceedances within the past 5 years, and are considered to be no longer exceeding water quality objectives, or MS4s were determined to not be the source because the exceedances occur in areas where there are no MS4s. However, the RAA analysis addresses all of the WBPCs for which MS4s are contributing

(1D, 2C, 3C and 3D) and demonstrates they will likely be addressed by the control measures identified for the prioritized constituents. Additionally, the constituents contributing to the impairments in Category 2B (e.g. toxicity, organic enrichment, etc.) are not yet identified and therefore cannot be specifically evaluated in the RAA analysis. As noted in the source assessment, controlling constituents identified as water quality priorities, such as pesticides and nutrients, may also contribute to reducing the Category 2B impairments and the EWMP is focused on addressing the constituents identified in the other categories. If the impairments continue after the other water quality priorities are addressed, further investigation will be conducted to identify control measures to address the continued impairment.

Attachment A. Non-Priority Not Detected Constituents

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethylene
1,2,3,4,7,8-HxCDD
1,2,3,7,8,9-HxCDD
1,2,3,7,8,9-HxCDF
1,2,3,7,8-PeCDD
1,2,3,7,8-PeCDF
1,2,4,5-Tetrachlorobenzene
1,2,4-Trichlorobenzene
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2-Diphenylhydrazine
1,2-Trans-Dichloroethylene
1,3-Dichlorobenzene
1,3-trans-Dichloropropene
1-Chloronaphthalene
1-Naphthylamine
2,3,4,6,7,8-HxCDF
2,3,4,6-Tetrachlorophenol
2,3,4,7,8-PeCDF
2,3,7,8-TCDD (Dioxin)
2,4,5-T
2,4,5-TP
2,4,5-Trichlorophenol
2,4-D
2,4-DB
2,4'-DDD
2,4'-DDE
2,4'-DDT
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dichlorophenol
2,6-Dinitrotoluene
2-Chloroethylvinyl Ether
2-Chloronaphthalene
2-Chlorophenol
2-Methyl-4,6-Dinitrophenol
2-Methylphenol
2-Naphthylamine
2-Nitroaniline
2-Picoline
3,3'-Dichlorobenzidine
3-Methyl-4-Chlorophenol
3-Methylcholanthrene
3-Nitroaniline
4,4'-DDD
4,4'-DDE
4,4'-DDT
4-Aminobiphenyl
4-Bromophenyl Phenyl Ether
4-Chlorophenyl Phenyl Ether
4-Methylphenol
4-Nitroaniline
4-Nitrophenol
7,12-Dimethylbenz(a)anthracene
a-,a-Dimethylphenethylamine
Acenaphthylene
Acetophenone
Acrolein
Acrylonitrile
Aldrin
alpha-BHC
alpha-Endosulfan
Aniline
Anthracene
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Atrazine
Bentazon
Benzene
Benzidine
Benzo(a)Anthracene
Benzo(a)Pyrene
Benzo(b)Fluoranthene
Benzo(ghi)Perylene
Benzoic Acid
Benzyl Alcohol
beta-BHC
beta-Endosulfan
Bis(2-chloroethoxy)Methane
Bis(2-chloroethyl)Ether
Bis(2-chloroisopropyl)Ether
Carbofuran
Carbon Tetrachloride
Carbonate
Chlordane (Technical)
Chlordane-alpha
Chlordane-gamma
Chlordanes
Chloroaniline
Chlorobenzene
Chloroethane
cis-1,3-Dichloropropylene
Cyanazine
Dalapon
delta-BHC
Dibenz(a,j)acridine
Dicamba
Dieldrin
Dimethyl Phthalate
Di-n-Octyl Phthalate
Dinoseb
Diphenylamine
Diuron
Endosulfan Sulfate
Endosulfans
Endrin
Endrin Aldehyde
Endrin ketone
Ethyl methanesulfonate
Ethylbenzene
Fluorene
gamma-BHC (Lindane)
Heptachlor
Heptachlor Epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Malathion
MCPA
MCPP
Methoxychlor
Methyl Bromide
Methyl methanesulfonate
Methylene Chloride
Molinate
MTBE
Naphthalene
NID
N-Nitrosodibutylamine
N-Nitrosodimethylamine
N-Nitrosodi-n-Propylamine
N-Nitrosodiphenylamine
N-Nitrosopiperidine
Pentachlorophenol
Phenacetin
Picloram
Prometryn
Pronamide
Simazine
Tetrachloroethylene
Thiobencarb
Toxaphene
Trichloroethylene
Vinyl Chloride

Attachment B. Detected Non-Priority Constituents with No Exceedences

Constituents in this attachment either did not exceed a water quality objective or there is no applicable water quality objective for the constituent.

1,2,3,4,6,7,8-HpCDD
1,2,3,4,6,7,8-HpCDF
1,2,3,4,7,8,9-HpCDF
1,2,3,4,7,8-HxCDF
1,2,3-Trichloropropane
1,4-Dioxane
2,3,7,8-TCDF
2-Nitrophenol
Alkalinity
Aluminum
Antimony
Arsenic
Barium
Benzo(k)Fluoranthene
Beryllium
Bicarbonate
BOD
Boron
Bromoform
Butylbenzyl Phthalate
Cadmium
Calcium
Chlorine (Total Residual)
Chlorodibromomethane
Chloroform
Chlorophyll
Chromium (Total)
Chromium (III)
Chromium (VI)
COD
Conductivity
Dibenzo(a,h)Anthracene
Dichlorobromomethane
Diethyl Phthalate
Di-n-Butyl Phthalate
Dissolved Organic Carbon
Fecal Coliform
Fecal Enterococcus
Fecal Streptococcus
Fluoranthene
Fluoride
Glyphosate
Hardness
Indeno(1,2,3-cd)Pyrene
Isophorone
Magnesium
Manganese
MBAS
Methyl Chloride
Nitrobenzene
OCDD
OCDF
Oil + Grease
Organic Nitrogen
Ortho Phosphate (as PO4)
Perchlorate
Perylene
Phenanthrene
Phenol
Phenols (Total)
Phosphate (Total)
Phosphorus
Potassium
Pyrene
Silver
Sodium
Specific Conductivity
Sulfate
Thallium
Toluene
Total Kjeldahl Nitrogen
Total Organic Carbon
Total Settleable Solids
TPH
TSS
Turbidity
Volatile Suspended Solids

Attachment C. Summary Stats

	WATERBODY: Santa Clara River Reach 4B																	
	Ammonia as N			**Chloride**			**Dissolved Oxygen**			**Nitrate as N**			**Nitrite as N**			**Nitrate as N + Nitrite as N**		
	Category 1D			**Category 1A**						**Category 1D**			**Category 1D**			**Category 1D**		
	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All
STATISTICS	Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: µg/L			Source: DAT Units: mg/L		
N	37	4	41	134	14	148	143	15	158	23	3	26	23	3	26	23	3	26
% detect	3%	0%	2%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%
Average	--	--	--	111.92	106.66	111.42	9.04	9.16	9.05	1.76	1.87	1.78	0.020	--	0.019	1.77	1.87	1.78
Median	--	--	--	115	107.5	114	8.9	9.2	8.9	1.9	2.13	1.93	0.015	--	0.015	1.93	2.13	1.95
10th	--	--	--	95.57	93.94	95.36	8.01	8.27	8.04	1.00	0.91	1.02	0.012	--	0.012	1.00	0.91	1.03
25th	--	--	--	102.62	99.61	102.31	8.46	8.67	8.49	1.27	1.25	1.29	0.015	--	0.014	1.28	1.25	1.30
75th	--	--	--	120.22	113.47	119.60	9.44	9.63	9.58	2.17	2.55	2.17	0.022	--	0.021	2.18	2.55	2.18
90th	--	--	--	129.10	120.31	128.31	10.12	10.10	10.11	2.76	3.52	2.74	0.027	--	0.025	2.77	3.52	2.76
Max	0.142	--	0.142	135	120	135	12.3	10.6	12.3	2.76	2.34	2.76	0.059	--	0.059	2.80	2.34	2.80
Stats Approach	Excel	--	Excel	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	Excel	--	Excel	ROS	ROS	ROS
% REDUCTIONS																		
WQO	pH Dependent Criteria			100	100	mg/L	>5	>5	mg/L	--	--	--	--	--	--	5	5	mg/L
Source	Basin Plan WQO			Upper Santa Clara Chloride TMDL			Basin Plan WQO			Nitrate as N + Nitrite as N is evaluated for compliance.						Basin Plan WQO		
% from Median				13%	7%	12%										-159%	-135%	-157%
% from Average				11%	6%	10%										-182%	-167%	-180%
% from 75th				17%	12%	16%										-129%	-96%	-129%
% from 90th				23%	17%	22%										-80%	-42%	-81%
% from Max				26%	17%	26%										-79%	-114%	-79%

	WATERBODY: Santa Clara River Reach 5																	
	Ammonia as N **Category 1D**			**Chloride** **Category 1A**			**Copper** **Category 3A**			**E. Coli** **Category 1A**			**Iron** **Category 2A**			**Mercury** **Category 3A**		
	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All
STATISTICS	Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: µg/L			Source: DAT Units: MPN/100mL			Source: DAT Units: µg/L			Source: DAT Units: µg/L		
N	52	462	514	476	49	525	191	24	215	468	48	516	191	24	215	190	24	214
% detect	50%	38%	39%	100%	100%	100%	100%	100%	100%	87%	94%	88%	95%	88%	94%	46%	33%	44%
Average	0.25	0.29	0.28	110.33	108.39	110.15	2.85	2.91	2.85	114.14	127.74	115.41	392.07	552.80	410.01	0.015	0.017	0.014
Median	0.10	0.23	0.22	110	108	110	2.38	2.54	2.42	32.44	50.33	33.80	44	32.7	43.8	0.012	0.02	0.012
10th	0.05	0.10	0.09	96.31	94.23	96.15	1.33	1.27	1.33	4.91	8.21	5.15	6.85	2.96	6.33	0.007	--	0.007
25th	0.08	0.15	0.14	102.45	100.45	102.28	1.77	1.76	1.77	12.01	19.38	12.56	18.06	11.72	17.35	0.009	--	0.009
75th	0.32	0.36	0.35	117.55	115.81	117.36	3.33	3.63	3.35	87.61	130.75	90.94	155.93	250.30	162.96	0.017	--	0.016
90th	0.59	0.55	0.55	125.05	123.46	124.85	4.43	5.03	4.46	214.22	308.71	221.63	411.37	992.47	446.53	0.022	--	0.021
Max	0.73	1.07	1.07	137	134	137	27	10.7	27	16000	1100	16000	21600	7300	21600	0.09	0.02	0.09
Stats Approach	Excel	Excel	Excel	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	Excel	ROS
% REDUCTIONS																		
WQO	5.2	5.2	mg/L	100	100	mg/L	Hardness Based Criteria			235	235	MPN/ 100mL	1000	1000	mg/L	0.051	0.051	µg/L
Source	SCR Nitrogen Compounds TMDL			Upper SCR Chloride TMDL			CTR Aquatic Life			SCR Indicator Bacteria TMDL			EPA Criteria			CTR Human Health Organism		
% from Median	-5023%	-2150%	-2275%	9%	7%	9%				-624%	-367%	-595%	-2173%	-2958%	-2183%	-313%	-155%	-320%
% from Average	-1976%	-1682%	-1732%	9%	8%	9%				-106%	-84%	-104%	-155%	-81%	-144%	-251%	-205%	-261%
% from 75th	-1528%	-1326%	-1367%	15%	14%	15%				-168%	-80%	-158%	-541%	-300%	-514%	-202%	--	-212%
% from 90th	-788%	-846%	-851%	20%	19%	20%				-10%	24%	-6%	-143%	-1%	-124%	-128%	--	-139%
% from Max	-613%	-386%	-386%	27%	25%	27%				99%	79%	99%	95%	86%	95%	43%	-155%	43%

	WATERBODY: Santa Clara River Reach 5 (Cont.)											
	Nitrate as N			**Nitrite as N**			**Nitrate as N + Nitrite as N**			**Total Dissolved Solids**		
	Category 1A			**Category 1A**			**Category 1A**			**Category 3A**		
	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All
STATISTICS	Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: mg/L		
N	467	49	516	467	49	516	467	49	516	113	12	125
% detect	100%	100%	100%	78%	84%	79%	100%	100%	100%	100%	100%	100%
Average	2.28	2.30	2.29	0.06	0.06	0.06	2.34	2.36	2.34	804.54	782.17	802.39
Median	2.29	2.27	2.29	0.06	0.07	0.06	2.35	2.32	2.34	802	779	800
10th	1.60	1.52	1.59	0.03	0.03	0.03	1.64	1.55	1.63	675.59	627.92	672.45
25th	1.86	1.82	1.86	0.04	0.04	0.04	1.91	1.86	1.91	730.85	693.41	728.08
75th	2.63	2.69	2.63	0.08	0.08	0.08	2.69	2.77	2.70	870.36	864.42	868.70
90th	3.06	3.22	3.08	0.11	0.11	0.11	3.14	3.31	3.15	941.54	954.57	940.56
Max	4.85	3.46	4.85	0.2	0.132	0.2	4.94	3.59	4.94	1150	954	1150
Stats Approach	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS
% REDUCTIONS												
WQO	--	--	--	--	--	--	5	5	mg/L	1000	1000	1000
Source	Nitrate as N + Nitrite as N is evaluated for compliance.						Basin Plan WQO			EPA Criteria		
% from Median							-113%	-116%	-114%	-25%	-28%	-25%
% from Average							-113%	-112%	-113%	-24%	-28%	-25%
% from 75th							-86%	-81%	-85%	-15%	-16%	-15%
% from 90th							-59%	-51%	-59%	-6%	-5%	-6%
% from Max							-1%	-39%	-1%	13%	-5%	13%

	WATERBODY: Santa Clara River Reach 6																	
	Ammonia as N Category 1D			Chloride Category 1A			Copper Category 2B			Cyanide Category 2A			Diazinon Category 2C			E. Coli Category 1A		
	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All
STATISTICS	Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: µg/L			Source: DAT Units: µg/L			Source: DAT Units: µg/L			Source: DAT Units: MPN/100mL		
N	196	59	255	298	72	370	68	78	146	59	42	101	33	39	72	156	16	172
% detect	0.8061224	0.7118644	0.7843137	100%	100%	100%	94%	91%	92%	54%	48%	51%	3%	26%	15%	15%	19%	16%
Average	0.9253005	0.4673385	0.7997412	117.71	76.63	109.72	6.76	18.72	13.11	2.95	18.94	9.65	0.012	0.04	0.027	3.14	1.15	2.96
Median	0.99	0.20	0.90	117	93.65	114	6.64	10.65	7.19	2.46	4.17	3.12	0.005	0.0019	0.005	1	1	1
10th	0.54	0.05	0.29	98.78	20.43	64.94	1.96	2.97	2.01	1.13	1.02	1.04	0.002	0.0003	0.001	0.68	0.77	0.69
25th	0.67	0.11	0.43	106.80	33.73	80.43	3.11	5.66	3.81	1.64	1.99	1.75	0.003	0.0003	0.003	0.88	0.91	0.89
75th	1.09	0.58	0.99	127.03	102.83	129.36	8.68	23.79	15.85	3.70	8.74	5.56	0.015	0.01	0.018	1.58	1.31	1.55
90th	1.36	1.22	1.45	137.34	169.81	160.21	13.78	17.01	30.10	5.33	17.01	9.36	0.029	0.09	0.041	2.06	1.55	2
Max	1.80	1.44	1.80	151	137	151	33.5	91.3	91.3	12	594	594	0.023	0.43	0.43	240	2	240
Stats Approach	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	Excel	ROS	Excel	Excel	Excel	Excel
% REDUCTIONS																		
WQO	pH Dependent Criteria			100	100	mg/L	Hardness Based Criteria			5.2	22	µg/L	0.17	0.17	µg/L	235	235	MPN/ 100mL
Source	Basin Plan WQO			Upper SCR Chloride TMDL			CTR Aquatic Life			CTR CCC/CMC			EPA Aquatic Life CCC			SCR Indicator Bacteria TMDL		
% from Median				15%	-7%	12%				-112%	-428%	-67%	-3300%	-8847%	-3300%	-23400%	-23400%	-23400%
% from Average				15%	-30%	9%				-76%	-16%	46%	-1320%	-345%	-528%	-7374%	-20335%	-7843%
% from 75th				21%	3%	23%				-41%	-152%	6%	-1039%	-1600%	-860%	-14757%	-17775%	-15025%
% from 90th				27%	41%	38%				3%	-29%	44%	-478%	-89%	-314%	-11333%	-15059%	-11653%
% from Max				34%	27%	34%				57%	96%	99%	-639%	60%	60%	2%	-11650%	2%

	WATERBODY: Santa Clara River Reach 6 (Cont.)																	
	Iron Dissolved Category 2A			Iron Total Category 2A			Mercury Category 3A			Nitrate as N Category 1D			Nitrite as N Category 1D			Nitrate as N + Nitrite as N Category 1D		
	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All
STATISTICS	Source: DAT Units: µg/L			Source: DAT Units: µg/L			Source: DAT Units: µg/L			Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: mg/L		
N	85	45	130	22	39	61	66	72	138	182	59	241	182	57	238	182	59	241
% detect	71%	73%	72%	77%	100%	92%	21%	3%	12%	98%	86%	95%	98%	49%	77%	0.98	0.88	0.96
Average	24.19	889.99	326.52	926.13	14410.49	9547.19	0.017	0.282	0.225	3.99	2.06	3.53	0.07	0.08	0.07	4.06	2.13	3.59
Median	14.29	132.25	31.99	124	7000	1720	0.011	0.449	0.05	4.14	1.4	3.01	0.06	0.03	0.06	4.21	1.44	3.06
10th	6.36	6.72	3.59	26.86	644.52	74.42	0.004	0.05	0.019	2.28	0.41	1.42	0.03	0.03	0.02	2.34	0.41	1.44
25th	9.33	27.57	10.12	62.88	1799.54	314.68	0.007	0.09	0.042	2.88	0.73	2.03	0.04	0.01	0.04	2.94	0.75	2.06
75th	21.88	634.51	101.09	416.39	17622.69	7750.03	0.02	0.32	0.246	4.81	2.67	4.47	0.08	0.08	0.09	4.88	2.79	4.56
90th	32.10	2602.52	284.74	974.91	49203.68	32769.35	0.03	0.58	0.545	6.06	4.78	6.39	0.11	0.20	0.13	6.13	5.05	6.53
Max	626	12700	12700	15160	68800	68800	0.201	0.5	0.5	7.31	6.29	7.31	0.6	1	1	7.408	6.48	7.408
Stats Approach	ROS	ROS	ROS	ROS	ROS	ROS	ROS	Excel	Excel	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS	ROS
% REDUCTIONS																		
WQO	1000	1000	1000	1000	1000	1000	0.051	0.051	µg/L	--	--	--	--	--	--	5	5	mg/L
Source	EPA Criteria			EPA Criteria			CTR Human Health Organism			Nitrate as N + Nitrite as N is evaluated for compliance						Basin Plan WQO		
% from Median	-6898%	-656%	-3026%	-706%	86%	42%	-349%	89%	-2%							-19%	-247%	-63%
% from Average	-4033%	-12%	-206%	-8%	93%	90%	-208%	82%	77%							-23%	-135%	-39%
% from 75th	-4471%	-58%	-889%	-140%	94%	87%	-172%	84%	79%							-3%	-79%	-10%
% from 90th	-3015%	62%	-251%	-3%	98%	97%	-74%	91%	91%							18%	1%	23%
% from Max	-60%	92%	92%	93%	99%	99%	75%	90%	90%							33%	23%	33%

	WATERBODY: Santa Clara River Reach 6 (Cont.)		
	Selenium **Category 3A**		
	Dry	Wet	All
STATISTICS	Source: DAT Units: µg/L		
N	68	74	142
% detect	91%	35%	62%
Average	1.99	1.14	1.59
Median	1.37	0.87	1.10
10th	0.42	0.31	0.35
25th	0.74	0.51	0.60
75th	2.53	1.50	2.01
90th	4.40	2.44	3.45
Max	6.78	4.62	12
Stats Approach	ROS	ROS	ROS
% REDUCTIONS			
WQO	5	--	µg/L
Source	CTR Aquatic Life CCC		
% from Median	-266%		-354%
% from Average	-151%		-215%
% from 75th	-98%		-149%
% from 90th	-14%		-45%
% from Max	26%		58%

	WATERBODY: Santa Clara River Reach 7														
	Ammonia as N Category 1D			**Chloride Category 1A**			**Copper Category 3A**			**E. Coli Category 1A**			**Mercury Category 3A**		
	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All
STATISTICS	Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: µg/L			Source: DAT Units: MPN/100mL			Source: DAT Units: µg/L		
N	7	2	9	7	2	9	2	--	2	7	2	9	2	--	2
% detect	86%	50%	78%	100%	100%	100%	100%	--	100%	1	1	1	100%	--	100%
Average	0.16	--	0.15	34.64	--	41.02	--	--	--	5783	--	4713	--	--	--
Median	0.16	--	0.14	28.5	--	36	--	--	--	1300	--	1300	--	--	--
10th	0.11	--	0.09	15.05	--	16.26	--	--	--	175.05	--	158.53	--	--	--
25th	0.13	--	0.11	21.19	--	23.72	--	--	--	537.76	--	455.82	--	--	--
75th	0.19	--	0.18	45.31	--	54.91	--	--	--	6512.13	--	4764.82	--	--	--
90th	0.23	--	0.23	63.80	--	80.11	--	--	--	20005.48	--	13700.24	--	--	--
Max	0.22	0.11	0.22	78	78.4	78.4	171	--	171	30000	1700	30000	0.26	--	0.26
Stats Approach	ROS	--	ROS	ROS	ROS	ROS	ROS	--	ROS	ROS	ROS	ROS	ROS	--	ROS
% REDUCTIONS															
WQO	pH Dependent Criteria			100	100	mg/L	Hardness Based Criteria			235	235	MPN/ 100mL	0.051	0.051	ug/L
Source	Basin Plan WQO			Upper SCR Chloride TMDL			CTR Aquatic Life			SCR Indicator Bacteria TMDL			CTR Human Health Organism		
% from Median				-251%		-178%				82%		82%			
% from Average				-189%		-144%				96%		95%			
% from 75th				-121%		-82%				96%		95%			
% from 90th				-57%		-25%				99%		98%			
% from Max				-28%		-28%				99%		99%			

	WATERBODY: Santa Clara River Reach 7 (Cont.)											
	Nitrate as N Category 1D			**Nitrite as N Category 1D**			**Nitrate as N + Nitrite as N Category 1D**			**pH Category 2B**		
	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All
STATISTICS	Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: mg/L			Source: DAT Units: pH Units		
N	7	2	9	7	2	9	7	2	9	7	2	9
% detect	86%	100%	89%	86%	100%	89%	86%	100%	89%	100%	100%	100%
Average	0.88	--	0.81	0.05	--	0.05	0.93	--	0.87	8.59	--	8.6
Median	0.766	--	0.71	0.057	--	0.053	0.811	--	0.765	8.6	--	8.6
10th	0.17	--	0.21	0.03	--	0.03	0.22	--	0.26	8.44	--	8.46
25th	0.32	--	0.35	0.04	--	0.04	0.38	--	0.41	8.51	--	8.53
75th	1.29	--	1.13	0.07	--	0.07	1.34	--	1.18	8.67	--	8.67
90th	2.41	--	1.91	0.10	--	0.09	2.36	--	1.90	8.74	--	8.74
Max	2.54	0.71	2.54	0.09	0.053	0.09	2.599	0.745	2.599	8.7	8.7	8.7
Stats Approach	ROS	--	ROS	ROS	--	ROS	ROS	--	ROS	ROS	--	ROS
% REDUCTIONS												
WQO	--	--	--	--	--	--	5	5	mg/L	6.5 - 8.5 pH Units		
Source	Nitrate as N + Nitrite as N is evaluated for compliance.						Basin Plan WQO			Basin Plan WQO		
% from Median							-517%	--	-554%			
% from Average							-435%	--	-477%			
% from 75th							-273%	--	-323%			
% from 90th							-112%	--	-163%			
% from Max							-92%	-571%	-92%			

	WATERBODY: Bouquet Canyon Creek					
	Chlorpyrifos **Category 3D**			**Diazinon** **Category 3D**		
	Dry	Wet	All	Dry	Wet	All
STATISTICS	Source: DAT Units: µg/L			Source: DAT Units: µg/L		
N	24	2	26	24	2	26
% detect	33%	0%	31%	100%	100%	100%
Average	0.05	--	0.05	2.05	--	2.16
Median	0.05	--	0.05	0.97	--	1.02
10th	0.04	--	0.03	0.04	--	0.24
25th	0.04	--	0.04	0.04	--	0.52
75th	0.06	--	0.06	0.06	--	2.83
90th	0.07	--	0.06	0.07	--	6.08
Max	0.07	--	0.07	6.7	6.05	6.7
Stats Approach	ROS	--	ROS	ROS	--	ROS
% REDUCTIONS						
WQO	0.041	0.083	µg/L	0.17	0.17	µg/L
Source	EPA Aquatic Life Criteria			EPA Aquatic Life CCC		
% from Median	15%		13%	82%	--	83%
% from Average	17%		16%	92%	--	92%
% from 75th	27%		26%	-201%	--	94%
% from 90th	37%		36%	-161%	--	97%
% from Max	41%		41%	97%	97%	97%

APPENDIX B1

Structural Control Measure Fact Sheets

B1-1 Introduction

BMP Fact Sheets were developed for each subcategory of structural BMPs. Each BMP Fact Sheet further details BMP functions, design variations, and typical design components. A relative performance gauge is used to display the BMP performance functions for each subcategory.

B1-2 BMP Fact Sheets for Regional BMPs

Regional BMPs are relatively large structural devices 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, and *treatment facilities*, which use either conventional or innovative treatment processes to target pollutants of concern or divert flows to other treatment facilities.

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.

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. Also known as spreading grounds.
- ***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

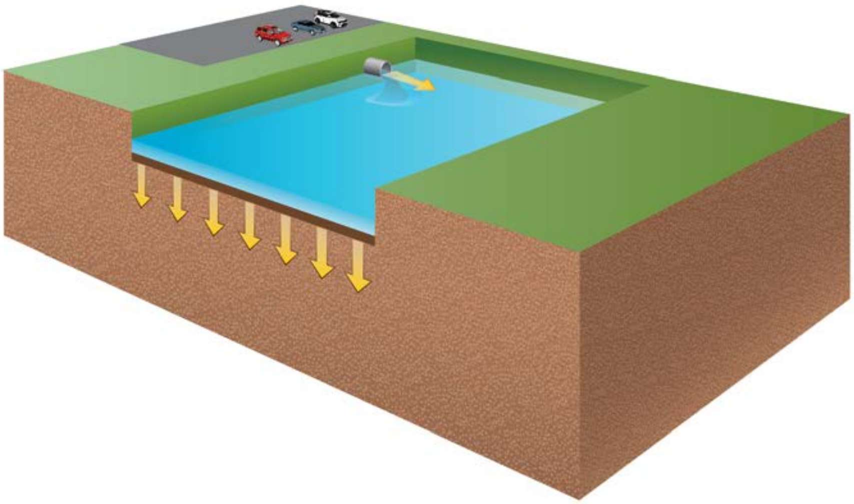
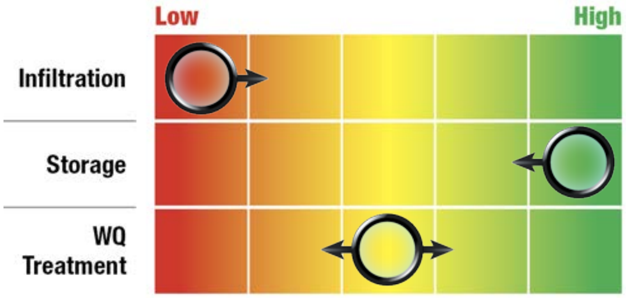


Figure B1-1. Typical regional infiltration facility schematic (arrows indicate water pathways).

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.

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

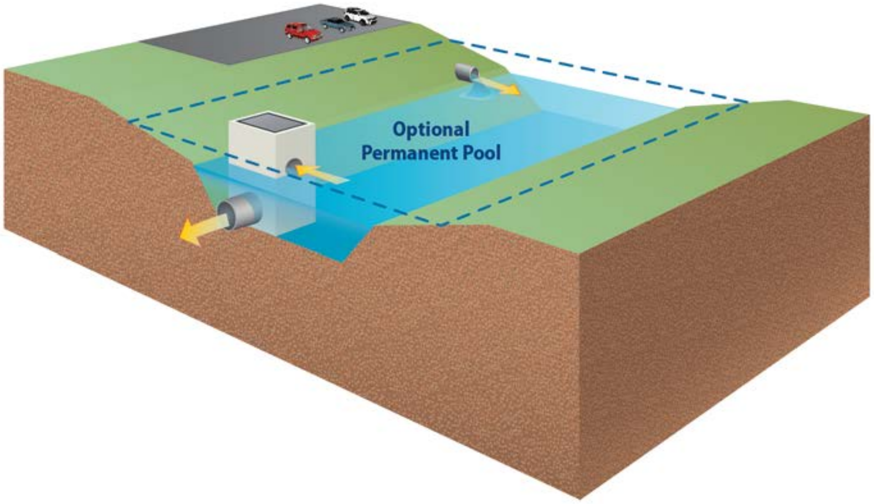
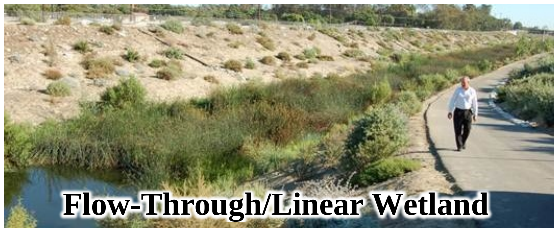


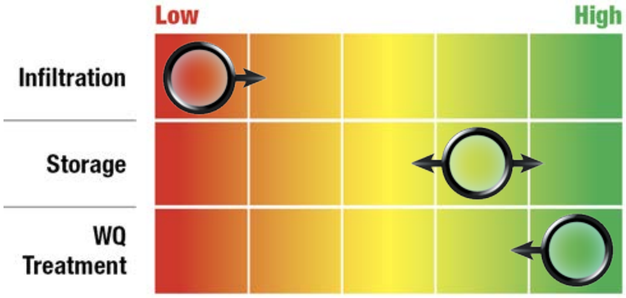
Figure B1-2. Typical regional detention facility schematic (arrows indicate water pathways).

CONSTRUCTED WETLANDS (REGIONAL BMP)

Constructed wetlands are engineered, shallow-marsh systems designed to control and treat stormwater and non-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.



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

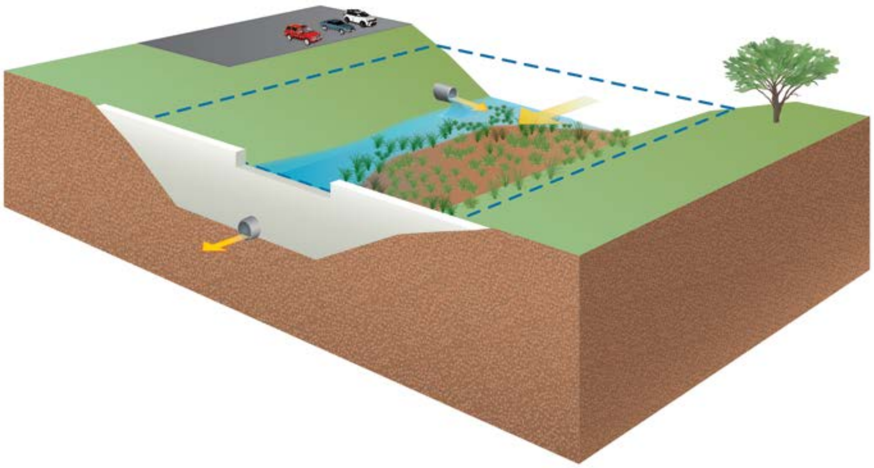


Figure B1-3. Typical regional constructed wetland schematic (arrows indicate water pathways).

TREATMENT FACILITIES (REGIONAL BMP)

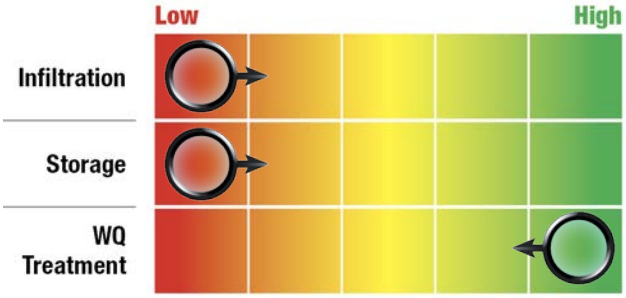
Other regional water quality technology falls into the *treatment facilities* subcategory. These systems typically divert flow from engineered channels to a treatment facility. Water is treated using physical, chemical, or radiological processes and is then used to offset potable water supply, returned to the original channel, or discharged to the treatment plant outfall.

Treatment Facility

(source: City of Santa Monica)

Low Flow Diversion Dam and Inlet in a Storm Drain

BMP Performance Functions



Design Variations

Treatment facilities 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 water 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

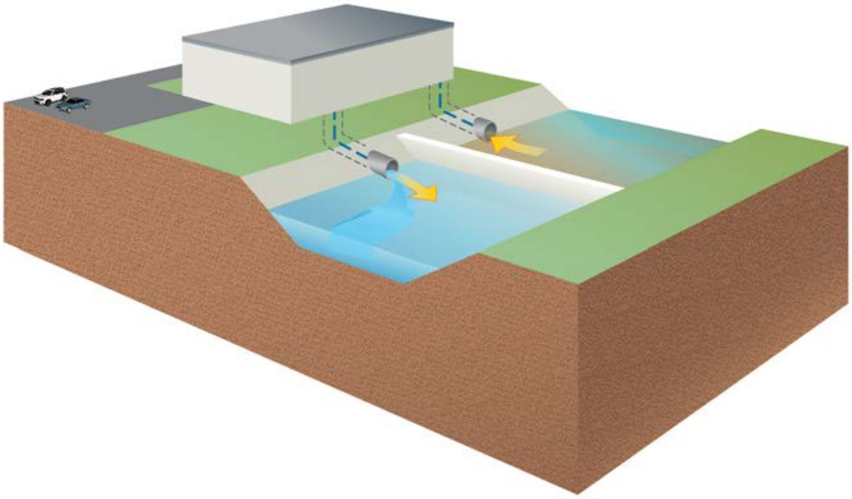


Figure B1-4. Typical regional treatment facility schematic (arrows indicate water pathways; a low flow diversion would direct flow to the nearby sanitary sewer).

B1-3 BMP Fact Sheets for Distributed BMPs

Distributed BMPs are relatively small scale structural devices 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 following BMP Fact Sheets, distributed BMPs include the following subcategories:

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

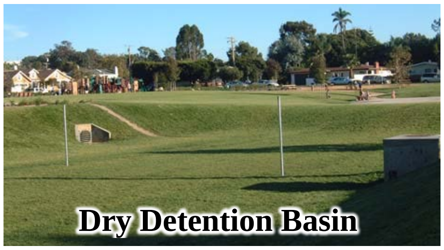
A major subcategory of distributed BMPs is *green infrastructure*. The Permit specifies that EWMPs should "incorporate effective technologies, approaches and practices, including green infrastructure." The primary goal of distributed green infrastructure BMPs is to intercept and treat runoff near its 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 below:

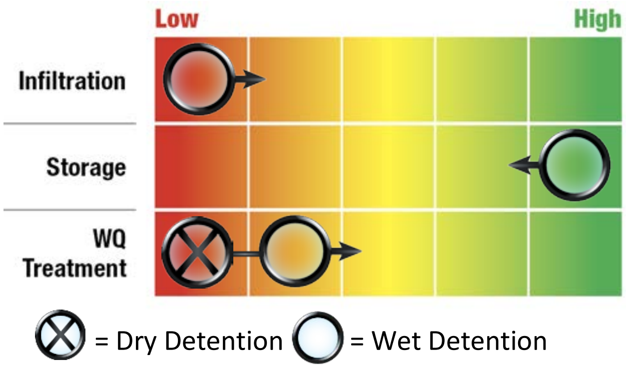
- Bioretention and biofiltration
- Permeable pavement
- Green streets
- Bioswales
- Infiltration BMPs
- Rainfall harvest (green roofs, cisterns and rain barrels)

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.



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

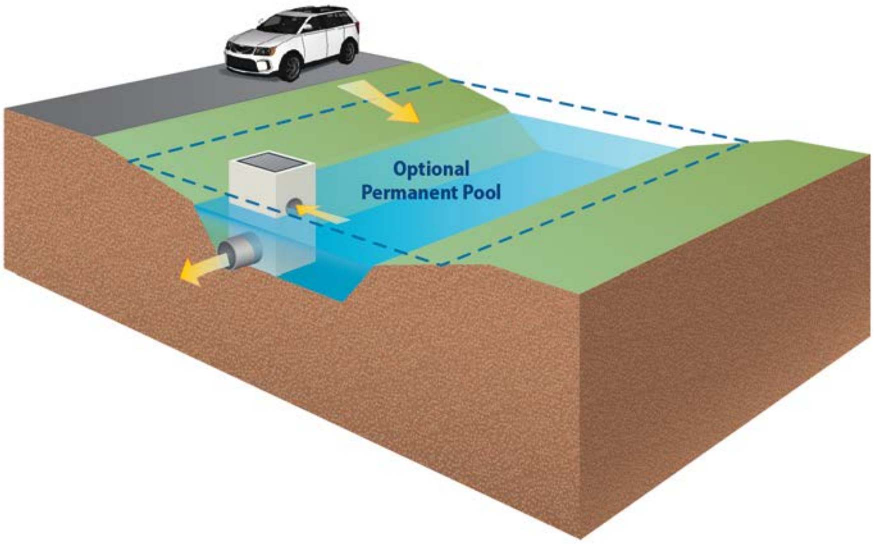
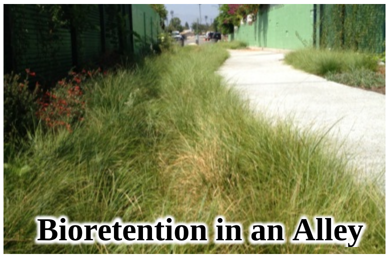


Figure B1-1. Typical distributed site-scale detention schematic (arrows indicate water pathways).

BIORETENTION & 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.

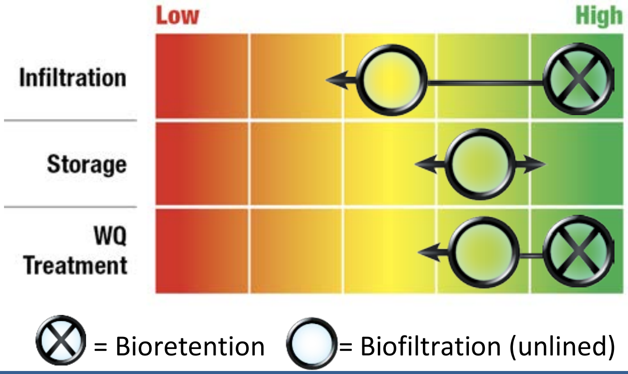
Residential Bioretention



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

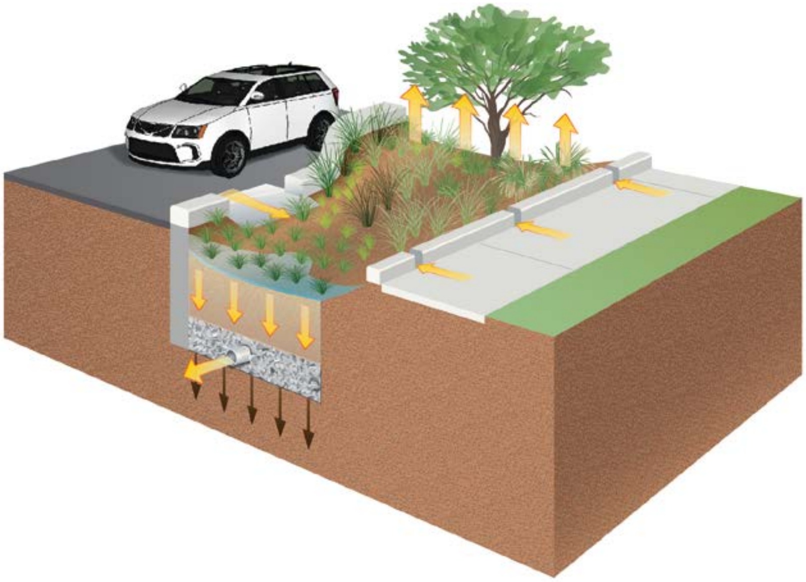
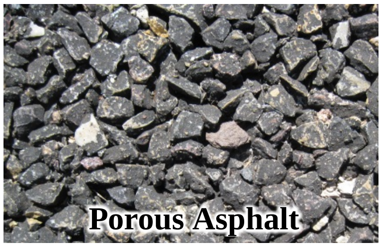


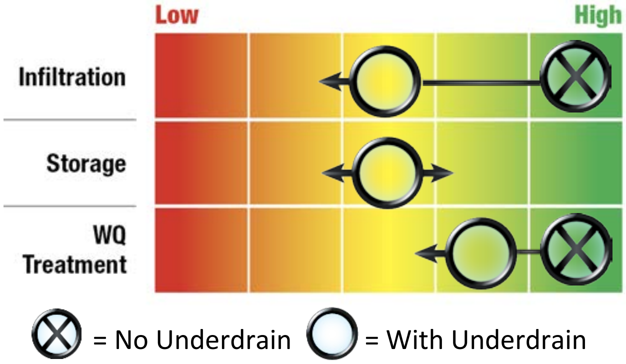
Figure B1-2. Typical distributed bioretention and biofiltration schematic showing underdrain option (arrows indicate water pathways).

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, respectively.



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

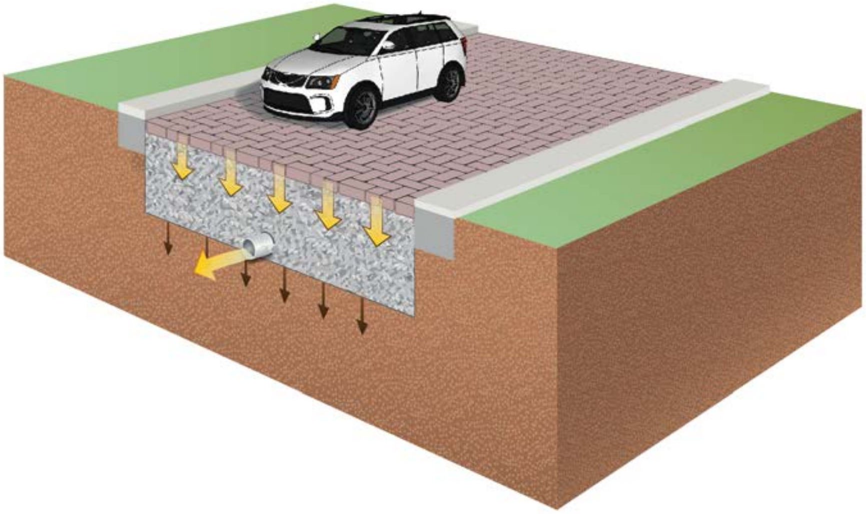
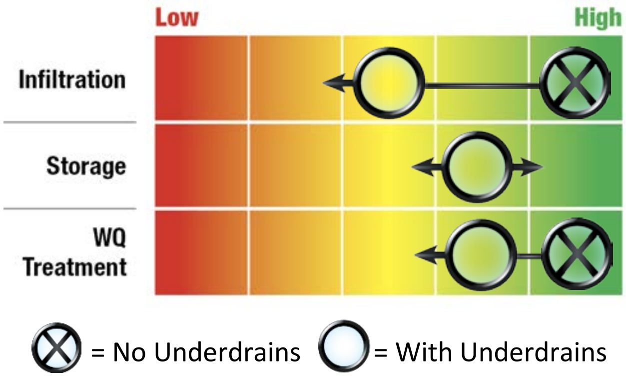


Figure B1-3. Typical distributed permeable pavement schematic showing underdrain option (arrows indicate water pathways).

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.

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 BMPs "bumpouts" can intercept gutter flow.
- ***Permeable Parking Lanes:*** street parking can be designed with permeable pavement to intercept roadway runoff.

Typical Design Components

Figure B1-4. Typical distributed green street schematic (arrows indicate water pathways).

INFILTRATION BMPS (GREEN INFRASTRUCTURE BMP)

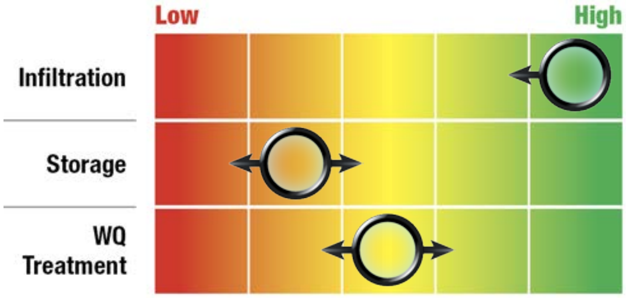
Infiltration BMPs capture and infiltrate runoff into underlying soils. Runoff is typically stored in subsurface trenches or pits filled with engineered soil media, gravel, or concrete chambers. Some infiltration BMPs that inject water into subsurface reservoirs are considered class V injection wells 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

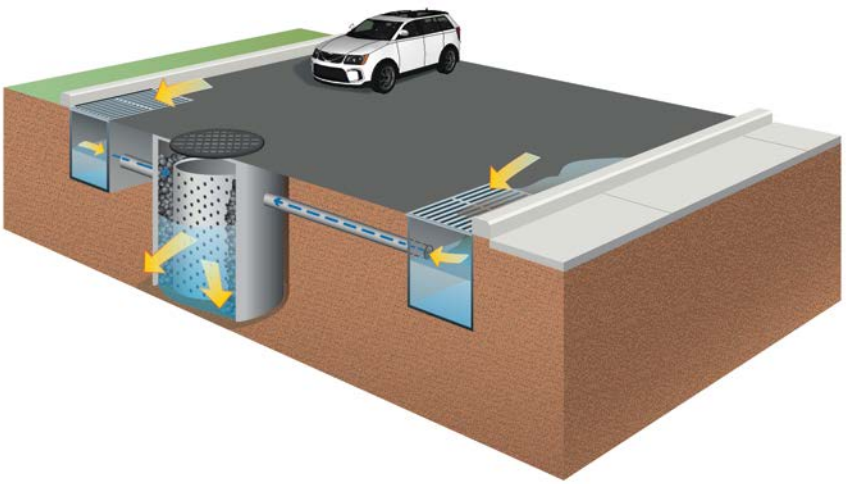
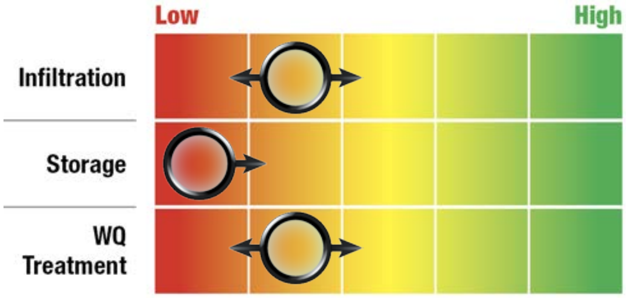


Figure B1-5. Typical distributed infiltration BMP schematic showing perforated concrete dry well variation (arrows indicate water pathways; for infiltration trenches, see Figure B1-2 and omit vegetation).

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.

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

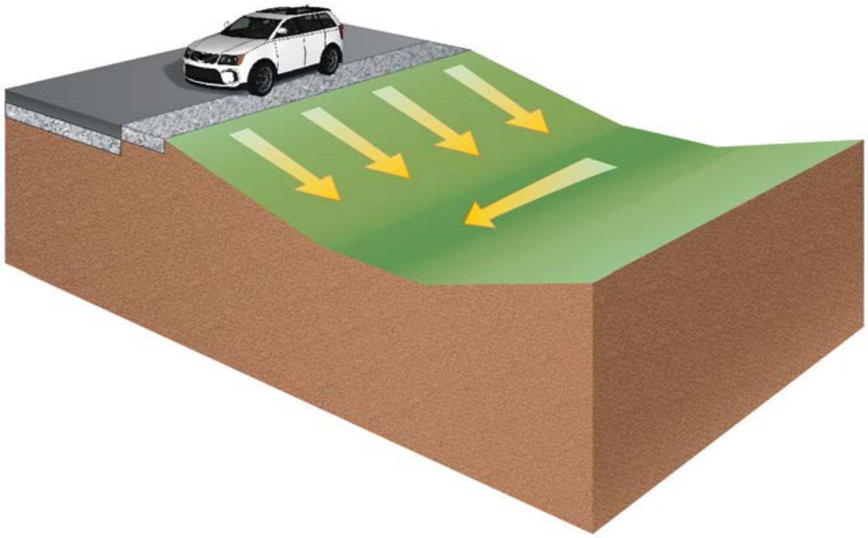
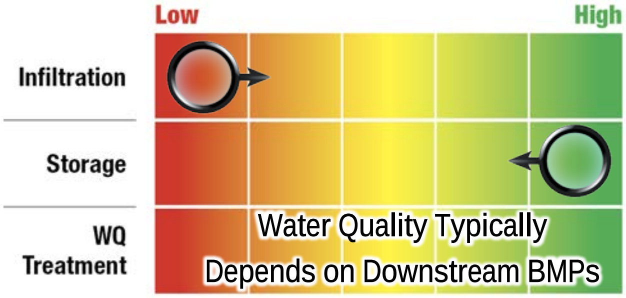


Figure B1-6. Typical distributed bioswale schematic (arrows indicate water pathways).

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.

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

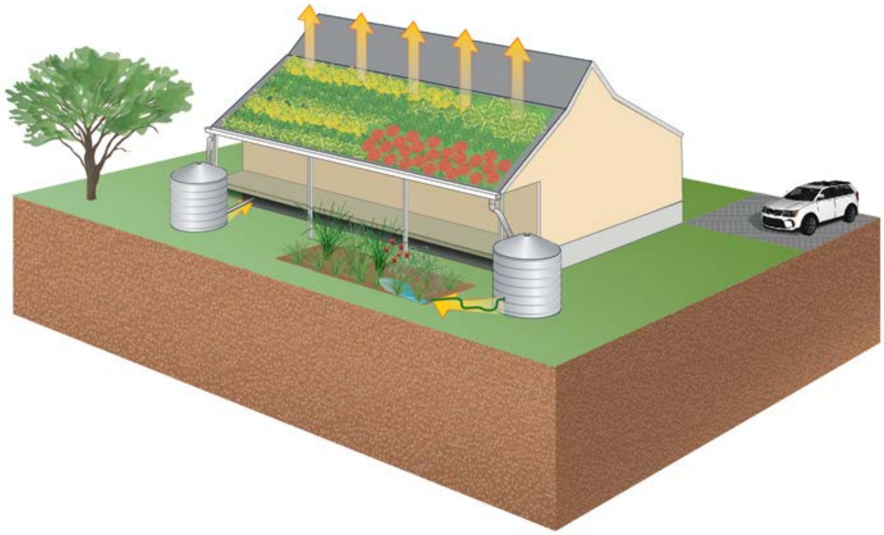
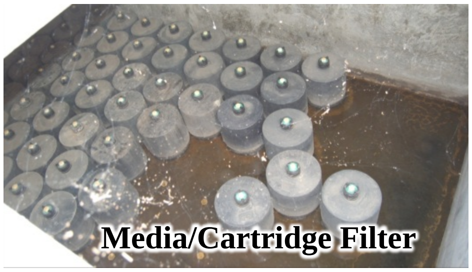
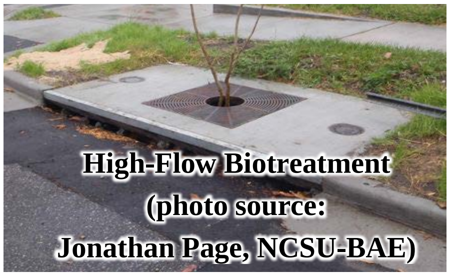


Figure B1-7. Typical distributed rainfall harvest schematic (arrows indicate water pathways).

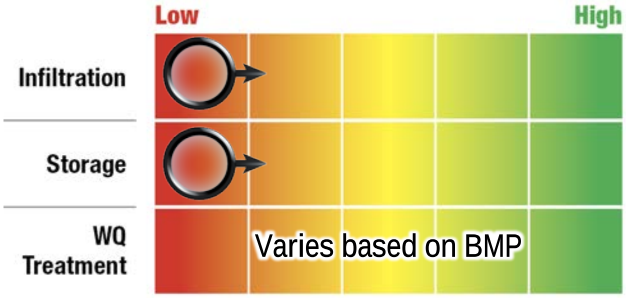
FLOW-THROUGH TREATMENT BMP (DISTRIBUTED BMP)

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.





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

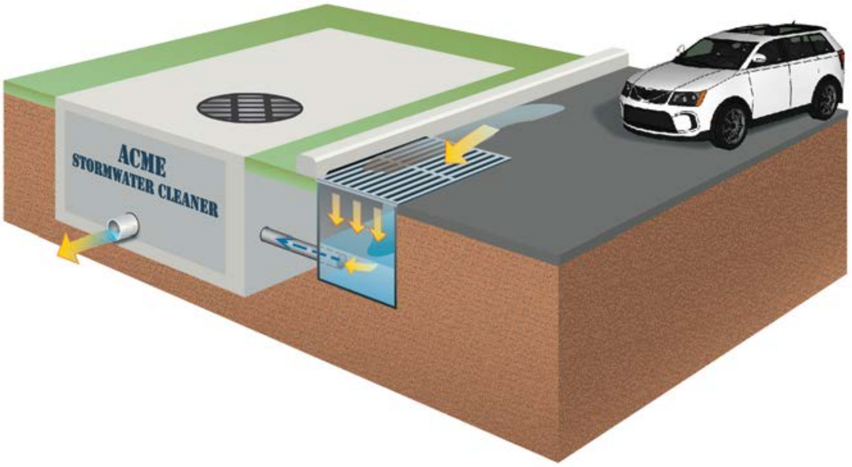
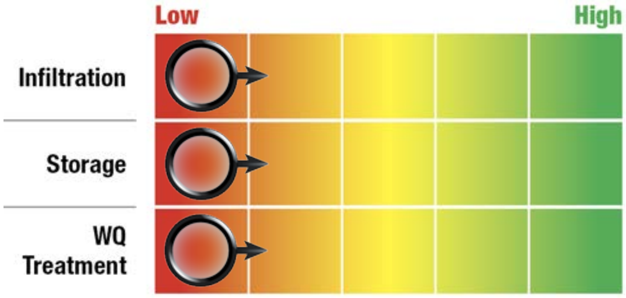


Figure B1-8. Typical distributed flow-through treatment BMP schematic (arrows indicate water pathways).

SOURCE CONTROL STRUCTURAL BMPS (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. Also includes trash full-capture devices.

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

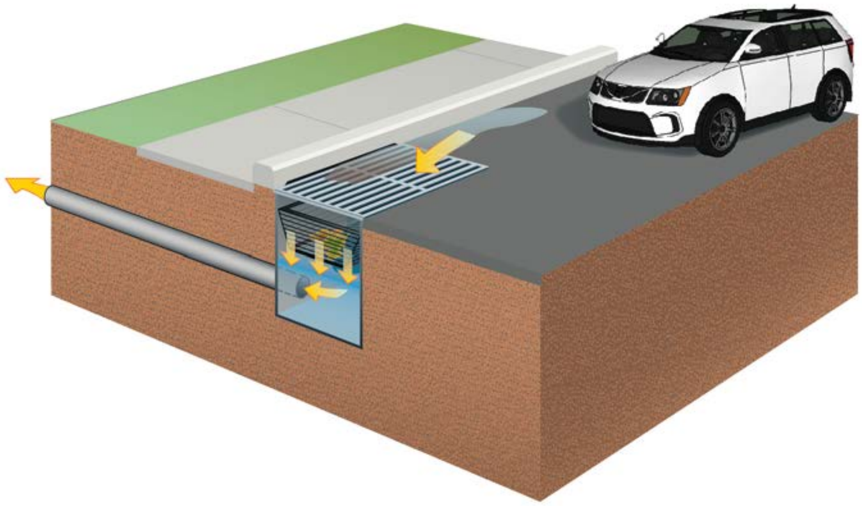


Figure B1-9. Typical distributed source control structural BMP (arrows indicate water pathways).

APPENDIX B2

MCM Evaluation

Appendix B2 Justification for Proposed Modifications to MCMs

Water Quality Priorities Addressed by MCMs

		Water Quality Priority Pollutants										Comments Dependent on program element - See specific categories below. Notes: [a] if still being used [b] if present in sediment [c] if contained in runoff from historic sources
MCM	2012 Permit Requirement	Salts	Trash	Nutrients	Metals		Pesticides		Other		Bacteria	
					Metals, except Se	Selenium	OP Pesticides	Pyrethroids	Cyanide	Bis-2		
D.2 Progressive Enforcement (Applies to D.4.d, D.6, D.7, D.8, and D.10)												
	Develop and maintain a Progressive Enforcement Policy		X		X		X	X	X			Depends on sources in watershed
	Conduct follow-up inspection within 4 weeks of date of initial inspection		X		X		X	X	X			Depends on sources in watershed
	Take progressive enforcement		X		X		X	X	X			Depends on sources in watershed
	Retain records		X		X		X	X	X			Depends on sources in watershed
	Refer violations to Regional Board		X		X		X	X	X			Depends on sources in watershed
	Investigate complaints from Regional Board (RB)		X		X		X	X	X			Depends on sources in watershed
	Assist RB with Enforcement Actions		X		X		X	X	X			Depends on sources in watershed
D.4.a and 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	X	X	X	X		X [a]	X			X	PIPP addresses pollutants that have sources that could be targeted with an outreach campaign.
	Maintain reporting hotline	X	X	X	X		X [a]	X			X	Reporting hotline provides an opportunity for the public to report activities that could address the listed pollutants which likely have sources for which activities could be observed and reported.
	Publish hotline info on web, telephone book											N/A: Grouped with Reporting Hotline
	ID staff/department that serve as the contact (publish this info)											N/A: Grouped with Reporting Hotline
	Organize events (e.g., clean ups)		X	X							X	
	Residential Outreach (Individually or with group):											N/A: General, see specific requirements below.
	Public Service Announcements	X	X	X	X		X [a]	X			X	General requirement to "conduct storm water pollution prevention public service announcements and advertising campaigns," more specificity provided in next two requirements. Same notes as PIPP program.
	(Develop) Public education materials on: vehicle fluids; household waste; construction waste; pesticides, fertilizers, and integrated pest management (IPM); green wastes; and animal wastes		X	X	X		X [a]	X			X	Same notes as PIPP program
	Distribute public education materials at points of purchase	X		X	X			X			X	Only listed for pollutants that have sources that can be actively purchased now. Could potentially be used as an avenue for educating on historically purchased products (i.e. organophosphate and organochlorine pesticides, but those are not identified since this would likely not be the target of a point of purchase campaign).
	Maintain stormwater website	X	X	X	X		X [a]	X			X	Same notes as PIPP program and reporting hotline.
	Provide schools with materials to educate children (K-12); can use state produced materials		X	X	X		X [a]	X			X	Same notes as PIPP program

Appendix B2 Justification for Proposed Modifications to MCMs

		Water Quality Priority Pollutants										Comments Dependent on program element - See specific categories below. Notes: [a] if still being used [b] if present in sediment [c] if contained in runoff from historic sources
MCM	2012 Permit Requirement	Salts	Trash	Nutrients	Metals		Pesticides		Other		Bacteria	
					Metals, except Se	Selenium	OP Pesticides	Pyrethroids	Cyanide	Bis-2		
D.6 Industrial/ Commercial Facilities												
	Track Critical Sources - maintain inventory (watershed based or lat/long recorded)		X	X	X				X	X	X	Will depend on the type of industrial and commercial facilities in watershed
	Educate - notify critical sources of BMP requirements		X	X	X				X	X	X	
	Implement a Business Assistance Program for select sectors or small businesses - technical assistance, and distribute materials to specific sectors			X	X				X	X	X	
	Inspect Commercial Sources		X	X	X				X	X	X	
	Inspect Industrial Sources - initial mandatory inspection		X	X	X				X	X	X	
	Secondary mandatory inspection		X	X	X				X	X	X	
	No Exposure - evaluate and conduct 2nd inspection at 25% of facilities									X		
	As needed conduct Progressive Enforcement follow-up inspections (see D.2)		X	X	X				X	X	X	
D.7 Planning and Land Development												
	Update ordinance/design standards to conform with new requirements (LID and Hydromod)	X		X	X	X	X [a]	X	X	X	X	Expect LID/Hydromod to reduce runoff, reducing associated pollutants. Would apply to entire PLD section.
	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)											

		Water Quality Priority Pollutants										Comments Dependent on program element - See specific categories below. Notes: [a] if still being used [b] if present in sediment [c] if contained in runoff from historic sources
MCM	2012 Permit Requirement	Salts	Trash	Nutrients	Metals		Pesticides		Other		Bacteria	
					Metals, except Se	Selenium	OP Pesticides	Pyrethroids	Cyanide	Bis-2		
D.8 Development Construction												
	Update erosion and sediment control ordinance/procedures to conform with new requirements		X	X	X	X	X [a]	X			X	MCMs that reduce sediment transport will reduce sediment-associated pollutants, if those pollutants are present in soils. Will apply to entire Construction section.
	Require operators of public and private construction sites to select, install, implement, and maintain BMPs that comply with the updated erosion and sediment control ordinance		X	X	X	X	X [a]	X			X	
	Sites < 1 acre; inspect based upon water quality threat		X	X	X	X	X [a]	X			X	
	Establish priority inspection process based on the potential for a site to be a source of pollutants identified as water quality priorities.		X	X	X			X			X	
	Sites < 1 acre; Require sites with soil disturbing activities to implement minimum BMPs		X	X	X	X	X [a]	X			X	
	For sites 1 acre or more; Require operators of public and private construction sites to select, install, implement, and maintain BMPs that comply with the updated erosion and sediment control ordinance		X	X	X	X	X [a]	X			X	
	For sites 1 acre or more, maintain inventory of grading, encroachment, demolition, building, or construction permits (and any other applicable authorization to move soil or disturb land)			X	X	X	X [a]	X			X	
	For sites 1 acre or more, require submittal and approval of an Erosion and Sediment Control Plan (ESCP) prior to land disturbance.		X	X	X	X	X [a]	X			X	
	Verify construction sites coverage under the CGP and 401 cert		X	X	X	X	X [a]	X			X	
	Develop/implement ESCP review checklist		X	X	X	X	X [a]	X			X	
	For sites 1 acre or more; Implement technical standards for the selection, installation, and maintenance of construction BMPs		X	X	X	X	X [a]	X			X	
	Require construction sites to adhere to standards and make standards readily available		X	X	X	X	X [a]	X			X	
	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)		X	X	X	X	X [a]	X			X	
	Develop/implement SOPs/inspection checklist		X	X	X	X	X [a]	X			X	
	Track number of inspections for inventoried sites and verify minimum inspections are completed		X	X	X	X	X [a]	X			X	
	As needed conduct Progressive Enforcement follow-up inspections (see D.2)		X	X	X	X	X [a]	X			X	
	Train plan review staff and inspectors		X	X	X	X	X [a]	X			X	
	Staff must be knowledgeable in QSD/P key objectives, local BMPs standards		X	X	X	X	X [a]	X			X	
D.4.a and 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				X	X	X [a]	X			X	MCMs that reduce sediment transport will reduce sediment-associated pollutants
	Maintain inventory of Permittee owned facilities (including parks and recreation facilties,)	X	X	X	X		X [a]	X			X	Depends on how the inventory is used, but should track public facilities that may be sources of pollutants. Will also depend on the facilities in the jurisdiction and pollutant sources.
	Update inventory											See above MCM
	Develop retrofit opportunity inventory; evaluate and rank	X		X	X	X	X [a]	X			X	Depends on type of retrofit and BMPs included
	Cooperate with private land owners to encourage site specific retrofitting; includes pilot projects and outreach	X		X	X	X	X [a]	X			X	Depends on type of retrofit and BMPs included
	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		X		X	X	X [a]	X			X	If implemented, would likely address sediment transported pollutants. If infiltration is incorporated, all pollutants would be addressed.
	Evaluate existing structural flood control facilities to determine if retrofitting facility to provide additional pollutant removal is feasible		X		X	X	X [a]	X			X	If implemented, would likely address sediment transported pollutants. If infiltration is incorporated, all pollutants would be addressed.

Appendix B2 Justification for Proposed Modifications to MCMs

		Water Quality Priority Pollutants											Comments Dependent on program element - See specific categories below. Notes: [a] if still being used [b] if present in sediment [c] if contained in runoff from historic sources
MCM	**2012 Permit Requirement**	Salts	Trash	Nutrients	Metals		Pesticides		Other		Bacteria		
					Metals, except Se	Selenium	OP Pesticides	Pyrethroids	Cyanide	Bis-2			
	Implement source control BMPs at Permittee owned facilities/activities		X		X			X					
	Require city-hired contractors to implement source control BMPs		X		X		X [a]	X					
	Prevent vehicle/equipment washing discharges to the MS4, including fire fighting and emergency response vehicles				X								
	Ensure new/redeveloped/replaced wash facilities are plumbed to the sanitary sewer or self contained.				X								
	Implement IPM program				X (copper)		X [a]	X					
	Ordinances, policies, and procedures reflect IPM techniques and include commitments and schedules to reduce the use of pesticides that cause impairments				X (copper)		X [a]	X					
	Annually update in inventory of pesticides used by agency; quantify pesticides used by staff and contractors; demonstrate IPM alternatives to reduce pesticide use				X (copper)		X [a]	X					
	Use SOPs for pesticide application				X (copper)		X [a]	X					
	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				X (copper)		X [a]	X					
	Ensure staff applying pesticides are certified or working under supervision of a certified applicator in the appropriate category				X (copper)		X [a]	X					
	Update catch basin map add GPS locations and update priority		X	X							X		
	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.		X		X (copper)								
	Required trash management at public events		X										
	Place and maintain trash receptacles/capture devices at newly identified high trash generating areas		X										
	Label storm drains	X	X	X				X			X		Included pollutants with sources that could be easily dumped into storm drains/catch basins
	Inspect labels prior to each wet season	X	X	X				X			X		
	Record and relabel illegible labels within 180 days of inspection	X	X	X				X			X		
	Post signs at access points to water bodies (open channels, creeks; lakes)	X	X	X				X			X		
	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		X										
	Inspect and Remove trash and debris from open channels and other drainage structures 1x/yr before rainy season.		X	X							X		
	Eliminate discharge of contaminants during MS4 maintenance		X	X	X [b]		X [b]	X			X		Will address sediment-transported pollutants, if they are present in sediment.
	Implement controls to limit infiltration of seepage from sanitary sewers to the storm drains			X							X		
	Implement routine preventative maintenance for both systems, survey sanitary sewer and MS4. May use SSO General WDR to fulfill this requirement.	X		X					X		X		
	Implement inspection and maintenance program for Permittee owned BMPs		X	X	X		X [b]	X			X		Depends on BMP type. Will address sediment-transported pollutants, if they are present in sediment.
	Manage residual water in treatment control BMPs removed during maintenance	X		X	X	X	X [a]	X			X		Will prevent discharge of any pollutants present in the water.
	Street sweeping - Priority A: 2x/mo; B: 1x/mo; C: as needed, not less than 1x/yr		X	X	X						X		

Appendix B2 Justification for Proposed Modifications to MCMs

		Water Quality Priority Pollutants										Comments Dependent on program element - See specific categories below. Notes: [a] if still being used [b] if present in sediment [c] if contained in runoff from historic sources
MCM	**2012 Permit Requirement**	Salts	Trash	Nutrients	Metals		Pesticides		Other		Bacteria	
					Metals, except Se	Selenium	OP Pesticides	Pyrethroids	Cyanide	Bis-2		
	Implement road construction maintenance BMPs (e.g., restrict paving activity to exclude periods of rain)			X	X	X	X [a]	X			X	Will address sediment-transported pollutants, if they are present in sediment.
	Inspect and/or clean Permittee owned parking lots 2x/mo		X		X						X	General training could support reducing all pollutants of concern.
	Train employees and contractors on stormwater requirements	X	X	X	X	X	X [a]	X	X		X	General training could support reducing all pollutants of concern.
	Train employees and contractors on pesticide use						X [a]	X				
D.10 Illicit Connections and Illicit Discharges Elimination												
	Continue IC/ID program	X	X	X	X		X [a]	X	X		X	
	Written procedures for conducting investigations and eliminations	X	X	X	X		X [a]	X	X		X	
	Initiate investigation within 72 hours from becoming aware of the discharge	X	X	X	X		X [a]	X	X		X	
	Implement solutions to eliminate discharge; conduct follow-up investigation to verify elimination; follow Progressive Enforcement Plan (see D.2)	X	X	X	X		X [a]	X	X		X	
	When discharge originates upstream of jurisdiction, notify the upstream jurisdiction and Regional Board within 30 days	X	X	X	X		X [a]	X	X		X	
	Initiate investigation within 21 days for illicit connection	X	X	X	X		X [a]	X	X		X	
	Permit or document illicit connection that only discharge stormwater or allowed non-stormwater	X	X	X	X		X [a]	X	X		X	
	Eliminate illicit connection within 180 days of investigation	X	X	X	X		X [a]	X	X		X	
	Facilitate public reporting via hotline	X	X	X	X		X [a]	X	X		X	
	Signage adjacent to open channels provide info re: public reporting	X	X	X	X		X [a]	X	X		X	
	Document calls and actions associated with hotline	X	X	X	X		X [a]	X	X		X	
	Implement procedures on responding to complaints; evaluate and update procedures	X	X	X	X		X [a]	X	X		X	
	Implement a spill response plan	X	X	X	X		X [a]	X	X		X	
	Train staff and contractors on ID/IC	X	X	X	X		X [a]	X	X		X	
	Create a list of positions and contractors that require ID/IC training	X	X	X	X		X [a]	X	X		X	

APPENDIX C1

Model Calibration and Parameters

C1-1 Introduction

The purpose of this appendix is to provide additional details on the approach taken and the results of the baseline model calibration for the RAA for the Upper Santa Clara River EWMP.

C1-2 Hydrology Calibration

Before beginning assessment and calibration of the Santa Clara River hydrology, 14 WMMS precipitation input time series were extended through 2011 using data from the ALERT network. These gages are specific to the Santa Clara River watershed and were not previously updated with inputs for other regional basins. Observed precipitation time series were assessed for data gaps and impairments. Missing records were repaired with quality records from nearby gages using the normal-ratio method.

Hydrology calibration continued with a comparison of the simulated and observed flow from 10/1/2002 through 9/30/2011 at the Los Angeles County Flood Control District streamflow gage on the Santa Clara River at Old Road Bridge (F92C-R), and Santa Clara River near Lang Railroad Station (F92C-R). **Figure C1-1** through **Figure C1-4** present the hydrology calibration results illustrated by hydrographs and summary statistics that compare modeled and observed flow. **Table C1-1** presents recommended and final calibrated hydrology parameter values. Differences in modeled versus observed flows could be due to model scale, changes in geology, subwatershed assignments and representation of precipitation, or other low-flow fluctuations in the observed dataset not captured by the model.

A review of the hydrology calibration metrics indicated that refinement to the model parameters was necessary, primarily to produce a reasonable match with low flow periods. Key observations included:

- Much of the baseflow from tributary channels is not realized at the downstream flow gages due to losing stream conditions between Saugus and Lang.
- Headwater bedrock conditions open up to a surficial alluvial deposit upstream of Lang allowing baseflows to bypass the Santa Clara River and enter a groundwater aquifer.
- Baseflows in the Santa Clara River Reach 5 through Santa Clarita are dominated by discharges from the Saugus and Valencia POTWs.

The hydrology calibration model was updated to reflect these observations.

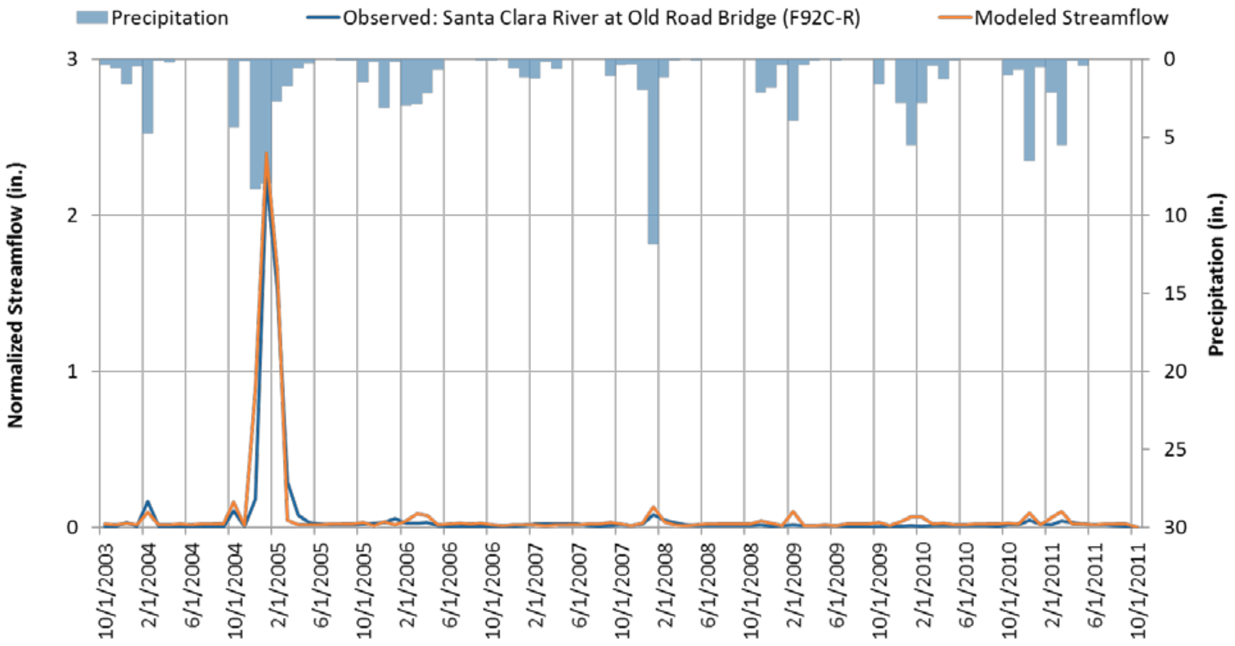


Figure C1-1. Monthly hydrograph for LACFCD F92C-R, Santa Clara River at Old Road Bridge

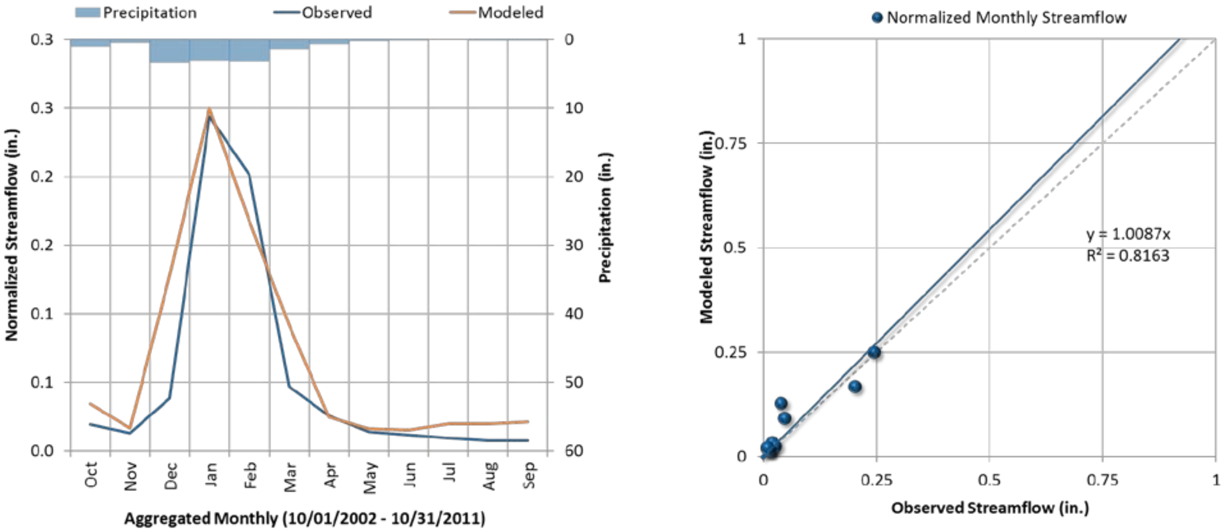


Figure C1-2. Aggregated monthly hydrograph for LACFCD F92C-R, Santa Clara River at Old Road Bridge (10/1/2002 – 9/30/2011).

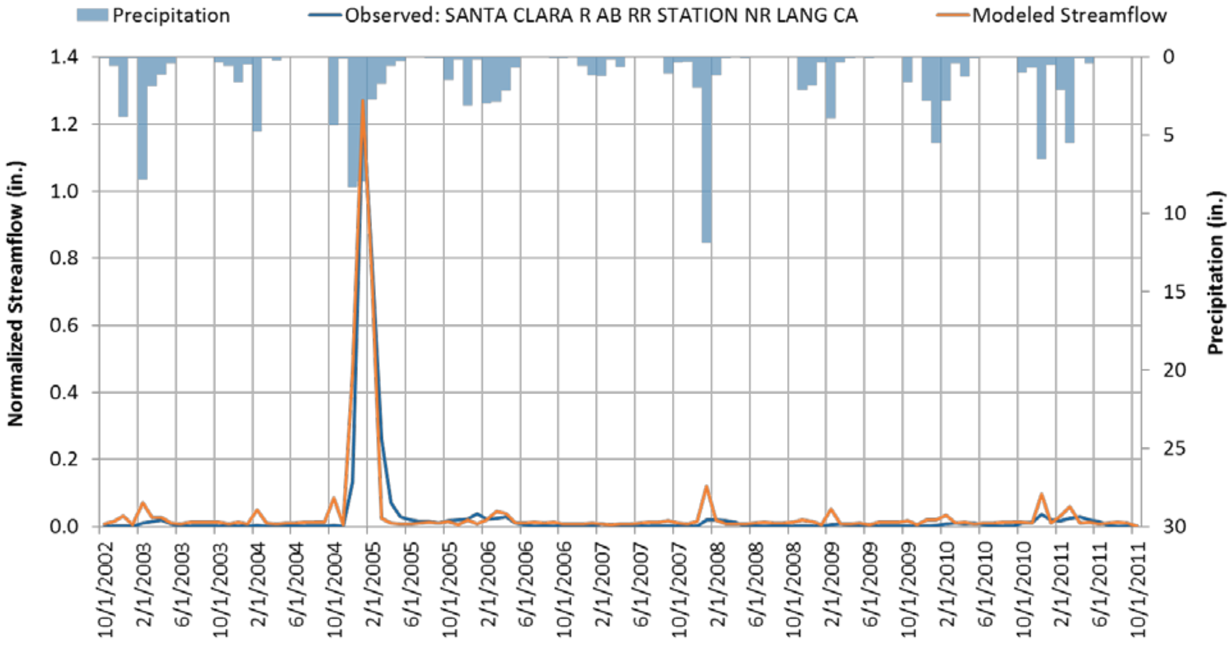


Figure C1-3. Monthly hydrograph for LACFCD F93B-R, Santa Clara River near Lang Railroad Station (10/1/2002 – 9/30/2011).

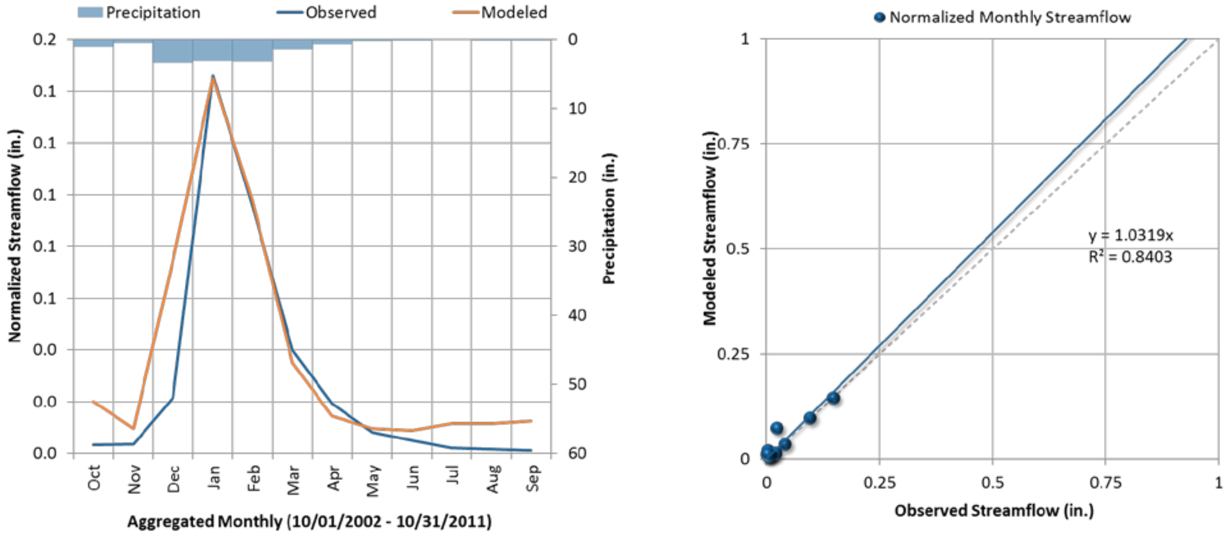


Figure C1-4. Aggregated monthly hydrograph for LACFCD F93B-R, Santa Clara River near Lang Railroad Station (10/1/2002 – 9/30/2011).

Table C1-1. Regional Board guidance and calibrated hydrology model parameter values

	Model Parameters	Units	Recommended Values*	Calibrated Values
Hydrology	Interception storage capacity (in)	Inches	0.01-0.40	0.05 – 0.25
	Manning’s n for overland flow	NA	0.01-0.15	0.1 – 0.2
	Upper zone nominal soil moisture storage (in)	Inches	0.05-2.0	0.5
	Temperature below which evapotranspiration (ET) is reduced by half (°F)	°F	32.0-48.0	45
	Temperature below which ET is set to zero (°F)	°F	30.0-40.0	35
	Fraction of groundwater (GW) inflow to deep recharge	NA	0.0-0.50	0
	Fraction of remaining ET from baseflow	NA	0.0-0.20	0
	Fraction of remaining ET from active GW	NA	0.0-0.20	0
	Lower zone nominal soil moisture storage (in)	Inches	2.0-15.0	7
	Interflow inflow parameter	NA	1.0-10.0	1
	Interflow recession parameter	NA	0.3-0.85	0.8 – 0.98
	Lower zone ET parameter	NA	0.1-0.9	0.25 – 0.6

* Source: Regional Board (Los Angeles Regional Water Quality Control Board). 2014. Guidelines for Conducting Reasonable Assurance Analysis in a Watershed Management Program, Including an Enhanced Watershed Management Program. LARWQCB, Los Angeles, CA.

C1-3 Water Quality Calibration

Sediment and water quality calibrations were parameterized consistently with other regional WMMS model calibrations performed for EWMP development projects in the region. Land use-specific potency factors (POTFW) for the metals were adjusted for the Santa Clara River watershed to match calibration with observed data at the mass emission station (S29). Event mean concentration values for fecal coliform on the newly added overspray model were set to be consistent with observed low flow concentrations from observed data. **Table C1-2** presents the final calibrated set of model parameters used to represent sediment and water quality.

Figure C1-5 through **Figure C1-8** present water quality calibration plots for the Santa Clara River mass emission station (S29).

Table C1-2. Regional Board guidance and calibrated water quality model parameter values

	Model Parameters	Units	Recommended Values*	Calibrated Values
Water Quality	Initial storage of water quality constituent	lbs	0.0-0.0005	0
	Wash-off potency for sediment associated constituent	lbs/ton	0.0-10.0	0-7.14
	Scour potency for sediment associated constituent	lbs/ton	NA	0-7.14
	Event Mean Concentration (Fecal Coliform)	MPN/100mL	1,680-79,900	1,000-200,000
	Accumulation rate of water quality constituent	lbs/acre/day	0.0-0.0005	NA
	Maximum storage of water quality constituent	lbs/acre/day	0.0-0.0005	NA
	Rate of surface runoff that removes 90% of constituent	in/hr	0.0-0.5	NA
	General first order in-stream loss rate of constituent	1/day	0.2-0.8	0.1-0.2
Sediment	Coefficient in the soil detachment equation	NA	0.05-0.75	0.1-0.35
	Exponent in the soil detachment equation	NA	1.0-3.0	1.81
	Coefficient in the sediment wash-off equation	NA	0.1-10.0	0.0075-1.125
	Exponent in the sediment wash-off equation	NA	1.0-3.0	2
	Coefficient in the sediment scour equation	NA	0.0-10.0	0
	Exponent in the sediment scour equation	NA	1.0-5.0	2
	Coefficient in the solids wash-off equation	NA	0.1-10.0	0.225-0.6375
	Exponent in the solids wash-off equation	NA	1.0-3.0	2
	Solids accumulation rate on the land surface	lbs/acre/day	0.0-30.0	0.003
	Fraction of solids removed from land surface per day	1/day	0.01-1.0	0.025

* Source: Regional Board (Los Angeles Regional Water Quality Control Board). 2014. Guidelines for Conducting Reasonable Assurance Analysis in a Watershed Management' Program, Including an Enhanced Watershed Management Program. LARWQCB, Los Angeles, CA.

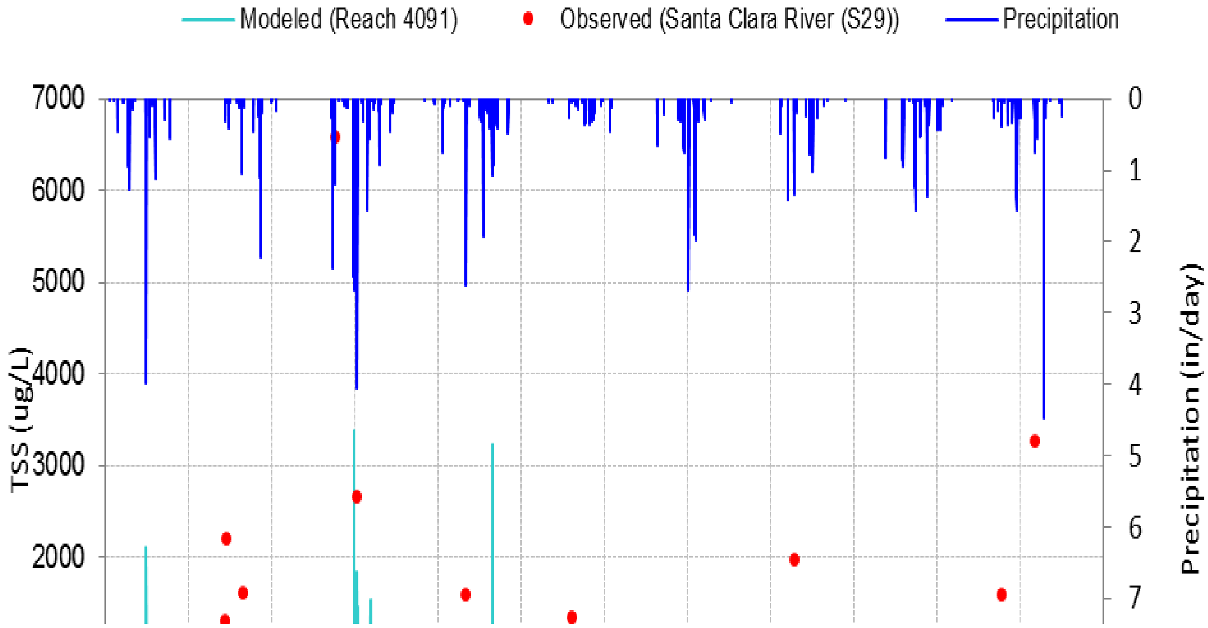


Figure C1-5. Simulated vs. observed time series plots for Total Suspended Sediment (TSS)) at Santa Clara River mass emission station S29 (10/1/2002 through 9/30/2011).

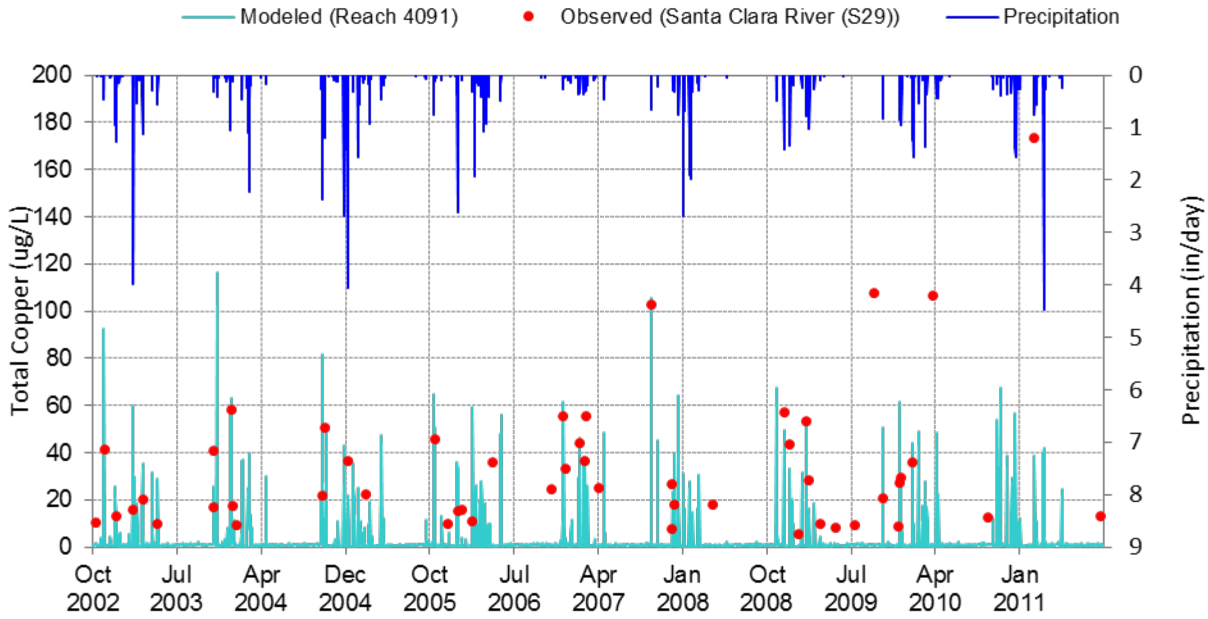


Figure C1-6. Simulated vs. observed time series plots for Total Copper at Santa Clara River mass emission station S29 (10/1/2002 through 9/30/2011).

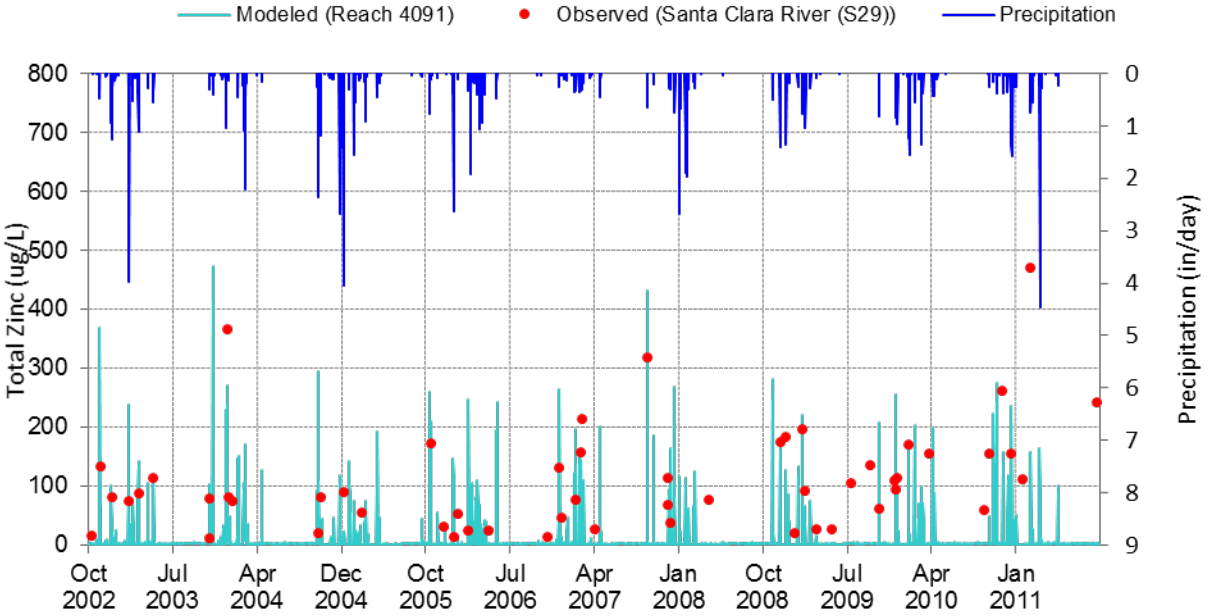


Figure C1-7. Simulated vs. observed time series plots for Total Zinc at Santa Clara River mass emission station S29 (10/1/2002 through 9/30/2011).

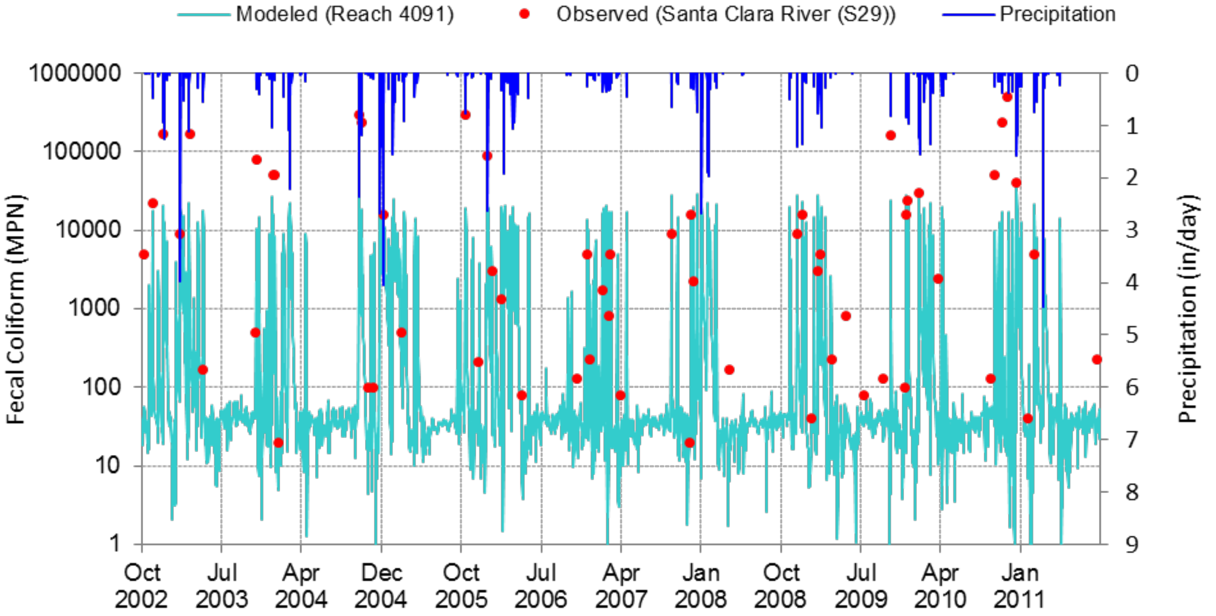


Figure C1-8. Simulated vs. observed time series plots for Fecal Coliform at Santa Clara River mass emission station S29 (10/1/2002 through 9/30/2011).

APPENDIX C2

Dry Weather RAA and Non-stormwater Analysis

C2-1 Introduction

This appendix presents the simulation of non-stormwater and dry weather reasonable assurance analysis (RAA) for the Upper Santa Clara River EWMP. The MS4 Permit effectively prohibits discharges of non-stormwater[1] (dry weather runoff) and states that EWMPs shall “ensure that discharges…do not include non-stormwater discharges that are effectively prohibited.” In addition, the MS4 Permit includes dry weather water quality based effluent limitations (WQBELs) for some of the applicable total maximum daily loads (TMDLs). However, it is important that dry and wet weather conditions not be evaluated in separate silos – the EWMP includes a large network of wet weather BMPs that will eliminate a majority of non-stormwater discharges. As presented herein, the non-stormwater simulation quantifies the reduction of non-stormwater discharges attributable to wet weather BMPs, and reductions to be achieved by non-stormwater abatement programs including source investigation/elimination and regional water use reduction efforts.

The non-stormwater analysis and dry weather RAA are presented as follows:

- Methodology and validation for non-stormwater simulation (Section 2)
- Results of non-stormwater simulation (Section 3)
- Dry weather RAA (Section 3)

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[1] Non-stormwater does not include all dry weather runoff. For example, permitted dry weather discharges (e.g., dewatering) and groundwater baseflow are exempted/allowed by the Permit.

C2-2 Non-stormwater Simulation Approach

The primary source of non-stormwater is outdoor water use. As such, the non-stormwater analysis is based on a simulation of non-stormwater whose *source* is outdoor water use[2] in each of the subwatersheds within the EWMP area and whose *sink* is evapotranspiration and incidental infiltration. The modeling approach used for the non-stormwater analysis is distinctly different from the wet weather RAA – with the wet weather RAA being process-based (build-up wash off) and the dry weather RAA being a steady-state simulation based on empirical water use data from southern California. The non-stormwater analysis and wet weather RAA are linked by estimating the effectiveness of wet weather control measures on non-stormwater flows. The methodology and validation are presented in the subsections below.

C2-2.1 METHODOLOGY

The methodology for the non-stormwater analysis is presented in the following subsections.

C2-2.1.1 Non-stormwater Production Rates

The volumes of non-stormwater generated in the EWMP area were estimated by combining per capita outdoor water use rates with population estimates. For each subwatershed in the EWMP area, the daily generation of non-stormwater was the product of [1] the population in the subwatershed and [2] the estimated per capita water use. The basic parameters are the following:

- U.S. census population at the subwatershed level, and
- A steady-state per capita outdoor water use rate derived from a literature review.

Outdoor water use was characterized through a literature review compiling typical per capita outdoor water use in Southern California. Twenty-five (25) estimates of outdoor water use were compiled[3] as shown in **Figure C2-1.** A 50th percentile (median) outdoor water use value of 68 gallons per capita per day (gpcd) was selected as the representative outdoor water use condition.

Population estimates were then calculated using United States Census Bureau 2010 population and housing unit counts by block (US Census Bureau 2010). The block-scale population density data were spatially intersected with the USCR EWMP subwatersheds **(see Figure C2-2)** and the total estimated population was then tabulated for each modeled area. The estimated population within each subwatershed was then proportionally distributed across the BMP drainage area. For outdoor water use estimates based on households, it was assumed that 2.97 persons are in each household (DeOreo et al., 2011)

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[2] Non-stormwater volumes are not necessarily equal to dry weather runoff volumes in the EWMP area. Non-stormwater is the portion of dry weather runoff that is effectively prohibited by the Permit. Dry weather runoff would also include groundwater that is discharged through the MS4 system (if any), which is either allowed or conditionally exempt under the permit. By focusing on the non-stormwater portion of dry weather runoff, the non-stormwater analysis and dry weather RAA are focused on the portion of dry weather runoff that is clearly required to be controlled by MS4s. Should any groundwater discharges be identified as a source of pollutants per the requirements in the permit, the EWMP will incorporate any results from the required non-stormwater investigations in the Permit during the adaptive management process.

[3] California Department of Water Resources, 2005, 2013; Christian-Smith et al., 2012; DeOreo et al., 2011; Gleick et al., 2003; LADPW 2010; Natural Resources Defense Council and Pacific Institute, 2014

This per capita outdoor water use was used as a steady state input to the LSPC watershed model baseline to generate non-stormwater in the EWMP area.

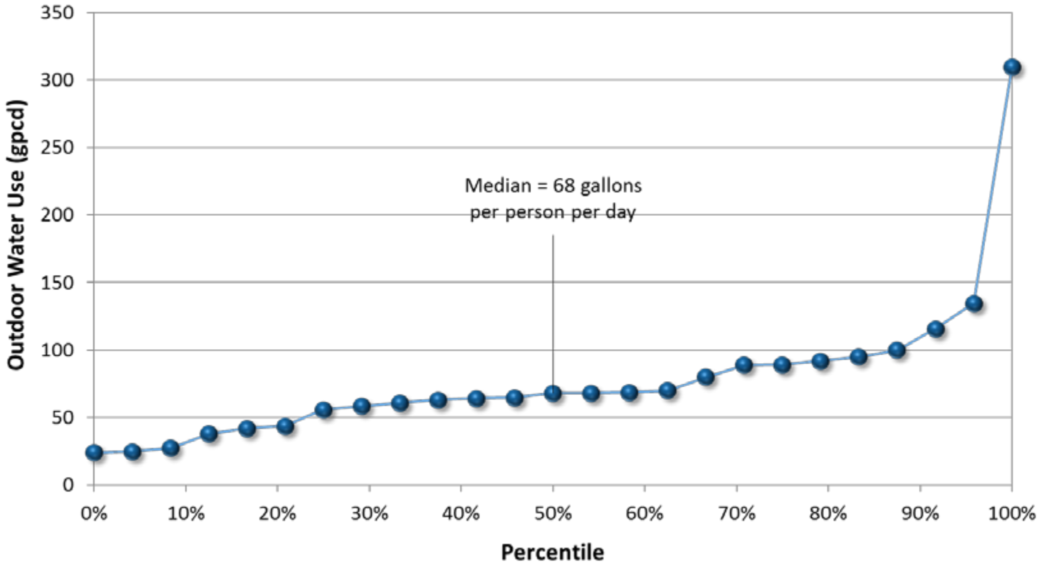

Figure C2-1. Distribution of Outdoor Water Use Estimates Compiled in Literature Review

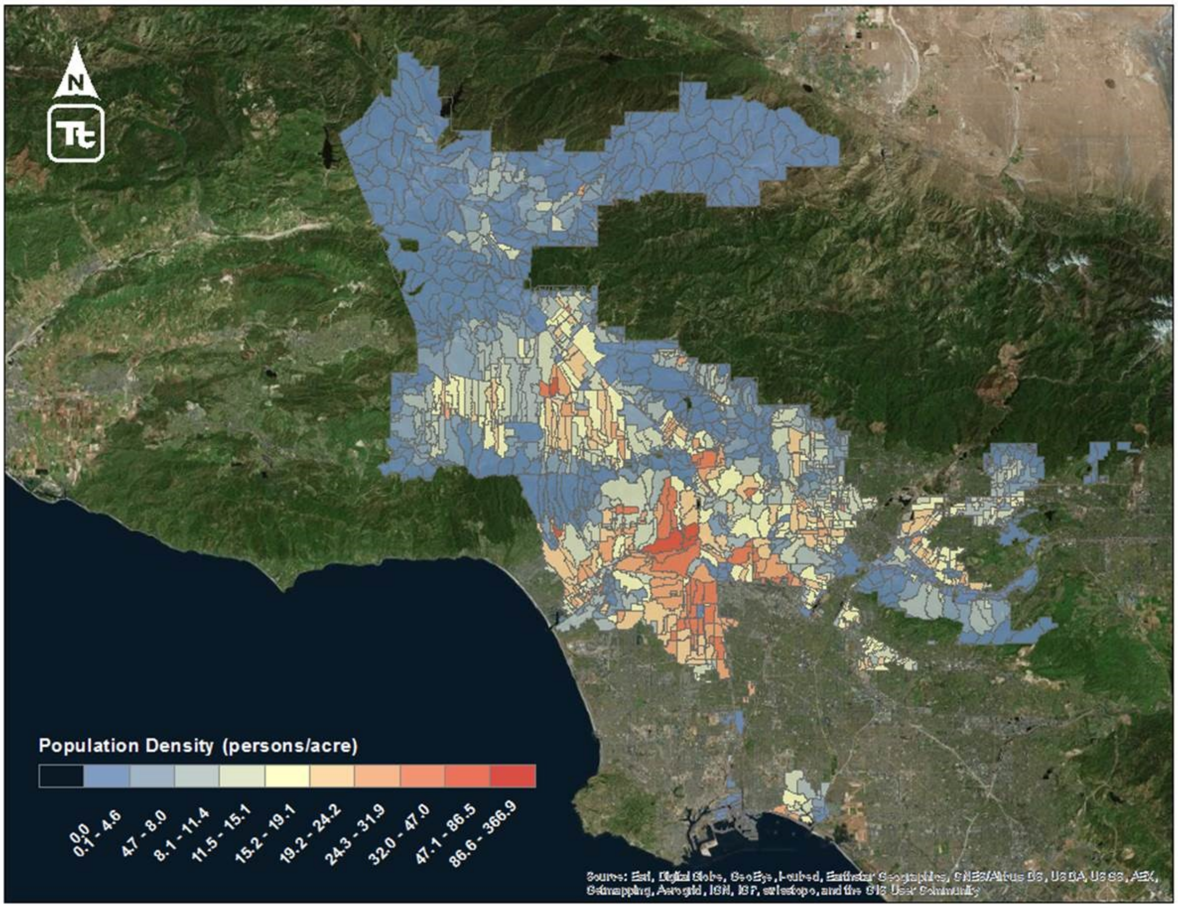

Figure C2-2. Population Estimates by Subwatershed in LA County

C2-2.1.2 Antecedent Conditions

Although clearly defined definitions exist for wet periods, definitions for dry periods are less clearly defined. Wet-weather periods are either defined in terms of rainfall or instream flow. For bacteria, a wet day is one with a rainfall total greater than 0.1 inches plus the three subsequent days, while metals TMDLs often define wet days as those with instream flow above the 90th percentile. As such, a dry weather critical condition was defined for the non-stormwater analysis, as described below.

Antecedent conditions for the USCR non-stormwater analysis was determined by counting the number of consecutive dry days by month, exactly as was done for the Gateway Watershed Management Programs (LSGWMP, 2015). **Figure C2-3** illustrates graphically the analysis to identify a representative dry period. Within the two selected years (Critical WY 2003 and Average WY 2008), the 45-day period between 8/17 and 9/30 was found to be the most representative of dry weather conditions because (1) no rainfall occurred at any of the gages throughout all three WMP areas, (2) it was during a time of the year that was historically shown to experience the least amount of spatially-weighted rainfall in a year, and (3) it was late in the summer following an extended period of no rainfall for both 2003 and 2008.

A 30-day period falling between 8/21 and 9/20 during the Average WY 2008 was used to generate the evapotranspiration boundary conditions for the USCR non-stormwater analysis. The daily average volume over the 30-day period is used as the basis for reporting.

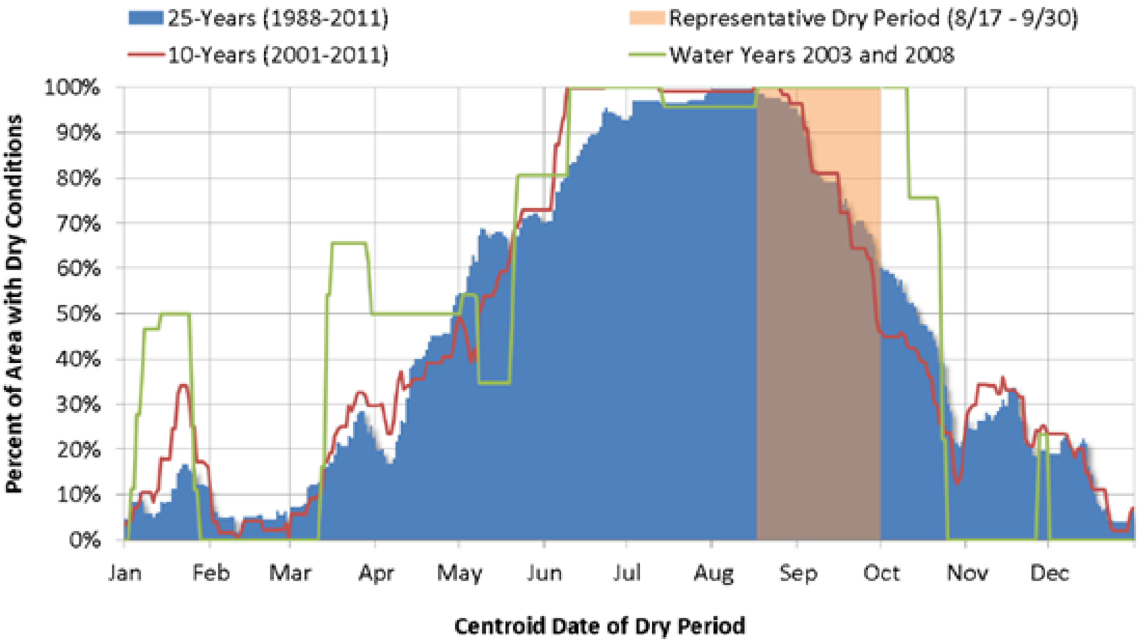

Figure C2-3. Summary of Non-Wet Weather Periods

C2-2.1.3 Effect of Wet Weather Controls on Non-stormwater

The wet weather control measures in the EWMP (defined by the wet weather RAA) will provide significant benefits for eliminating non-stormwater. For UCSR, the non-stormwater runoff time series was routed through the final (100%) bacteria wet-weather BMP networks to quantify the incidental non-stormwater runoff reduction. The comparison of baseline to remaining non-stormwater volume is used to calculate the percent reduction in non-stormwater flows in the EWMP area at each milestone through structural BMPs alone. Remaining runoff volume, if any, is the amount to be addressed by non-stormwater abatement programs including source investigation/elimination and regional water use reduction efforts.

C2-2.2 VALIDATION

Several studies in Southern California have produced correlations between drainage area and dry weather flow for larger basins. A study by Ackerman and Stein (2005) was used to support the validation effort. The study included selection of four urbanized sites in Los Angeles County which had a historic flow record. The two largest basins included in the study were Ballona Creek and Coyote Creek. To allow anthropogenic dry weather flows to be isolated, each location was selected based on specific characteristics including heavily urbanized landscapes, concrete lined channels (to focus on areas with minimal groundwater baseflow), and lack of significant point source discharges. The study estimated dry weather runoff to be about 180 cubic meters per day per square kilometer of drainage area for large basins in Southern California (Ackerman and Stein, 2005).

Multiplying the daily flow estimate from Ackerman and Stein (2005) by the total MS4 drainage area of the USCR EWMP results in an estimated flow of **117.1** acre-feet per day. Using the dry weather modeling methodology described above, the total non-stormwater runoff simulated for USCR is approximately **58.1** acre-feet per day for the median and **93.1** acre-feet per day for the 90th percentile, a ***difference of -20.5%***. Considering the lower population density of USCR **Figure C2-2**), based on calculated percent difference, the non-stormwater analysis provides a reasonable estimate of non-stormwater generated in the EWMP area.

C2-3 Results of Non-stormwater Simulation

The amount of non-stormwater to be addressed by the EWMP was determined by the non-stormwater simulation. For each jurisdiction in the USCR EWMP Group, the baseline non-stormwater volumes were estimated along with the non-stormwater volume remaining *after* implementation of wet weather control measures. The corresponding non-stormwater volume reductions and percent reductions at the proposed EWMP milestones are shown in **Figure C2-1** and **Figure C2-2,** respectively.

To consider the sensitivity of the analysis to the assumed outdoor water use, the simulation was also conducted using the 90th percentile water use estimate (109 gpcd), as shown in **Table C2-1.** The analysis of non-stormwater percent reduction was generally insensitive to a higher water use estimate, due to the fact that residual non-stormwater is due to areas where few control measures are implemented (rather than BMPs being "overtopped" by higher non-stormwater flow rates).

Table C2-1. Simulated Non-stormwater Reduction using 50th versus 90th Percentile Water Use Estimates

Jurisdiction	Percent Reduction of Non-stormwater Volume with Final Bacteria BMPs Implemented (2029)	
	Median Outdoor Water Use Estimate (68 gpcd)	90th Percentile Outdoor Water Use Estimate (109 gpcd)
Santa Clarita	100%	100%
Uninc. LA County	100%	100%

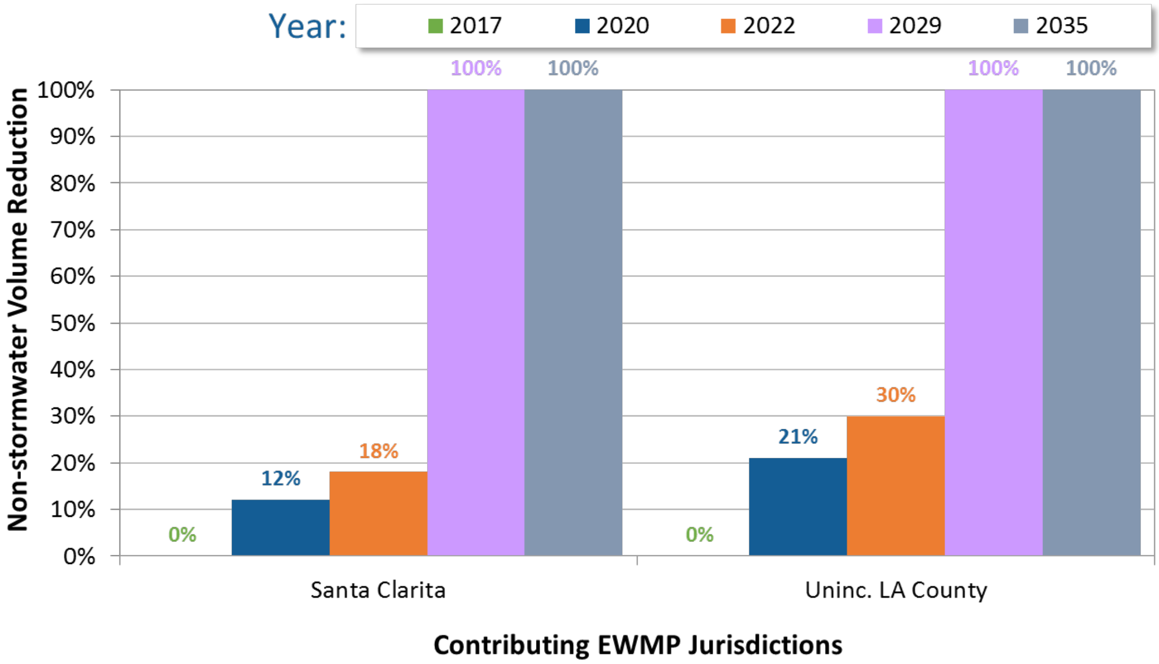

Figure C2-4. Schedule for Non-stormwater Reductions via Implementation of EWMP Structural BMPs

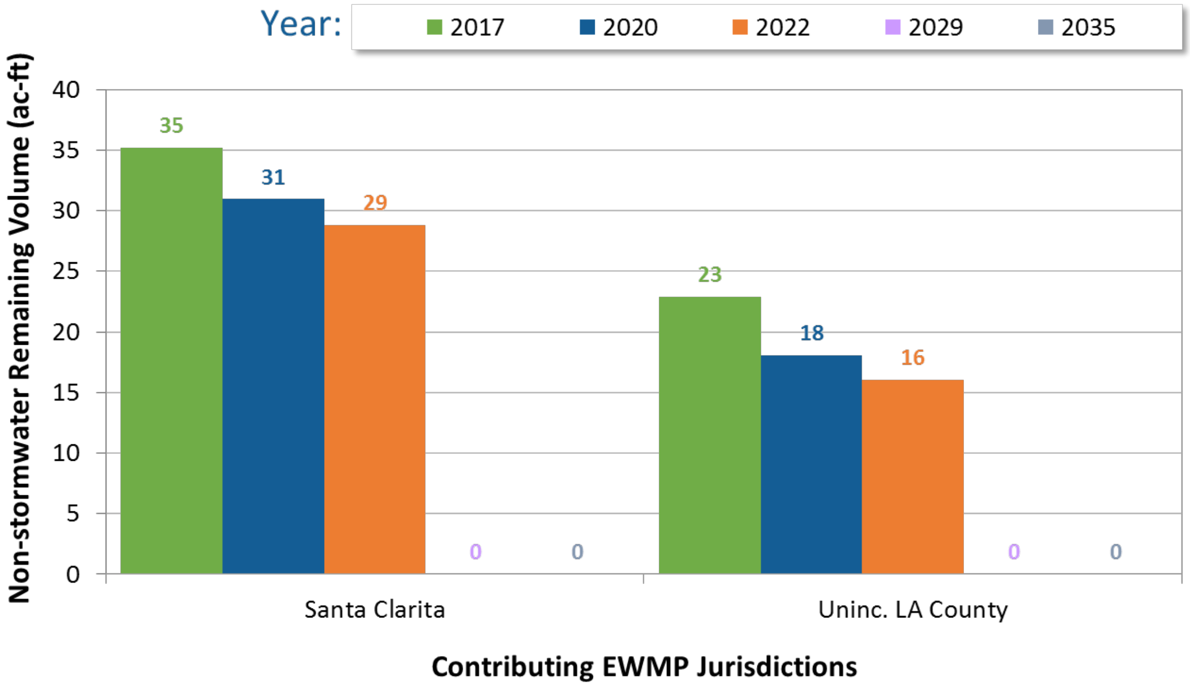

Figure C2-5. Schedule for Remaining Non-stormwater Volume after Implementation of EWMP Structural BMPs

C2-4 Evaluation of Non-Structural Controls

The non-stormwater simulation provides reasonable assurance that by 2029, non-stormwater flows will be effectively prohibited and meet applicable WQBELs. However, not all of the structural controls will be in place by the 2023 dry weather Bacteria TMDL deadline. As shown in the figures above, the structural control measures to be implemented according to the EWMP milestones will achieve reduction in non-stormwater flows by 18% to 30%. To determine the percent reduction necessary to achieve the RWLs during dry weather, the 90th percentile of receiving water data from Reach 5 of the Santa Clara River was calculated and compared to the RWL of 126 MPN per 100 mL. Based on that analysis, a 41% reduction in *E. coli* concentrations is expected to be needed to achieve the RWLs for the SCR.

To achieve the additional 23% reduction for the City and 11% reduction for the County needed by the 2023 TMDL deadline, non-stormwater abatement programs and water conservation programs will be utilized to reduce dry weather flows and achieve the necessary reductions. The non-stormwater screening, investigation and abatement programs being conducted under the CIMP for the USCR EWMP Group will provide significant reductions in dry weather flows. These programs require source identification for all outfalls identified as exhibiting significant non-stormwater discharges by 2017. Based on the source investigations, identified illicit discharges would need to be abated. As a result, the program will be targeting the highest and most persistent non-stormwater flows. Studies conducted in the Los Angeles River and Ballona Creek have shown that the top 10% of the outfalls are responsible for the majority of the non-stormwater flows. As a result, targeting these outfalls for source control and abatement is likely to achieve the required reductions in non-stormwater discharges by the Bacteria TMDL deadline.

Additionally, water conservation programs are anticipated to continue reducing outdoor water use and the corresponding runoff. The Urban Water Management Plans in the EWMP area have identified a target of 20% reduction in water use between 2010 and 2020. Based on 2013 and 2014 water use data, reductions of between 6% and 9% have already been achieved. Given the ongoing drought and emphasis on water conservation programs, it is reasonable to assume that a 20% reduction in outdoor water use could be achieved by 2023.

C2-5 Conclusions

The combination of a strong non-stormwater abatement program that targets the most significant flows, water conservation programs that target outdoor water use, and the planned structural controls to address wet weather discharges have a reasonable assurance of meeting the dry weather WQBELs for the bacteria TMDL. Additionally, the structural controls to address wet weather discharges have reasonable assurance of eliminating non-stormwater discharges by 2029, through implementation of the network of wet weather control measures and non-stormwater abatement programs.

C2-6 References

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APPENDIX C3

BMP Opportunity Summary and Candidate Public Parcels

C3-1 Introduction

This appendix summarizes the methods for identifying existing, planned, and potential control measure opportunities in the Upper Santa Clara River EWMP area. The identified control measures (herein called best management practices, or BMPs, interchangeably) served as the "pool" of opportunities considered in the RAA, and ultimately determined the suite of strategies prescribed in the EWMP.

Methods and results are presented per the following sections:

- **Section C3-2 – Existing and Planned Control Measures:** summarizes the known existing and planned BMP opportunities in the Upper Santa Clara River EWMP area.

- **Section C3-3 – Potential Control Measure Opportunity Assessment:** identifies new BMP opportunities for each category described in Section 5.2 and estimates the relevant subwatershed-scale infiltration rates.

- **Section C3-4 – Detailed List of Screened Public Parcels:** a list of public parcels screened as candidates for regional projects is presented.

C3-2 Existing and Planned Control Measures

This section summarizes the identified existing and planned BMPs within each jurisdiction. Note that all BMPs constructed prior to September 2011 are implicitly included in the EWMP analysis through calibration of the WMMS, whereas BMPs constructed post-September 2011 were explicitly included in the RAA. These BMPs demonstrate progress towards meeting the water quality objectives of the EWMP.

A BMP data request was distributed to all jurisdictions within the Upper Santa Clara River EWMP area to identify existing BMPs. The City of Santa Clarita and Los Angeles (LA) County responded to the data request with summaries of existing and planned BMPs. In addition, a literature review was performed to identify further structural BMP projects that were not encompassed by the data request. The literature review included the following documents/sources:

- Integrated Regional Watershed Management Plan (IRWMP) documents,
- The online OPTI database, and
- The Notice of Intent (NOI).

Furthermore, the 2011-2012 Annual Report was reviewed, and a summary of the BMPs reported therein is presented in **Section C3-2.2**. Note that no existing or planned regional control measures were identified.

C3-2.1 EXISTING DISTRIBUTED BMPS VIA DATA REQUEST AND LITERATURE REVIEW

Existing distributed BMPs (a total of 191) identified during the data request and literature review are summarized in **Table C3-3** and shown in **Figure C3-1**. A detailed list of distributed BMPs is provided in Appendix C5.

Table C3-1. Summary of existing distributed BMPs from data request

Jurisdiction	**Number of Existing Distributed BMPs Reported by Jurisdiction**								
	Site-Scale Detention	**Green Infrastructure**						**Flow-Through Treatment BMP**	**Source Control Structural BMP**
		Bioretention/ Biofiltration	**Permeable Pavement**	**Green Street**	**Bioswale**	**Infiltration BMPs**	**Rainfall Harvest**		
LA County	8	9	1	--	10	--	1	4	118
Santa Clarita	--	4	--	--	--	--	--	1	31
TOTAL:	**8**	**13**	**1**	**0**	**10**	**0**	**1**	**5**	**149**

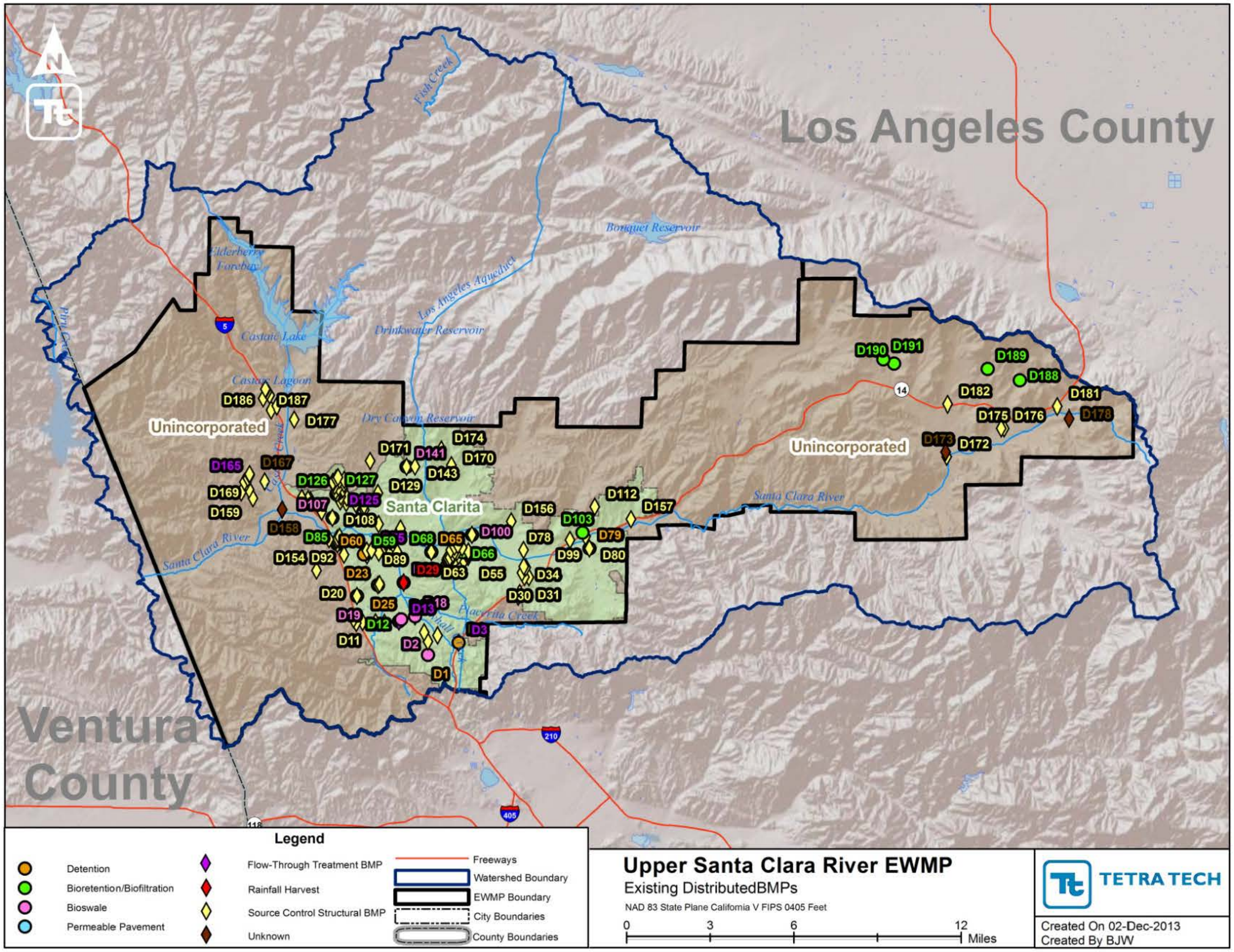

Figure C3-1. Existing distributed BMPs

Notes: BMPs with no spatial data are not shown. Numbering corresponds with project ID numbers listed in Appendix C5.

C3-2.2 EXISTING BMPS ACCORDING TO 2011-2012 MS4 ANNUAL REPORT

The MS4 Annual Report includes reporting of BMPs that have been installed and maintained during each Permit year. The 2011-2012Annual Report was reviewed for information regarding existing BMPs, and categorized into the regional and distributed BMP categories. As shown in **Table C3-2**, an estimate of the current number of existing BMPs was created based on the following assumption: the number of existing BMPs is the number of BMPs reported as *installed* in 2011-2012 plus the number of BMPs *maintained* in 2011-2012. It is possible that an individual BMP was both installed and maintained in 2011-2012, and then it would be "double counted". Each EWMP agency reviewed **Table C3-2** and confirmed that the data are accurate to the best of their knowledge, and verified that the installed and/or maintained BMPs are not being double counted. For those BMPs that are important to the RAA, follow-up information was requested for important BMP characteristics including location, capacity, etc. These details were not available in the Annual Report.

Table C3-2. Existing BMPs according to Review of 2011-2012 MS4 Annual Report[1,2]

Type	Combined	LA County	LACFCD	Santa Clarita	Total
Bioretention	Bioretention	0	0	6	6
Bioswale	Vegetated Swale/Strip	0	0	21	21
Permeable Pavement	Gravel Pave Porous Pavement	1	0	0	1
Infiltration	Infiltration Trenches	0	0	16	16
	Infiltration Basin	1	0	16	17
Flow-Through Treatment BMP	Hydro Cartridge In-Line Filters	0	0	2[3]	1
	Filterra	56	0	0	56
Source Control Structural BMP	Abtech OARS Oil Skimmer	44	0	0	44
	Abtech Ultra Urban Catch Basin Insert	0	0	1	1
	CDS Gross Pollutant Separators	3	0	0	3
	Clean Screen Catch Basin Inserts	155	0	0	155
	Drain Pac Catch Basin Inserts	5	0	0	5
	Fossil Filter Catch Basin Inserts	4[3]	0	0	2
	Stormceptor Gross Pollutant Separators	1	0	0	1
	Automatic Retractable Screen Catch Basin(ARS)	4[3]	0	0	2
	Catch Basin Inserts(various)	4[3]	0	0	2
	Connector Pipe Screens Catch Basin(CPS)	6	0	0	6
	Contech CDS Unit	4[3]	0	0	2
	EnviroPod Catch Basin Inserts	7	0	0	7
	Floguard Drain Insert	2	0	0	2
	FloMaster Trench Drain Filter	0	0	2[3]	1
	Fossil Filter Downspout Insert	1,650	0	0	1,650
	Kristar Flograd Hydrodynamic Separator	2,814	0	0	2,814
	Streamguard Catch Basin Inserts	2	0	0	2
Treatment Facilities	Floating Trash Booms	801	0	0	801
Institutional BMPs	Covered Material Bunkers	4[3]	0	0	2
	Covered Trash Bins	40	0	0	40
Institutional	Dog Parks	1	0	0	1
	Enhanced Street Sweeping	11	0	0	11
	Extra Trash Cans	2	0	0	2
	Concrete Waste Management	7	0	0	7
	Dust Control	2[3]	0	0	1
	Erosion Control	4[3]	0	106	108
	Liquid Waste Management	1	3	33	37
	Sanitary/Septic Waste Management	43	0	0	43
	Scheduling	6[3]	0	27	30

Type	Combined	LA County	LACFCD	Santa Clarita	Total
	Solid Waste Management	3	0	381	384
	Stockpile Management	0	0	2	2
Other	Check Dam	5	0	0	5
	Desilting Basin	4	0	0	4
	Fiber Rolls	5	0	0	5
	Sand Bags	4[3]	0	0	2
	Sediment Trap	0	0	1	1
	Silt Fence	0	0	22	22
	Silt Screen	0	0	5	5
	Soil Stabilizer/Irrigation	1	0	0	1
	Sediment Trap	0	0	3	3
	Stabilized Construction Entrance	0	0	5	5
	Steel Plate	2	0	0	2
Total		**5,691**	**3**	**647**	**6,341**

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 may be an 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.

C3-2.3 PLANNED DISTRIBUTED BMPS VIA DATA REQUEST AND LITERATURE REVIEW

Two planned distributed BMP projects were identified during the literature review:

- Trash removal BMPs for up to 110 storm drain inlets in commercial and industrial park, Unincorporated LA County.
- Trash removal BMPs for up to 79 storm drain inlets in commercial and industrial park, City of Santa Clarita.

The planned distributed BMPs are listed in Appendix C5. In addition to the identified planned projects, the Standard Urban Stormwater Mitigation Plan (SUSMP) requires post-construction structural or treatment-control BMPs for new development and redevelopment throughout the Upper Santa Clara River watershed. As development and redevelopment occur, additional structural BMPs will be constructed in accordance with the SUSMP to treat or retain the runoff from public and private parcels (for redevelopment assumptions see **Section C3-3.2.3**).

C3-3 Potential Control Measure Opportunity Assessment

Additional control measures were identified to meet the numeric water quality objectives of the EWMP. This section discusses the methods used to assess *new* control measure opportunities for each category discussed in Section 5 of the EWMP[1]. Analysis of soil infiltration rates was also performed to evaluate the prominence of systems where poor infiltration necessitates underdrains (e.g. biofiltration systems) and to aid with project prioritization.

Data used for the desktop assessment are listed in **Table C3-3.**

Table C3-3. Data inventory for street screening

Data Set	Format	Description	Source
Parcels	GIS Shapefile	Outlines property boundaries, sizes, and ownership	Los Angeles County (LAC) Assessor
Roads	GIS Shapefile	Shows street centerline network & classification by Topologically Integrated Geographic Encoding and Reference (TIGER)	LAC GIS Portal
Land Use	GIS Shapefile	Subdivides the region into predefined land use categories with similar runoff properties. Each individual land use feature identifies the associated percent impervious coverage.	LAC WMMS Model
Soils	GIS Shapefile	Outlines spatial extents of dominant soil types	LAC GIS Portal
Subwatersheds	GIS Shapefile	Defines drainage areas to selected outlet points	LAC WMMS Model
Groundwater Contours	GIS Shapefile	Illustrates groundwater depth as measured from the surface	Los Angeles Bureau of Sanitation
Slopes	GIS Shapefile	Classifies regions by the slope category	LAC WMMS Model
Jurisdictions	GIS Shapefile	Establishes city and county boundaries	LAC GIS Portal
Aerial Orthoimagery	Image	Shows high resolution (30-cm) satellite imagery	ESRI Basemap
Soil Contamination Hazards	Table	Coordinates of active soil contamination and cleanup sites	State of California Water Resources Control Board GeoTracker

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[1] Note that for the purposes of the RAA, total drainage area must be conserved. In other words, overlapping drainage areas were consolidated to avoid double-counting the same treated drainage area. The reported opportunities in this section are therefore smaller than the actual available spatial opportunities in the EWMP area – this was reconciled in the RAA by incorporating routing between BMPs so that the cumulative upstream drainage area to each BMP is represented.

C3-3.1 SOIL INFILTRATION RATE ASSESSMENT

Soil infiltration rates are one of the key drivers of infiltration BMP performance, (as discussed in Section 6 of the EWMP), and determine whether an underdrain is necessary to facilitate drainage. This section describes the methodology used to estimate subwatershed-scale soil infiltration rates for BMP modeling.

The RAA model implicitly includes soil infiltration parameters that were arrived at through calibration efforts; however, to explicitly model control measures, infiltration rates were defined by subwatershed using available geospatial data. Soil data coverage provided through the LACDPW Hydrology Manual categorized soil unit areas into soil types. Runoff coefficient curves reported in the Hydrology Manual were developed by LACDPW for each soil type using double ring infiltrometer tests performed on areas of homogeneous runoff characteristics (LACDPW 2006). LADPW employed a sprinkling-type infiltrometer to perform the tests in each homogeneous area.

Runoff coefficient curves represent the response of the runoff coefficient (defined as the ratio of runoff to rainfall from a land area) to varying rainfall intensities. Each curve displays an inflection point representing the rainfall intensity at which substantial runoff initiates. According to LADPW (2006), each curve was assigned a minimum runoff coefficient of 0.1, “indicating that there is some runoff even at the smallest rainfall intensities.” The infiltration rate for each soil curve can therefore be calculated as the difference between the rainfall intensity at the point of inflection and the minimum runoff rate, as demonstrated conceptually in **Figure C3-2**.

The inflection point, and subsequently calculated infiltration rate, for each unique soil type in the EWMP area were identified using the runoff coefficient curves in Appendix C of the *Hydrology Manual* (LADPW 2006). Subwatershed areas were then intersected with the soil type coverage to calculate an area-weighted infiltration rate. **Figure C3-3** shows the distribution of the infiltration rates.

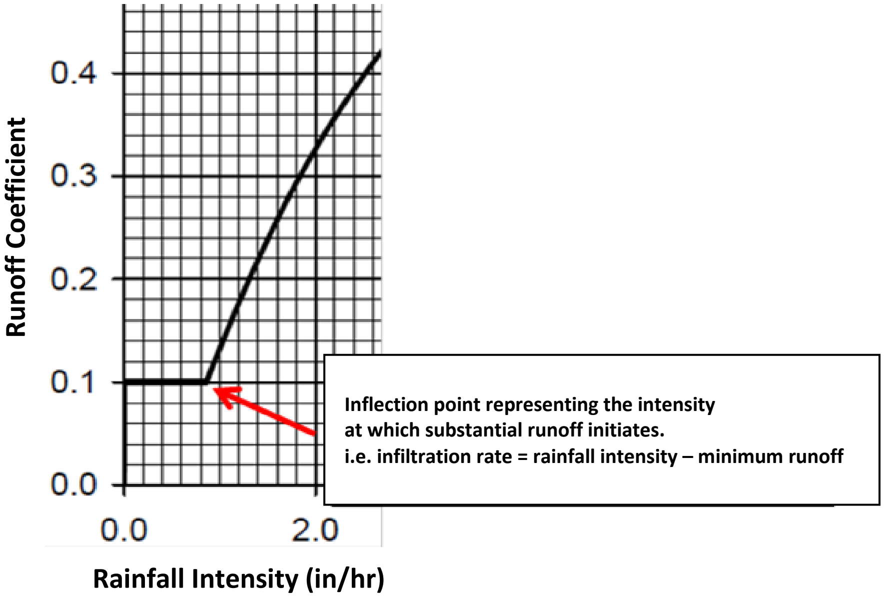

Figure C3-2. Example Determination of Runoff Coefficient Inflection Point for an Arbitrary Soil Type in Appendix C of LACDPW (2006)

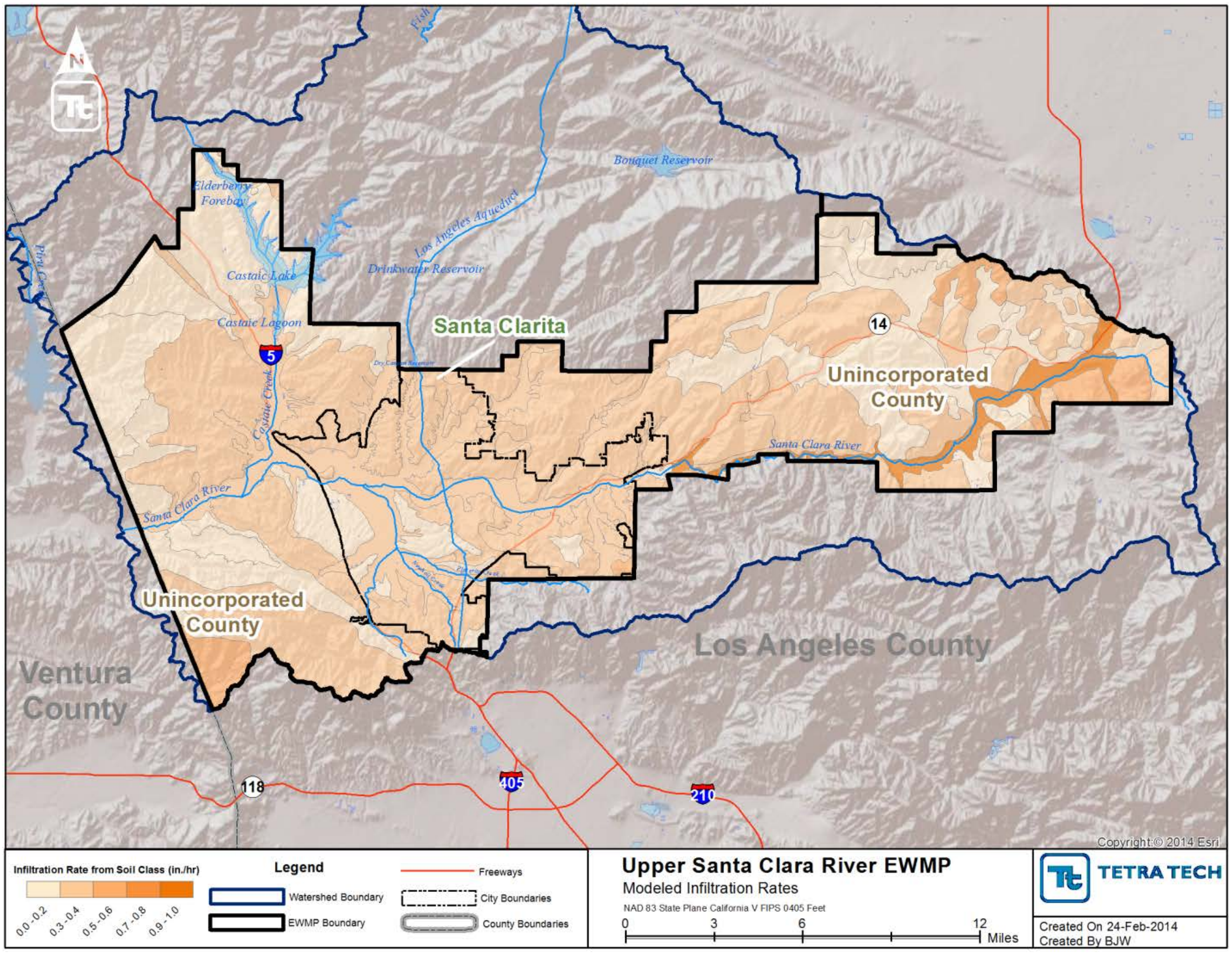

Figure C3-3. Modeled Soil Infiltration Rates throughout the Upper Santa Clara River EWMP Area

Appendix H of the Permit mandates underdrains (biofiltration systems) when subsoil infiltration rates are below 0.3 in/hr. **Figure C3-4** shows areas where green infrastructure and LID BMPs will likely require underdrains.

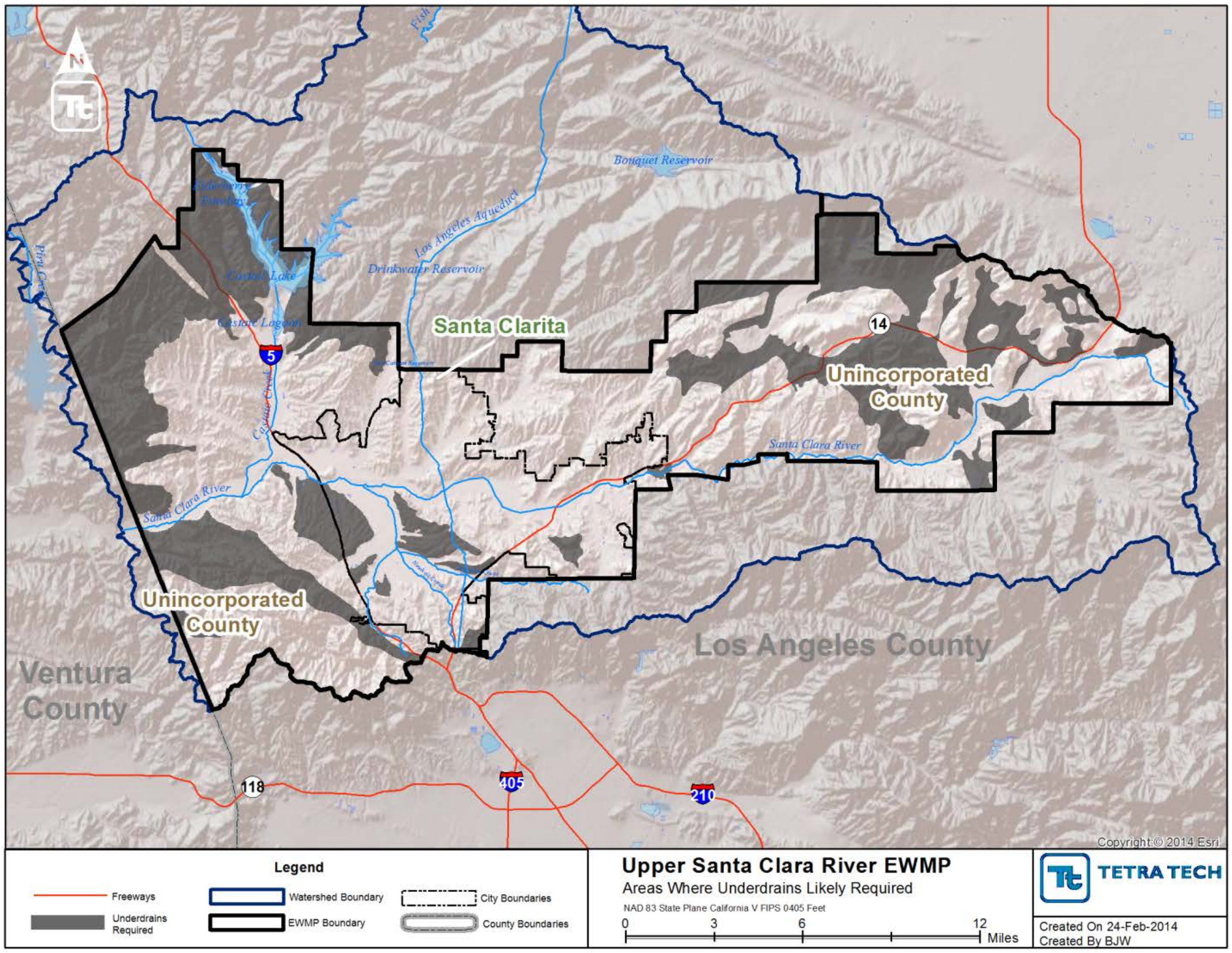

Figure C3-4. Areas Where Underdrains Would Likely be Required (i.e. Where Subsoil Infiltration Rates are Estimated Less Than 0.3 In/Hr)

C3-3.2 PARCEL SCREENING METHODS

Some parcels are unsuitable for control measures due to physical site constraints and/or institutional barriers. All parcels within the EWMP area were therefore screened for suitability, and the remaining candidate parcels were ranked using quantitative prioritization metrics. The following subsections describe these methods.

C3-3.2.1 Public Parcel Screening Criteria (LID and Regional Projects on Public Parcels)

Retrofitting public parcels with BMPs can be an efficient strategy for reducing stormwater runoff. This method allows municipalities the flexibility to prioritize and schedule stormwater projects to coincide with improvements that are already on the books (such as scheduled parking lot resurfacing, utility work, and public park improvements). Implementing LID on public parcels also allows municipalities the freedom to construct, inspect, and maintain BMPs without the need to purchase private property or to create stormwater easements.

Potential sites were screened using the following criteria:

- **Ownership:** Public parcels in the EWMP area were first identified using their assessor's identification number. Private parcels are discussed in **Section C3-3.2.3.**
- **Slopes:** The identified list of public parcels underwent screening for slope because high slope areas tend to preclude efficient BMP retrofits. Areas with slopes greater than 10% were clipped out of the candidate parcels, while low slope parcel areas were retained as potential opportunities.
- **Soil contamination:** Infiltrating runoff near historical spills and cleanup sites can present a risk of mobilizing pollutants into the groundwater. To avoid potential problems, sites that were identified as open contamination cases (per the State of California GeoTracker database) were eliminated as unsuitable BMP retrofit opportunities. Sites that have been remediated or have closed cases were still considered as opportunities to provide BMP retrofits.
- **Receiving waters:** Sites located within the extents of open channels and receiving waters were screened out because compliance must be achieved at the point of discharge (e.g. runoff must be treated *before* it reaches the stream)
- **Proximity to storm drains (regional projects only):** Sites located near – or transected by – large storm drains are more cost effective for diversion and routing of offsite runoff. Parcels greater than 500 ft. from storm drains were excluded from the list of regional control measure candidates (although retained as potential LID retrofit opportunities).
- **Engineering feasibility (regional projects only):** A reconnaissance of aerial imagery was performed for each candidate parcel to assess the suitability of each parcel for regional BMPs. Sites deemed unsuitable based on best professional judgment (i.e. sites located at the base of steep canyons or on hilltops, sites built out with extensive building footprints, etc.) were eliminated from the pool of opportunities.

The results of desktop screening for LID and regional BMPs on public parcels is tabulated in **Table C3-4** and displayed in **Figure C3-5**. Note that the RAA assumed LID BMPs could be implemented on the identified public parcels to treat the *direct* runoff from the parcel proper, whereas regional BMPs could be co-located on the same parcel to treat *offsite* runoff.

Table C3-4. Screened Public Parcel Retrofit Opportunities[2]

Jurisdiction	Total Public Parcel Area Identified for LID Opportunity (acres)	Total Public Parcel Area Identified for Regional BMP Opportunity (acres)
City of Santa Clarita	338	224
Unincorporated LA County	772	257

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[2] Reported areas represent total parcel areas – the actual *BMP footprints* to be implemented on the screened parcels used in the RAA was based on the design assumptions detailed in Appendix C4.

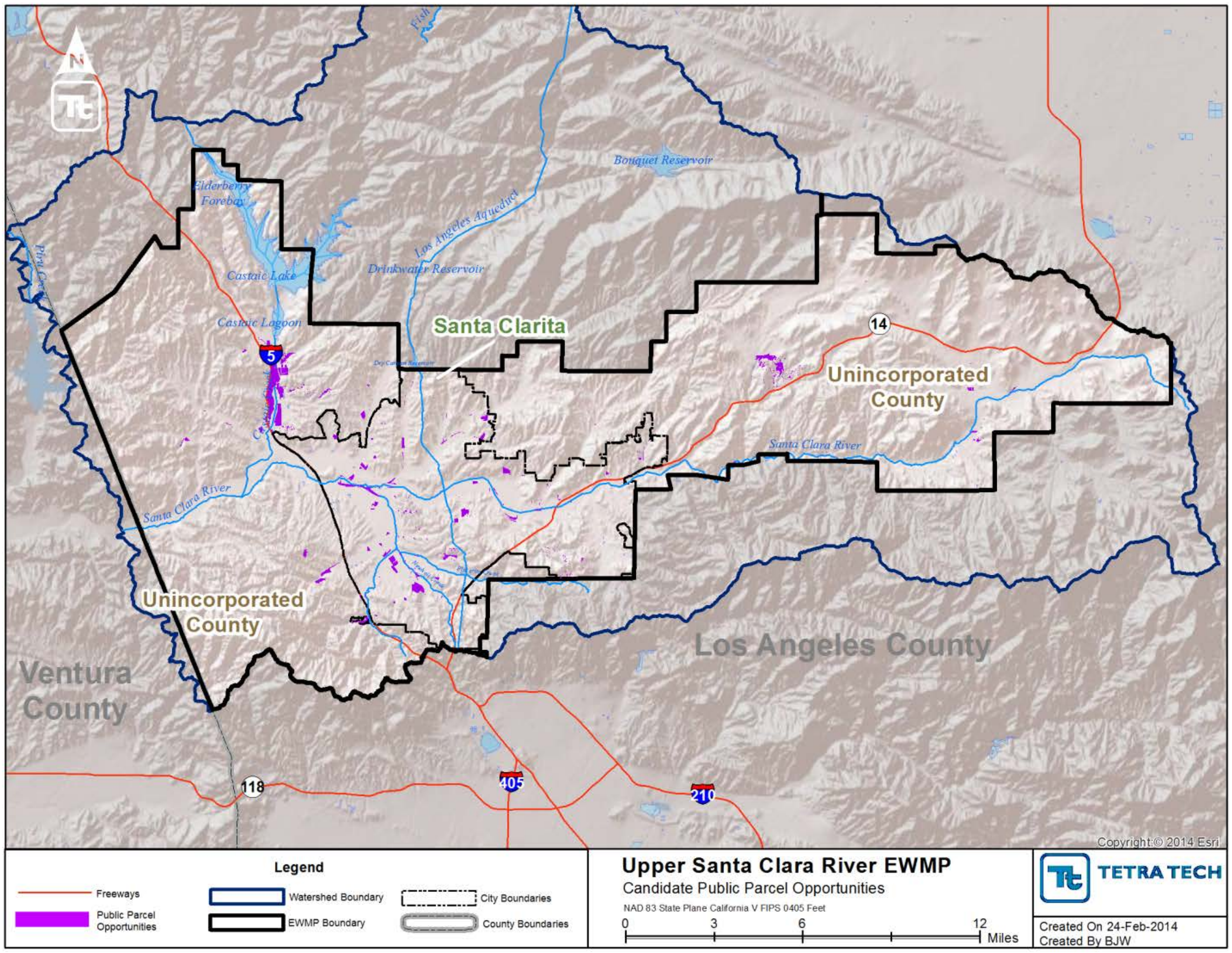

Figure C3-5. Screened Opportunities for BMPs on Public Parcels

Notes: Regional and LID BMPs can be co-located on the same parcel, although their respective drainage areas do not overlap (LID treats the parcel, while regional BMPs treat the upstream area).

C3-3.2.2 Public Parcel Prioritization (Regional Projects on Public Parcels)

Candidate parcels identified in **Section C3-3.2.1** underwent a prioritization process to rank the sites for implementation. The prioritization matrix presented in **Table C3-5** assigned each candidate parcel a composite score based on the parameters that favor BMP suitability and performance. Because regional BMPs with large drainage areas tend to be highly efficient at pollutant removal, a secondary prioritization was performed to identify those sites located at the downstream end of major subwatersheds. Furthermore, special consideration was given to sites near identified alluvial aquifer recharge zones.

The resulting prioritized parcel list was subject to review by the EWMP agencies to ensure institutional feasibility. Prioritization scores and drainage area flags were used to rank all suitable parcels and the top 16 (Tier A) regional candidates were selected from this list (shown in **Figure C3-6**; see Appendix C6 for Tier A project details and Appendix C9 for Conceptual Designs for featured Tier A projects).

Table C3-5. Regional Project Prioritization Criteria

Factor	Score (5 = Best, 1 = Worst)				
	5	4	3	2	1
Parcel type	City- or county-owned public parcels were assigned a priority score of 10.	Other publically owned parcels (schools/ universities, state and federal facilities, utilities) were assigned a priority score of 8.	Private Parcels (Screened Out)		
Slope (Percent of the parcel less that 10 percent slope)	95% (score of 8)	85% (score of 6)	65% (score of 4)	< 50 (Score of 2)	100% (screened out)
Proximity to storm drainage network (feet)	<100	100 >, <250	<500		> 500 (screened out)
Contaminated Sites	> 500		>100	<100	
HSG soil type	A, B		C		D
Depth to groundwater (feet)	> 20	10 to 20			< 10
% Imperviousness of the parcel	≤ 30%	30%–40%			> 40%
Parcel size (acres)	≥ 200	150–200	100–150	1–100	< 1
Proximity to impaired waters (miles)		< 1	< 2	< 3	< 4
Proximity to subwatershed outlet	Site within 1,000 feet of each subwatershed outlet were flagged for additional review				
Proximity to recharge zones	Sites located near alluvial aquifer recharge zones were flagged for additional review				

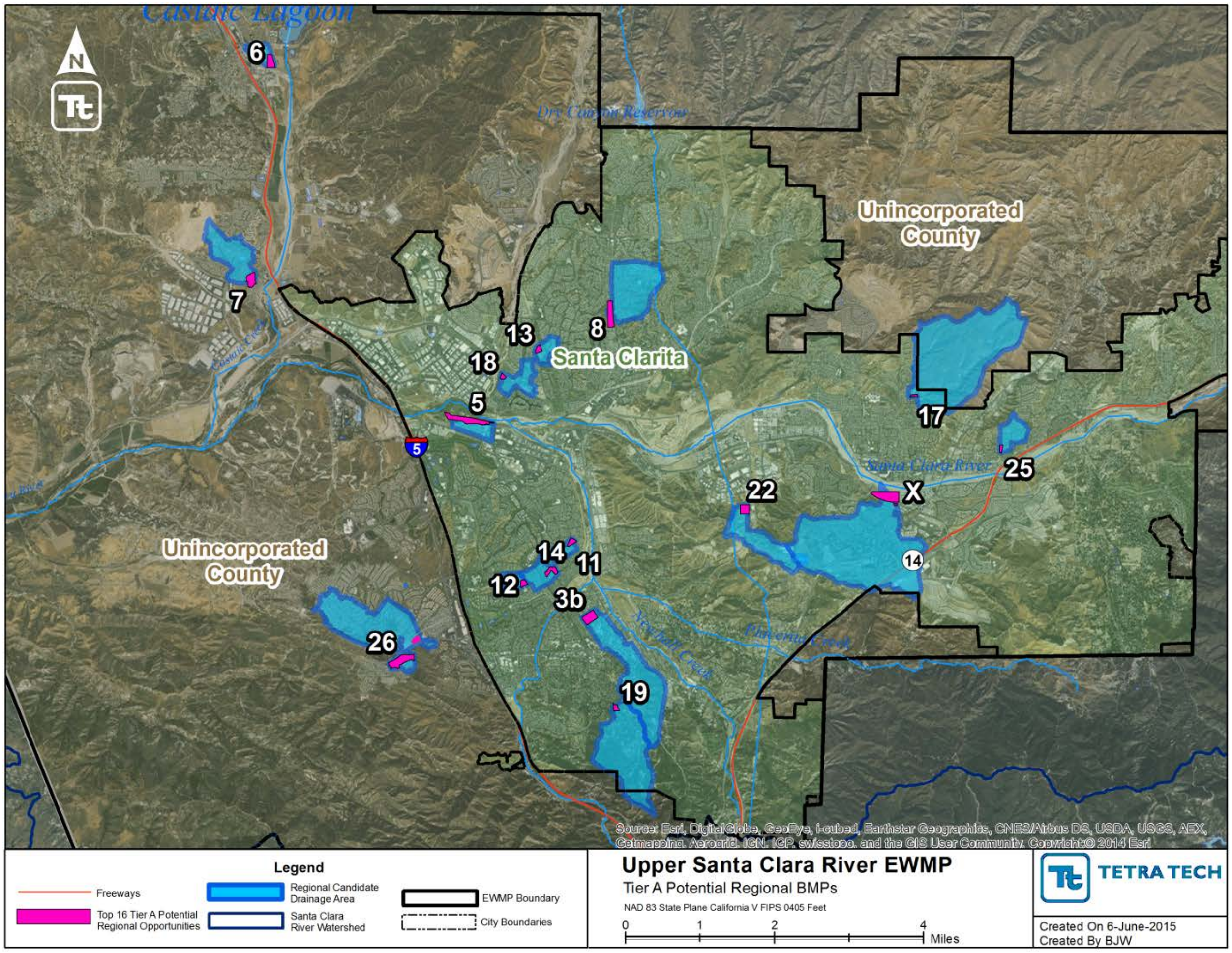

Figure C3-6. Candidate Tier A Regional Parcels

Notes: Numbering corresponds with fact sheet ID numbers in Appendix C6

C3-3.2.3 Private Parcel Screening (Residential LID and Redevelopment)

Distributed LID on private parcels was applied based on the relevant land use areas. High-density residential land areas were considered for residential LID opportunities at a predicted rate of 1% per year (starting in 2017); in other words, the RAA assumed that 1% of residences would implement LID measures to treat their parcels each year.

To represent LID due to redevelopment in the EWMP area, all developed land uses were considered. The land area redeveloped (and treated) was approximated using redevelopment forecasts provided by the City of Santa Clarita. A total of 1,050 acres of redevelopment was forecasted within the City before the year 2029, of which 50% was expected to occur on commercial land use (the remainder to be distributed proportional to the developed land uses in the WMMS). These area-weighted redevelopment rates were also applied to the developed land uses in the unincorporated County EWMP area.

LID on private parcels represented in the EWMP is tabulated in **Table C3-6** and shown visually in **Figure C3-7.**

Table C3-6. Predicted Areas Treated by LID on Private Parcels

Jurisdiction	Total Acres Assumed Treated by Residential LID (2017-2029)	Total Acres Assumed Treated by LID due to Redevelopment (2015-2029)
City of Santa Clarita	707	1,049
Unincorporated LA County	460	2,091

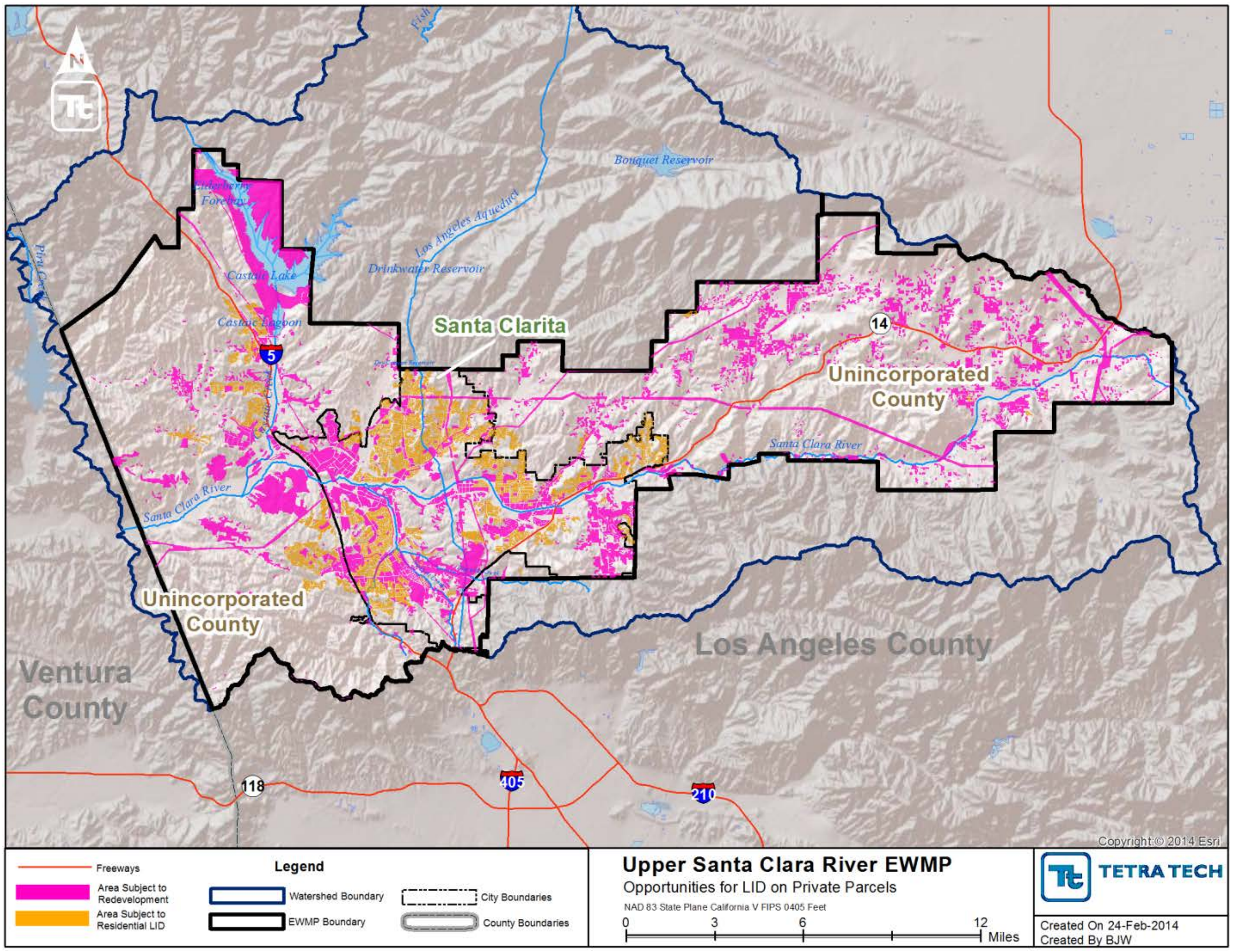

Figure C3-7. LID on Private Parcels Represented in the EWMP

Notes: Displayed opportunities are distributed proportionally by land use throughout the EWMP area at the rates specified in **Table C3-6.**

C3-3.3 STREET SCREENING METHODS

Stormwater BMPs in the right-of-way are treatment systems arranged linearly within the street corridor and are designed to reduce runoff volumes and improve runoff water quality from the roadway and adjacent parcels. Implementing BMPs in the right-of-way provides an opportunity to meet water quality goals by locating BMPs in areas owned or controlled by a municipality to avoid the cost of land acquisition or establishing an easement. Implementing street retrofit opportunities allows for direct control of construction, maintenance, and monitoring activities by the responsible jurisdiction.

Not all roads are suited for right-of-way BMP retrofits; therefore, screening is required to eliminate roads where green street retrofits are impractical or infeasible due to physical constraints. While right-of-way BMP retrofits can be implemented in a variety of settings, the physical characteristics of the road itself such as the road type, local topography, and depth to groundwater can significantly influence the practicality of designing and constructing these features. A screening protocol was established to identify realistic opportunities for retrofits based on the best available GIS data, as listed in **Table C3-3**, and supplemented with the Topologically Integrated Geographic Encoding and Reference (TIGER) Census roads data.

Streets were screened based on the following criteria:

- **Road Functional Class**: High traffic volumes, speed limits, and slopes impact the feasibility of green infrastructure implementation along street corridors. Road classification data contains information typically useful for determining if the street is subject to high traffic volumes and speeds, and Census TIGER road data provides the best available road classification information for the study area. **Table C3-7** shows the Master Address File (MAF)/TIGER Feature Classification Codes (MTFCC) deemed appropriate for street retrofit opportunities. Only roads with the MTFCCs listed in **Table C3-7** were considered for street retrofits in this screening analysis. All other roads were screened out.
- **Slopes**: In addition to the screening of road types, opportunities were further screened to remove segments that have steep slopes. BMP implementation on streets with grades greater than 10 percent present engineering challenges that substantially reduce the cost effectiveness of the retrofit opportunity. From the available WMMS slope information, roads were considered as retrofit opportunities if the slope was less than 10 percent.

The results of the street screening are presented in **Table C3-8** and shown in **Figure C3-8**. Note that the analysis screened many roads out of the Upper Santa Clara EWMP area due to steep slopes.

Table C3-7. Green Street BMP Assumed Suitable MTFCC

MTFCC	Description
S1400	Local neighborhood road, rural road, city street
S1730	Alley
S1780	Parking lot road

Table C3-8. Screened Potential Green Street Opportunities

Jurisdiction	Approximate Miles of Screened Green Street Opportunity (miles of frontage length)[3]	Total Approximate Direct[4] Drainage Area to Screened Street Opportunities (acres)
City of Santa Clarita	157	6,887
Unincorporated LA County	57	5,571

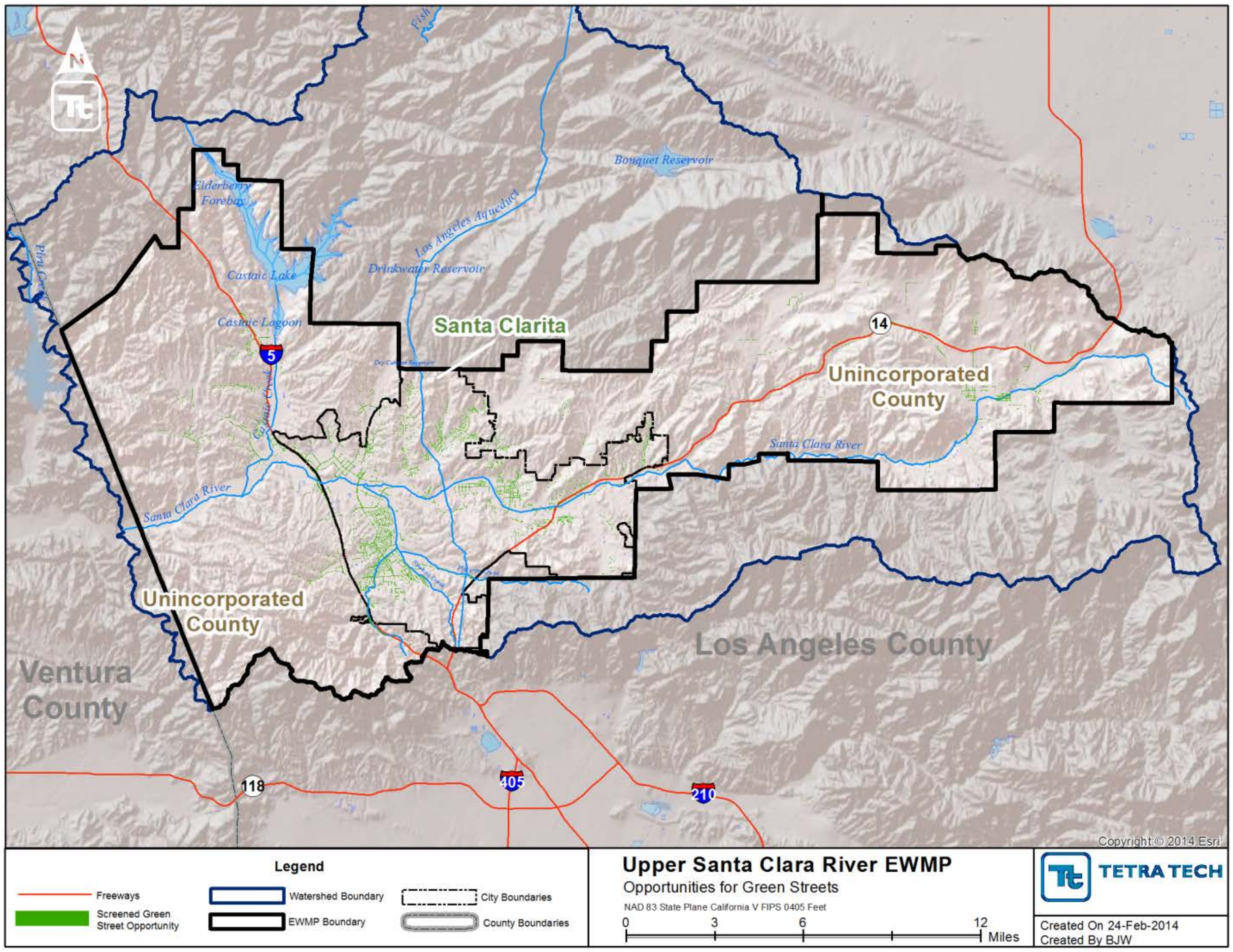

Figure C3-8. Screened Potential Green Street Locations

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[3] Note that this is total screened *frontage* length (not *road* length or *BMP* length). The road length is approximately one half of the reported frontage, and the required green street BMP lengths were determined in the RAA based on the assumptions in Appendix C4.

[4] Recall that upstream BMPs such as LID on parcels, and their associated drainage areas, are also ultimately routed to green streets.

C3-4 Detailed List of Screened Public Parcels

The following is a list of all of the public parcels that were considered in the RAA for regional projects (screened using methods outlined in Appendix C3).

ASSESSOR'S IDENTIFICATION NUMBER (AIN)	OWNER	Tier
2844013900	SANTA CLARITA CITY	TierA
2827022901	L A CO FLOOD CONTROL DIST	TierA
2827022900	L A CO FLOOD CONTROL DIST	TierA
2836012905	SANTA CLARITA CITY	TierA
2855006902	SANTA CLARITA CITY	TierA
2855006901	SANTA CLARITA CITY	TierA
2858007900	SANTA CLARITA CITY	TierA
2859014900	SANTA CLARITA CITY	TierA
2859030902	SANTA CLARITA CITY	TierA
2859030901	L A COUNTY	TierA
2811062904	SANTA CLARITA CITY	TierA
2826119900	L A COUNTY	TierA
2866015900	L A COUNTY	TierA
2866014900	L A COUNTY	TierA
2802003908	L A CO FLOOD CONTROL DIST	TierA
2810032901	SANTA CLARITA CITY	TierA
2811029900	SANTA CLARITA CITY	TierA
2865007906	NEWHALL CO WATER DIST	TierA
2811083902	SANTA CLARITA CITY	TierA
2860003900	SANTA CLARITA CITY	TierA
2866020908	CASTAIC UNION SCHOOL DISTRICT	TierB
2866020910	CASTAIC UNION SCHOOL DISTRICT	TierB
2866020909	CASTAIC UNION SCHOOL DISTRICT	TierB
2810032902	SAUGUS UNION SCHOOL DIST	TierB
2866014934	CASTAIC UNION SCHOOL DIST	TierB
2837020900	SANTA CLARITA CITY	TierB
2837033900	SANTA CLARITA CITY	TierB
2854038900	SANTA CLARITA CITY	TierB
2802038902	SANTA CLARITA CITY	TierB
2805013900	SAUGUS UNION SCHOOL DIST	TierB
2811065907	SANTA CLARITA CITY	TierB
2825010929	SANTA CLARITA CITY	TierB
2827001903	L A COUNTY	TierB
2827001900	L A COUNTY	TierB
2827001901	L A COUNTY	TierB
2827001908	L A COUNTY	TierB
2827034901	L A CO FLOOD CONTROL DIST	TierB

ASSESSOR'S IDENTIFICATION NUMBER (AIN)	OWNER	Tier
2831006902	SANTA CLARITA CITY	TierB
2831006903	SANTA CLARITA CITY	TierB
2831009900	SANTA CLARITA CITY	TierB
2831006901	SANTA CLARITA CITY	TierB
2831006900	SANTA CLARITA CITY	TierB
2831014900	SANTA CLARITA CITY	TierB
2833005903	L A COUNTY	TierB
2833014902	SANTA CLARITA CITY	TierB
2833005904	L A COUNTY	TierB
2833005902	L A COUNTY	TierB
2833012900	SANTA CLARITA CITY	TierB
2833016900	SANTA CLARITA CITY	TierB
2834024918	SANTA CLARITA CITY	TierB
2834023950	SANTA CLARITA CITY	TierB
2834023950	SANTA CLARITA CITY	TierB
2855006904	WILLIAM S HART UNION HIGH SCHOOL	TierB
2855006900	WILLIAM S HART UNION	TierB
2855006900	WILLIAM S HART UNION	TierB
2855011902	L A CO FLOOD CONTROL DIST	TierB
2855011900	L A CO FLOOD CONTROL DIST	TierB
2855011901	L A CO FLOOD CONTROL DIST	TierB
2859004902	L A COUNTY HOUSING AUTHORITY	TierB
2859002901	L A CO FLOOD CONTROL DIST S BY S	TierB
2861009909	L A COUNTY	TierB
2861009901	L A COUNTY	TierB
2861009904	SANTA CLARITA CITY	TierB
2861009908	SANTA CLARITA CITY	TierB
2861009903	SANTA CLARITA CITY	TierB
2861009907	SANTA CLARITA CITY	TierB
2861009905	SANTA CLARITA CITY	TierB
2861009906	SANTA CLARITA CITY	TierB
2861026900	SANTA CLARITA CITY	TierB
2826022901	L A COUNTY	TierB
2826075900	L A COUNTY	TierB
2826085900	NEWHALL SCHOOL DISTRICT	TierB
2826119900	L A COUNTY	TierB
2826119900	L A COUNTY	TierB
2826130900	L A COUNTY	TierB
2826160901	LA COUNTY PARK	TierB
2826160900	LA CO FLOOD CONTROL DIST	TierB
2865012912	L A COUNTY	TierB
3270020902	L A COUNTY	TierB

ASSESSOR'S IDENTIFICATION NUMBER (AIN)	OWNER	Tier
2802004900	L A COUNTY	TierB
2802038904	SANTA CLARITA CITY	TierB
2810041900	SANTA CLARITA CITY	TierB
2810070900	SANTA CLARITA CITY	TierB
3244160900	L A COUNTY	TierB
2810001903	HART WILLIAM S UNION HIGH SCHOOL	TierB
2836018901	SANTA CLARITA CITY	TierB
2836018900	SANTA CLARITA CITY	TierB
2836066901	SANTA CLARITA CITY	TierB
2812009900	SANTA CLARITA CITY	TierB
2831011904	SANTA CLARITA CITY	TierB
2833014903	SANTA CLARITA CITY	TierB
2836036900	SANTA CLARITA CITY	TierB
2836064900	SANTA CLARITA CITY	TierB
3270021900	L A COUNTY	TierB
2831026914	SANTA CLARITA CITY	TierB
2831026914	SANTA CLARITA CITY	TierB
2827001902	L A COUNTY	TierB
2827001904	L A COUNTY	TierB
2827040900	LA CO FLOOD CONTROL DIST	TierB
2866047900	SANTA CLARITA CITY	TierB
2865024901	L A COUNTY	TierB
2865018900	L A COUNTY	TierB
2865021902	L A COUNTY	TierB
2865021902	L A COUNTY	TierB
2865012916	L A COUNTY	TierB

APPENDIX C4

BMP Design for Modeling Details

C4-1 Introduction

This appendix presents details on BMP design assumptions. These assumptions were generated using best available data to represent the opportunities and limitations in the EWMP area. For the EWMP to meet its full potential as a planning document, it is essential that the control measure assumptions provide a definitive link between the RAA and actual implementation efforts that are aligned with Group Member preferences. Group Members were therefore surveyed and the resulting preferences used to inform the RAA are listed in Table C4-1.

The routing schematic used for BMP routing in the RAA model (SUSTAIN) is shown in **Figure C4-1**. Note that hydrologic response units (HRU) are analogous with land uses for many purposes. Discrete land uses are routed to different types of BMPs. For example, residential HRUs/land uses are routed to residential LID. The allocations and available BMP opportunities vary by jurisdiction, HRU, and subwatershed. Runoff from non-EWMP and non-MS4 permittees – including non-traditional Phase 2 MS4 areas, parcels with industrial stormwater permits, and the extent of the Caltrans right-of-way – was not routed to BMPs.

Table C4-1. Jurisdictional BMP Preferences

Jurisdiction	Institutional	LID Ordinance	Residential LID	LID on Municipal Parcels	Permeable Pavement	Tier A and B Regional	Regional/ LID on Schools
City of Santa Clarita	5%	Yes	Yes	Yes	Yes	Yes	No[1]
Unincorporated LA County	5%	Yes	Yes	Yes	No	Yes	No

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[1] Select school parcels in the City of Santa Clarita were considered as potential, lower-priority candidates for regional projects due to their hydrologic setting. Schools were not considered candidates for LID.

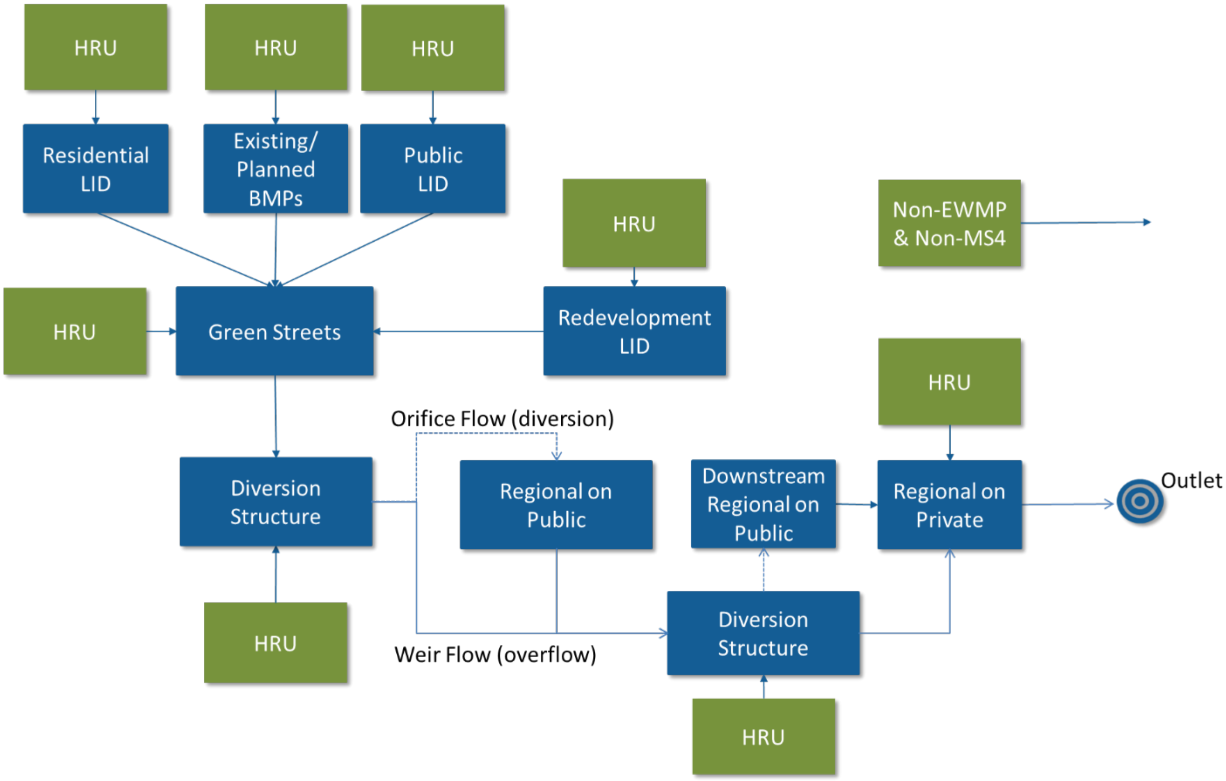

Figure C4-1. Conceptual Schematic Illustrating BMP Routing for the RAA

C4-2 Institutional BMPs

Enhanced MCMs required in the 2012 MS4 permit and proposed by City and County were assumed to achieve 5% reduction, and this reduction was assumed implicitly – no modeling was performed.

C4-2.1 EXISTING/PLANNED DISTRIBUTED BMPS, LID ON PUBLIC PARCELS, REDEVELOPMENT

Table C4-2 provides the modeled sizing criteria for existing/planned distributed BMPs, LID on public parcels, and redevelopment LID. The public parcels considered for LID only included screened parcels owned by the Group Members, with the exception of select parcels owned by schools and other entities (consistent with Tier A regional BMP parcels).

Table C4-2. Existing/Planned Infiltration/Filtration BMP Design Criteria

Parameter		Value	Units
Surface	Design Drainage Area	*Sized to capture 85th percentile volume*	
	BMP Footprint		
	Ponding Depth	9	*in.*
Soil	Depth	2	*ft.*
	Media Porosity	0.35	*n/a*
	Media Infiltration Rate	2	*in/hr*
Underdrain	Use underdrain if underlying soils are less than	0.3	*in/hr*
	Depth	1.5	*ft.*
	Media Porosity	0.4	*n/a*
	Subsoil Infiltration Rate	*Match underlying soils*	
Cost	*Use bioretention cost functions*		

C4-2.2 REGIONAL BMPS ON PUBLIC PARCELS

The assumptions for modeling the Tier B regional facilities are listed in **Table C4-3.** Assumptions governing Tier A facilities were specified on a site-by-site basis per aerial investigations and planning-level site layouts.

Table C4-3. Tier B Regional Facility on Public Parcels Design Criteria

Parameter		Value	Units	Notes
Surface	Design Drainage Area	*Specified explicitly for each BMP (planning-level drainage areas and BMP footprints manually delineated using desktop methods)*		
	BMP Footprint			
	Ponding Depth	3	*ft*	*Assumed*
	Weir Length	100	*ft*	*Assumed to allow free overflow*
	Orifice Req'd if Underlying Soil Infiltration Rate less than	0.3	*In/hr*	
	Assumed Dewatering Time	3-5	*days*	
	Assumed Orifice Height	0	*ft*	
Diversion Type	*Assumed pumped if major storm drain greater than 100 ft from BMP. Used optimum diversion rate of 0.04 cfs per contributing acreage.*			
Cost	*Use regional project cost functions*			

C4-2.3 GREEN STREETS

Green street design criteria and drainage areas are provided in **Table C4-4** below, and permeable pavement is included to simulate "additional storage", which would be in the form of permeable pavements, suspended pavements, or other subsurface storage. Certain high-efficiency BMPs (green street opportunities undersized relative to their contributing drainage area) are inherently acknowledged in the subwatershed-scale model inputs, but such opportunities must be identified with street-scale analyses.

Table C4-4. Green Street BMP Design Criteria

Parameter		Value	Units
Bioretention Assumptions			
Surface	Design Drainage Area	*Specified for each subwatershed, jurisdiction, and land use combination based on available opportunities*	
	BMP Footprint		
	Ponding Depth	7	*in.*
Soil	Depth	2	*ft.*
	Media Porosity	0.35	*n/a*
	Media Infiltration Rate	2	*in./hr.*
Underdrain	Use underdrain if underlying soils are less than	0.3	*in./hr.*
	Depth	1.5	*ft.*
	Media Porosity	0.4	*n/a*
	Subsoil infiltration Rate	*Match underlying soils*	
Cost	*Use bioretention cost functions*		
Permeable Pavement Assumptions			
Surface	Design Drainage Area	*Specified for each subwatershed, jurisdiction, and land use combination based on available opportunities*	
	BMP Footprint		
	Ponding Depth	0.12	*in.*
Aggregate	Depth	2	*ft.*
	Media Porosity	0.4	*n/a*
	Media Infiltration Rate	2	*in./hr.*
Underdrain	Use underdrain if underlying soils are less than	0.3	*in./hr.*
	Depth	1.5	*ft.*
	Media Porosity	0.4	*n/a*
	Subsoil Infiltration Rate	*Match underlying soils*	
Cost	*Use permeable pavement cost functions*		

C4-2.4 LID ON PRIVATE RESIDENTIAL PARCELS

Model inputs assumed that 1% of homeowners per year (starting in 2017) would participate in residential LID programs. Assumptions for LID on private residential parcels are presented in **Table C4-5.**

Table C4-5. Residential LID Design Criteria

Parameter		Value	Units
Surface	Design Drainage Area	*1% of high-density residential land use per year, starting in 2017*	
	BMP Footprint	*4*	*% of drainage area (e.g. footprint as percentage of each retrofitted parcel)*
	Ponding Depth	9	*in.*
Soil	Depth	2	*ft.*
	Media Porosity	0.35	*n/a*
	Media Infiltration Rate	*Match underlying soils*	
Cost	*Use LID on Residential cost functions*		

C4-2.5 REGIONAL PROJECTS ON ACQUIRED PRIVATE PARCELS

Remaining untreated areas and effluent from upstream BMPs are assumed to drain to private regional opportunities. For the purposes of the RAA, these BMP opportunities were assumed to be infiltration basins. **Table C4-6** provides a summary of the criteria for these BMPs.

Table C4-6. Other Regional Design Criteria

Parameter		Value	Units
Infiltration Basin			
Surface	Design Drainage Area	*All areas not routed to upstream BMPs*	
	Maximum BMP Footprint	5	*% of directly contributing drainage area*
	Ponding Depth	36	*in.*
	Orifice	*No Orifice – Assume fully infiltrating*	
Diversion Type	*Assume 100% routed to facility*		
Cost	*Use Regional Project on Private Parcel cost functions*		

C4-2.6 BMP PERFORMANCE ANALYSIS

This section presents the results of a statistical analysis of available BMP performance data relevant to Southern California. The goal was to review and summarize data regarding performance of BMPs for reducing priority constituents from stormwater and non-stormwater flows. The scope of work specified the analysis to be based on data provided by the Group Members, specific to southern California, and analyzed in consideration of applicable MS4 Permit limitations. No USCRW specific BMP performance data were available, and thus external data were compiled as described below.

The following sections provide an overview of the data sources, description of statistical methods, and summary of the results of the statistical analysis.

C4-2.6.1 Data Sources for BMP Performance Data

Data for the BMP performance analysis were derived from the International BMP Database (IBD), the most extensive effort to collect and distribute BMP performance data in the United States (US). The IBD is sponsored by the US Environmental Protection Agency (USEPA), Water Environment Research Foundation (WERF), the American Society of Civil Engineers (ASCE)/Environmental and Water Resources Institute (EWRI), the American Public Works Association (APWA), and the Federal Highway Administration (FHWA). The stated purpose of the project is “to provide scientifically sound information to improve the design, selection and performance of BMPs.”

Current (November 2013) available sites with monitoring data in Southern California are displayed in **Figure C4-2** to provide an applicable data set for the Upper Santa Clara River EWMP area. There are 44 sites that have data within the mapped area with monitoring data from a total of 58 BMPs. Each of the IBD BMPs was mapped to the categories and subcategories established in Appendix B-1. Many of the BMPs, particularly bioswales, are owned and operated by CalTrans and therefore implemented on roadways, maintenance stations, and park and ride facilities throughout Southern California.

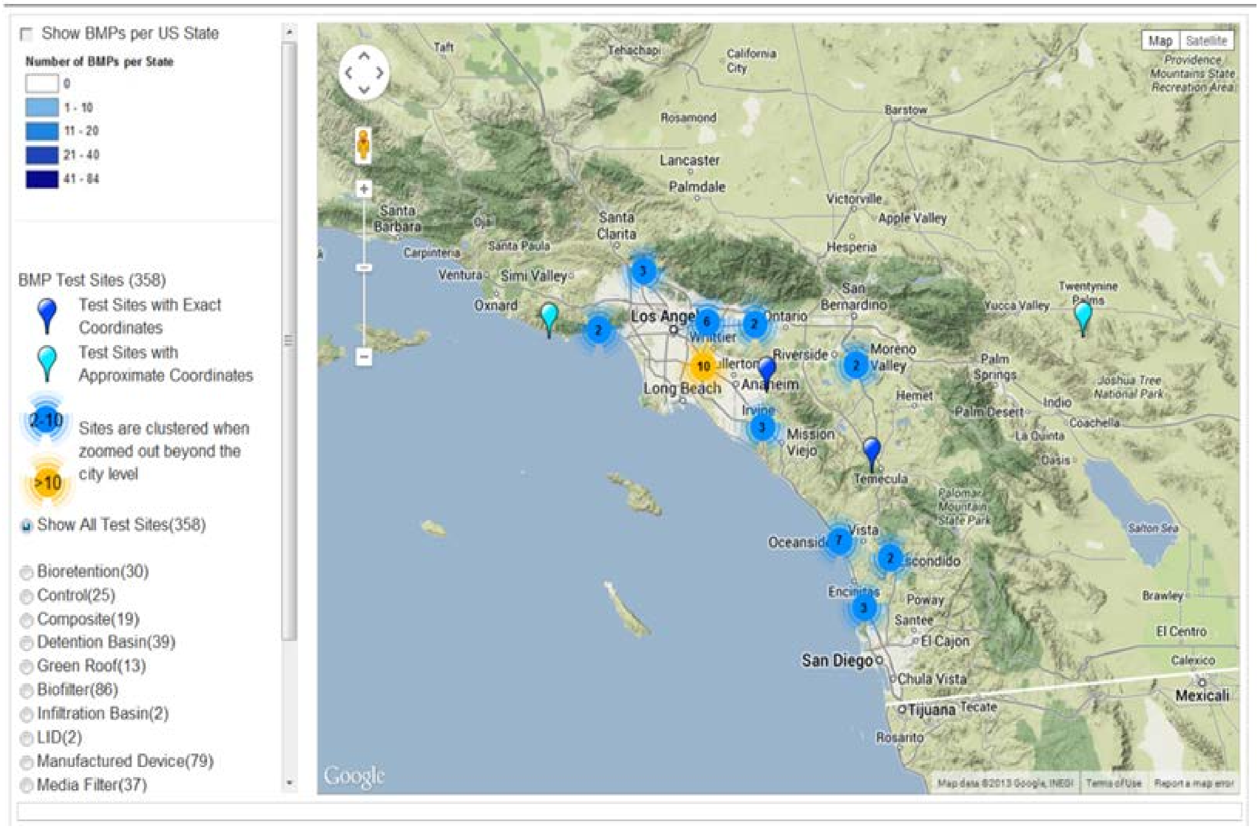

Figure C4-2. Southern California BMPs from the International BMP Database

(www.bmpdatabase.org)

C4-2.6.2 Description of Analyzed Data

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

- **BMP types:** five of the BMP subcategories were represented in the IBD for 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. This analysis herein emphasized a subset of constituents referred to herein as "common constituents of concern", and consists of:
  - Total suspended solids (TSS)
  - Fecal coliform
  - Total copper
  - Total lead, and
  - Total zinc

  The database was then screened for additional constituents with sufficient data to perform analysis and 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 were categorized into four groups:
  - Metals
  - Bacteria
  - Solids, and
  - Nutrients.
- **Land use:** a majority of the BMPs identified in the IBD are primarily for transportation related sites. Other major land use categories such as residential, commercial, and industrial are not heavily represented in the analysis herein. However, the effluent concentrations and performance metrics are still generally considered applicable to non-transportation land uses. Many bioswales were included in the analysis, which allowed for grouping of bioswales into three categories: "all", "Caltrans", and "Non-Caltrans."
- **Monitoring methods:** the majority of the data from the IBD are 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 portrays the removal efficiency of BMPs. These types of samples can be used to generate representative event mean concentrations (EMCs) that can be used to calibrate water quality models. The analysis herein emphasizes reduction in concentrations of

constituents. Flow reduction is heavily site- and storm-specific (dependent on rainfall intensity, soil types, antecedent conditions, etc.) and can be predicted through other means (e.g., modeling).

C4-2.6.3 Statistical Analysis

The statistical analysis herein 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[2]). Percent reduction is a readily-understandable BMP performance metric, and it also convenient for reporting a compact form (as shown in **Table C4-7**). 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, in order to characterize the quality of BMP outfalls and allow for future comparison to 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-detect (referred to as “censored”). An Excel add-in developed by the California Department of Transportation (CalTrans) was used to generate ROS, for which the primary references for the statistical procedures are Shumway and Azari (2000) and Helsel (1990).

C4-2.6.4 Results

The results of the statistical analysis produced thousands of measures that can be used to evaluate BMPs. These results will support the RAA assumptions regarding effluent concentrations from some BMPs. 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. The results of the analysis are presented as follows:

- **Percent removal:** the results in **Table C4-7** provide mean and median removal percentages for the BMPs and for each of the 23 Constituents of Concern (COCs) analyzed. The table can be used to evaluate relative performance across constituent and BMP categories.

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[2] http://www.stormh2o.com/SW/Editorial/Voodoo_Hydrology_37.aspx

- **Inflow and outflow concentrations for common COCs:** shown in **Table C4-8** thru **Table C4-12** are comparisons of standard statistics for the five available BMP categories across each of the common COCs. The corresponding box plots in **Figure C4-4** thru **Figure C4-8** graphically represent the range of inflow versus outflow performance for the BMP categories.

Box plots are a graphical representation of numerical data through their quartiles. The presented box plots 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. The following **Figure C4-3** is graphical representation of box plots for reference.

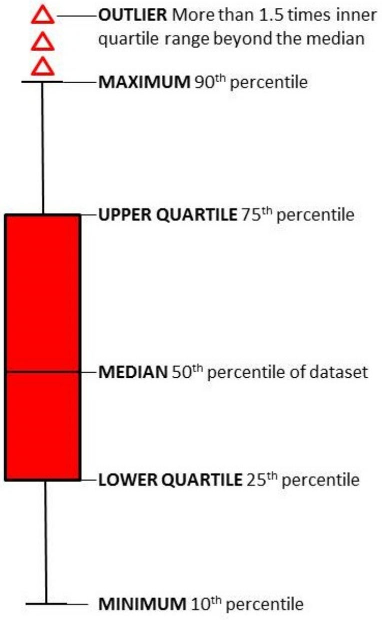

Figure C4-3. Box Plot Component Legend

Table C4-7. Mean and Median Percent Removal from Inflow to Outfall for All Constituents and BMP Categories

Constituent Group	Constituent	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 (NO3) 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 (NO2) as N	89.01%	31.91%	89.01%	31.91%	---	---	-100%	-100%	---	---	---	---
	Nitrogen, unionized ammonia (NH3) 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%	---	---	---	---	---	---

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

Table C4-8. Inflow/Outflow Summary Statistics for 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
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

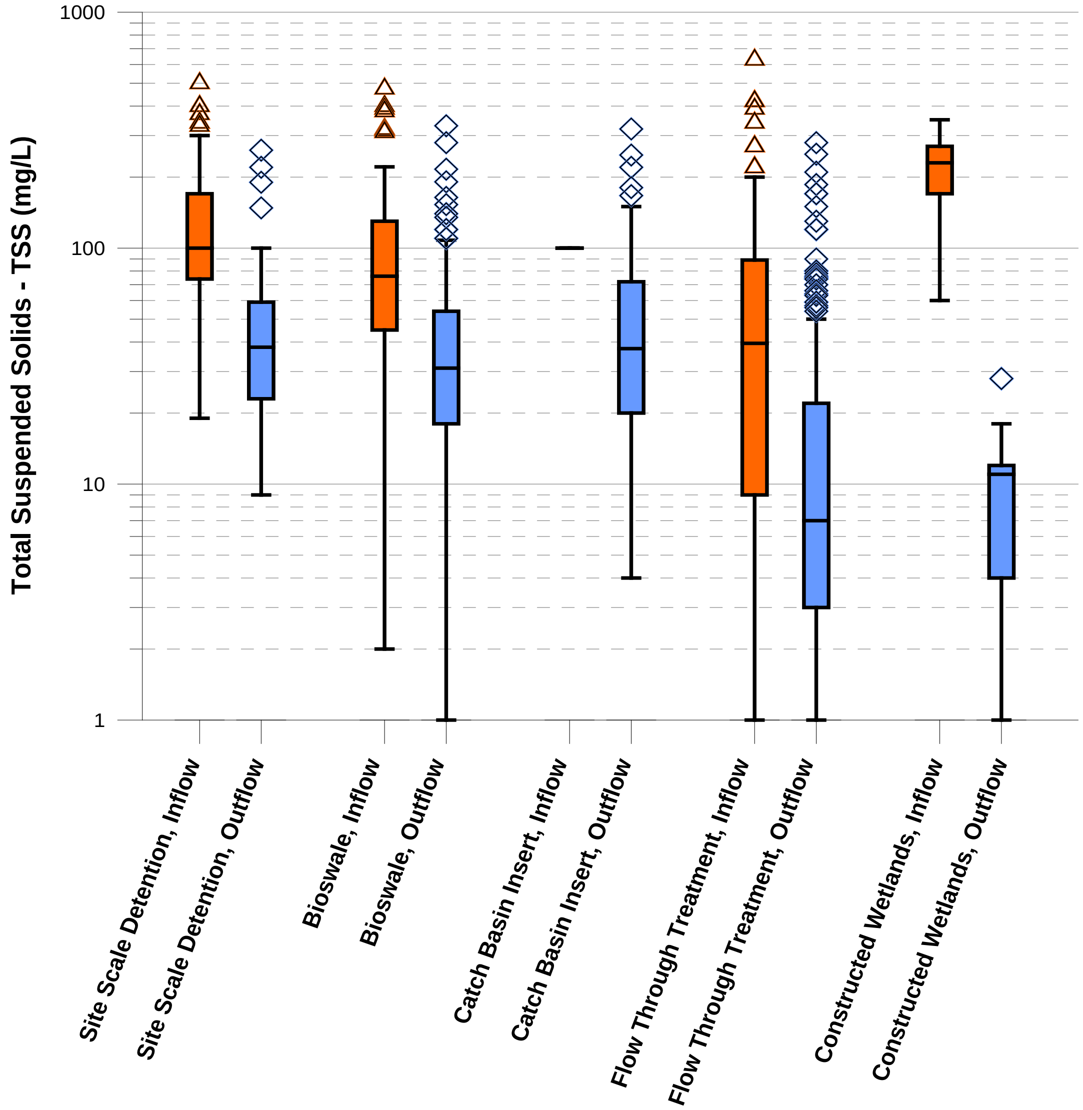

Figure C4-4. Box Plots of Inflow/Outflow TSS Concentrations in Southern California

Table C4-9. Inflow/Outflow 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
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

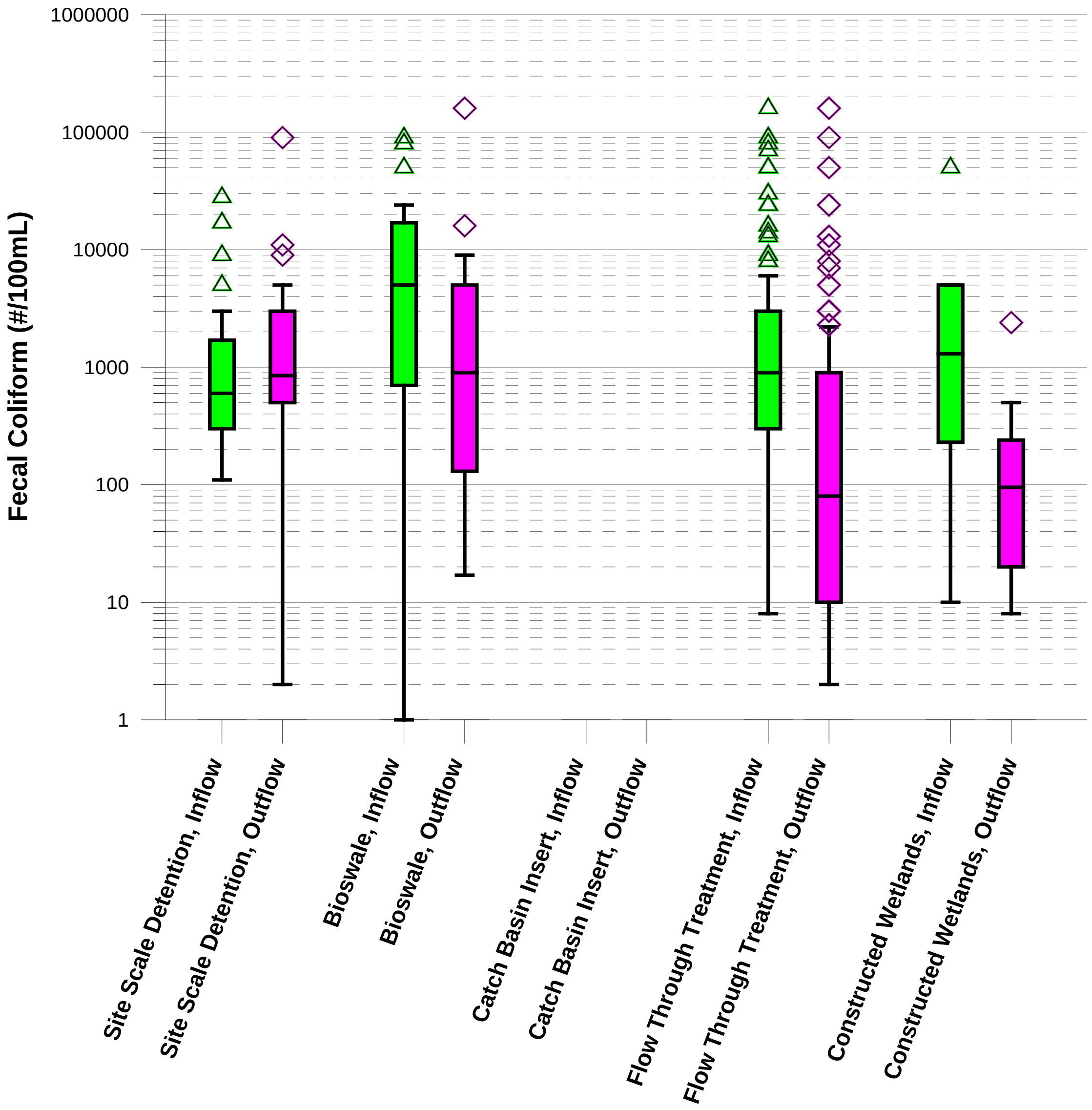

Figure C4-5. Box Plots of Inflow/Outflow Fecal Coliform Concentrations in Southern California

Table C4-10. Inflow/Outflow Summary Statistics for Copper (µg/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	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	110.00	14.75

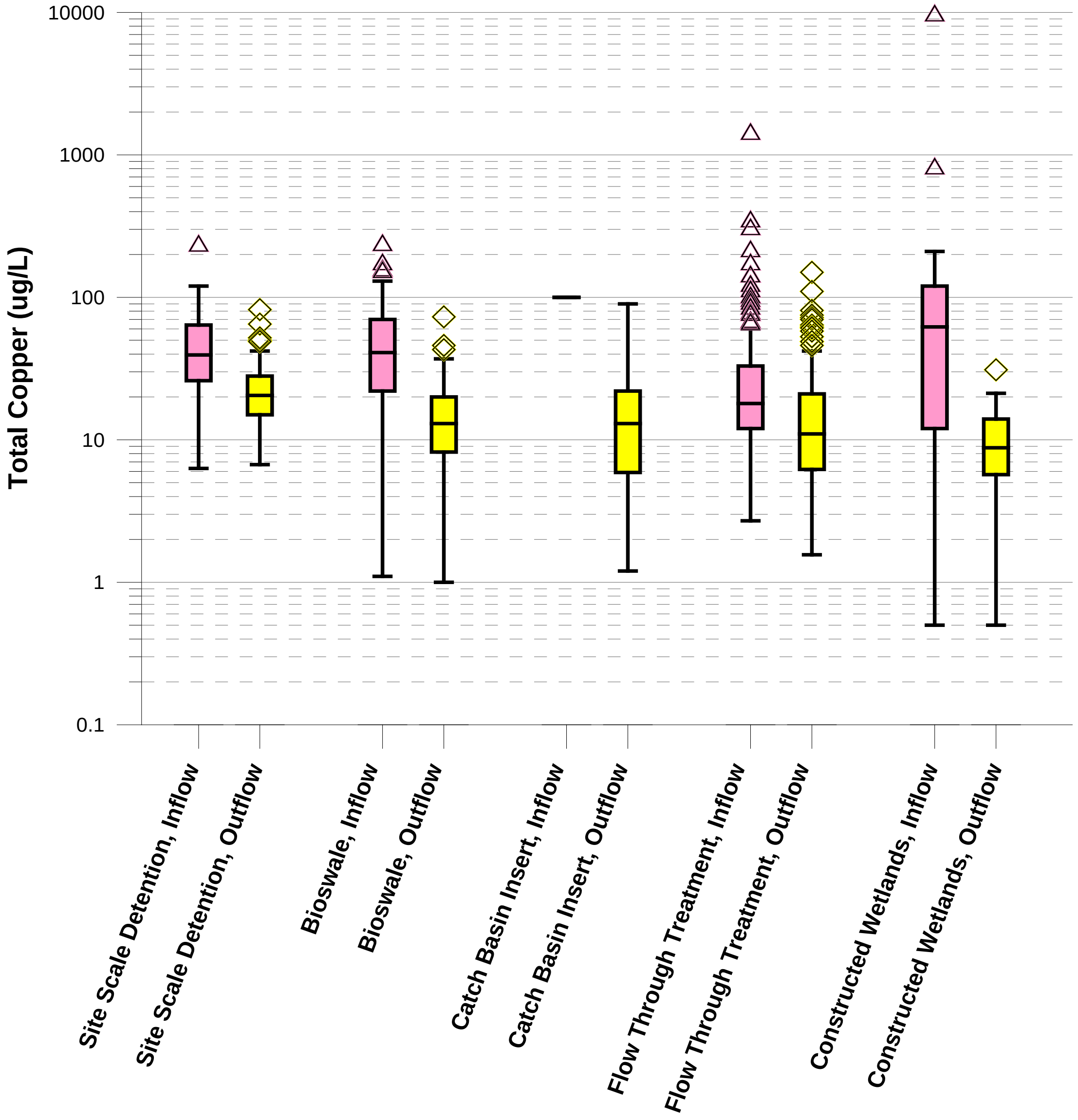

Figure C4-6. Box Plots of Inflow/Outflow Copper Concentrations in Southern California

Table C4-11. Inflow/Outflow Summary Statistics for Lead (µg/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	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	170.00	4.40	315.00	8.32

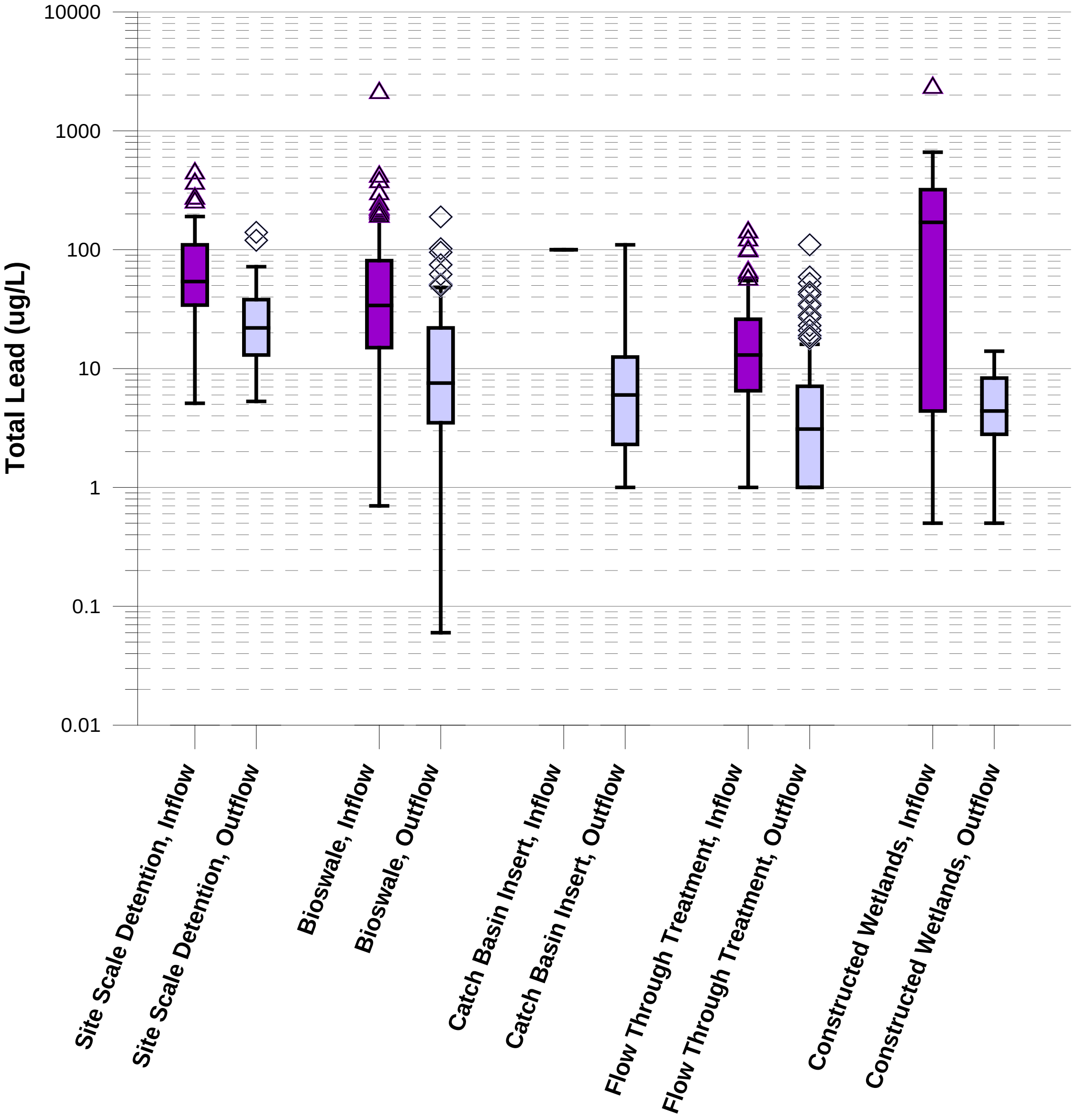

Figure C4-7. Box Plots of Inflow/Outflow Lead Concentrations in Southern California

Table C4-12. Inflow/Outflow Summary Statistics for Zinc (µg/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
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

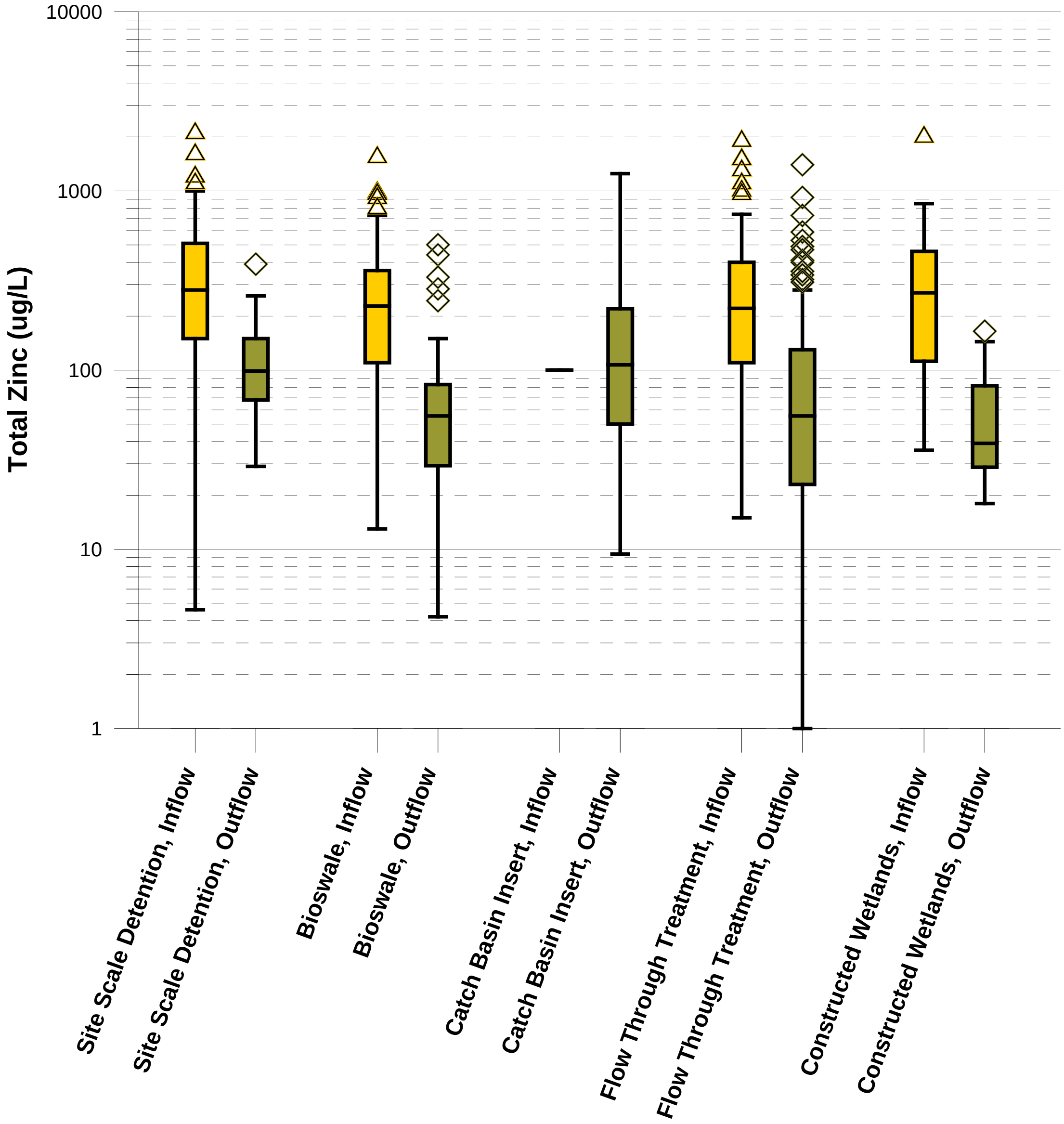

Figure C4-8. Box Plots of Inflow/Outflow Zinc Concentrations in Southern California

C4-2.6.5 Discussion and Observations regarding BMP Performance

The statistical analysis presented herein has many applications, including supporting the RAA for the EWMP. As future applications are undertaken, the results can be analyzed in more detail. For this EWMP, several general observations are highlighted, as follows:

- **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 C4-8** and **Figure C4-4**). 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 C4-7**). 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 Permit limitation if fecal coliform is assumed equivalent to *E. coli*) (see Table C4-9 and **Figure C4-5**).

Application of the data herein 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). SUSTAIN, which was 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. Because the model is dynamic, these proportions change from storm to storm (i.e., overflows are less frequent during small storms than large storms). SUSTAIN also simulated first order decay of pollutants per the parameters listed in the *Guidelines for Conducting Reasonable Assurance Analysis in a Watershed Management Program, Including an Enhanced Watershed Management Program* (Nguyen et al., 2014).

For the subset of BMPs with a treatment component, some assumptions were needed regarding the quality of treated and discharged outflow (e.g., biofiltration BMPs, which have an underdrain). The analysis herein support those assumptions. It is noted that SUSTAIN does not provide a mechanism to apply effluent concentrations, so the median concentration reduction rates reported in **Table C4-7** were applied to underdrain effluent (acknowledging the limitations of this metric discussed in Section C4-2.6.3).

C4-3 References

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APPENDIX C5

Detailed Lists of Existing and Planned BMPs

C5-1 Detailed List of Existing Distributed BMPs in Upper Santa Clara River EWMP Group

ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D1	S	DR	D		34.3617958451, -118.521892347	SUSMP	8/24/2011	23492 PINE STREET - LANDSCAP BUSINESS
D2	S	DR	Bs		34.3617958451, -118.521892347	SUSMP	8/24/2011	23492 PINE STREET - LANDSCAP BUSINESS
D3	S	DR	FT	(7) FILTERRA	34.3682890856, -118.502708225	SUSMP	11/8/2008	OFFICE BUILDING 23658 SIERRA HIGHWAY
D4	S	DR	D		34.3682890856, -118.502708225	SUSMP	11/8/2008	OFFICE BUILDING 23658 SIERRA HIGHWAY
D5	S	DR	SC	(1) REM TRITON C/B FILTER (MODEL:TR1212-SR). FILTERED CAPACTIY=.17 cfs	34.3688013297, -118.521985991	SUSMP	5/7/2009	NEWHALL COUNTY WATER DISTRICT
D6	S	DR	SC	(1) REM TRITON C/B FILTER (MODEL:TR1212-SR). FILTERED CAPACTIY=.17 cfs	34.3688013297, -118.521985991	SUSMP	5/7/2009	NEWHALL COUNTY WATER DISTRICT
D7	S	DR	SC	(7) DRAIN PAC INSERTS	34.37193785, -118.515980886	SUSMP	8/29/2005	SAN FERNANDO RETAIL CENTER
D8	S	DR	SC	(2) FG-T1212 FLO-GARD FILTERS	34.3735688234, -118.524345446	SUSMP	1/30/2007	WILLIAM S HART REGIONAL PARK
D9	S	DR	SC	(3) FGP-18D KRISTAR FOSSIL FILTERS	34.3783221032, -118.549307015	SUSMP	10/16/2007	LYONS AUTO CENTER
D10	S	DR	SC	(1) FOSSIL FILTER MODEL FGP-24F	34.3786212188, -118.554927857	SUSMP	10/15/2007	AUGUSTA FINANCIAL
D11	S	DR	SC	(3) ULTRA URBAN FILTER W/ OARS ONBOARD	34.3787375727, -118.563124278	SUSMP	1/1/2003	WENDY'S/FOUR CORNERS INC
D12	S	DR	Bio		34.379228, -118.54024	SUSMP		WALGREENS 24740 VALLEY STREET
D13	S	DR	FT	(2) FILTERRA	34.379228, -118.54024	SUSMP		WALGREENS 24740 VALLEY STREET
D14	S	DR	PP		34.3802446897, -118.538811062	SUSMP	11/6/2012	23233 LYONS AVE
D15	S	DR	D		34.3802446897, -118.538811062	SUSMP	11/6/2012	23233 LYONS AVE

Notes: S = Santa Clarita, Uninc = Unincorporated LA County, DR = Data Request, D = Detention, Bs = Bioswale, FT = Flow-Through Treatment BMP, SC = Source Control Structural BMP, Bio = Bioretention/Biofiltration, PP = Permeable Pavement, RH = Rainfall Harvest, SUSMP = Standard Urban Stormwater Mitigation Plan, Unk = Unknown

ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D16	S	DR	Bs		34.3802446897, -118.538811062	SUSMP	11/6/2012	23233 LYONS AVE
D17	S	DR	SC	(5) KRISTAR FLOGARD DOWNSPOUT FILTERS	34.381922074, -118.530079577	SUSMP		NEWHALL LIBRARY
D18	S	DR	Bs		34.381922074, -118.530079577	SUSMP		NEWHALL LIBRARY
D19	S	DR	Bs		34.3922916687, -118.566684913	SUSMP	6/21/2012	A24700 MCBEAN PARKWAY
D20	S	DR	SC	(5) FOSSIL FILTER CATCH BASIN INSERT	34.3922916687, -118.566684913	SUSMP	6/21/2012	A24700 MCBEAN PARKWAY
D21	S	DR	SC	(2) CDS UNITS MODEL CDS20_20	34.392368, -118.465442	SUSMP	1/1/2012	LA CO FIRE STATION #150
D22	S	DR	SC	(1) CDS UNIT	34.3942357596, -118.464421473	SUSMP	1/1/2009	PLAZA @GOLDEN VALLEY
D23	S	DR	D		34.3980657845, -118.553497633	SUSMP	4/19/2010	23845 MCBEAN PARKWAY
D24	S	DR	SC	(1) VORTEX SEPARATOR	34.3980657845, -118.553497633	SUSMP	4/19/2010	23845 MCBEAN PARKWAY
D25	S	DR	D		34.3980657845, -118.553497633	SUSMP	9/21/2012	23803 MCBEAN PARKWAY MOB1
D26	S	DR	SC	(1) VORTEX SEPARATOR	34.3980657845, -118.553497633	SUSMP	9/21/2012	23803 MCBEAN PARKWAY MOB1
D27	S	DR	SC	(1) KRISTAR FLOGARD PVS36S (1) KRISTAR FLOGARD DVS48C (1) KRISTAR CUDOCUBE (2) FLOGARD (manufacturer not specified)	34.398609, -118.552588	SUSMP		HENRY MAYO HOSPITAL
D28	S	DR	Bs		34.399447124, -118.537366524	SUSMP	2/24/2011	SC RETAIL CENTER
D29	S	DR	RH		34.399447124, -118.537366524	SUSMP	2/24/2011	SC RETAIL CENTER
D30	S	DR	SC	(12) FOSSIL FILTER FLO-GARD FF-2424HC	34.4025169094, -118.458718775	SUSMP	9/1/2004	PRINCESSA PLAZA LLC
D31	S	DR	SC	(2) 18"X18" CATCH BASIN W/ FILTER PAC STORM DRAIN INSERT (6) 24"X24" CATCH BASIN W/ FILTER PAC STORM DRAIN INSERT	34.4026026574, -118.461541091	SUSMP	1/1/2002	PUBLIC STORAGE
D32	S	DR	SC	(4) KRISTAR FLOGARD FILTER MODEL FF-2424HC	34.4049077564, -118.46308366	SUSMP	1/1/2006	18715-29 VIA PRINCESSA SHOPPING CENTER

Notes: S = Santa Clarita, Uninc = Unincorporated LA County, DR = Data Request, D = Detention, Bs = Bioswale, FT = Flow-Through Treatment BMP, SC = Source Control Structural BMP, Bio = Bioretention/Biofiltration, PP = Permeable Pavement, RH = Rainfall Harvest, SUSMP = Standard Urban Stormwater Mitigation Plan, Unk = Unknown

ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D33	S	DR	SC	DRAIN FILTERS (NUMBER UNKNOWN)	34.4076861485, -118.460684611	SUSMP	1/1/2011	FLYING TIGER COMMERCIAL CENTER
D34	S	DR	SC	(2) KRISTAR FLOGARD FILTER INSERT MODEL FF24D (1) KRISTAR FLOGARD FILTER INSERT MODEL FGP-RF36F	34.4081717268, -118.461957253	SUSMP	10/19/2006	27125 SIERRA HIGHWAY
D35	S	DR	SC	(3) KRISTAR FOSSIL FILTER CATCH BASIN INSERT MODEL FGP-21F	34.4087023063, -118.508894447	SUSMP	1/1/2006	DIAMOND DEVELOPMENT PARCEL #9
D36	S	DR	SC	(3) KRISTAR FOSSIL FILTER CATCH BASIN INSERT MODEL FGP-21F	34.4090944467, -118.50751229	SUSMP	1/1/2007	DIAMOND DEVELOPMENT PARCEL #7
D37	S	DR	SC	(1) DI2020N WITH DI2020FN (4) CATCH BASIN FILTERS	34.4092851086, -118.511144335	SUSMP	11/8/2006	WILLIAM S HART UNION HIGH
D38	S	DR	SC	(4) KRISTAR FOSSIL FILTER CATCH BASIN INSERT MODEL FGP-21F	34.409412, -118.507452	SUSMP	1/1/2007	DIAMOND DEVELOPMENT PARCEL #6
D39	S	DR	SC	(3) CATCH BASIN FILTER INSERTS ABTECH MODEL DI2020	34.4094271013, -118.509951646	SUSMP	1/1/2004	UNIVERSAL HOSIERY INC.
D40	S	DR	SC	(2) KRISTAR FOSSIL FILTER CATCH BASIN INSERT MODEL FGP-21F	34.4095798703, -118.508836714	SUSMP	1/1/2006	DIAMOND DEVELOPMENT PARCEL #4
D41	S	DR	SC	(5) KRISTAR FLOGARD CATCH BASIN FILTER FF-2424 HC	34.4101277352, -118.507591847	SUSMP	1/1/2004	CANAM HOLDING LLC.
D42	S	DR	SC	(12) DI2020N WITH DI2020FN	34.4101721795, -118.50984565	SUSMP	1/8/2007	CERTIFIED THERMOPLASTICS
D43	S	DR	SC	(4) KRISTAR FOSSIL FILTER CATCH BASIN INSERT MODEL FGP-21F	34.4101909622, -118.508848218	SUSMP	1/1/2006	DIAMOND DEVELOPMENT PARCEL #3
D44	S	DR	SC	(8) KRISTAR CATCH BASIN INSERT FF-2424 HC	34.4108356911, -118.505484173	SUSMP	1/1/2005	CENTRE POINTE COLLISION CENTER
D45	S	DR	SC	(4) KRISTAR FOSSIL FILTER FLOGARD MODEL FF-2424 HC	34.4110280447, -118.508830375	SUSMP	1/1/2006	LOT 1 OF FERRY COURT (26410 SUMMIT CIRCLE)
D46	S	DR	SC	(3) CURB OPENING CATCH BASINW ITH DRAINPAC STORM DRAIN FITLER (2) INLET TRASH RACKS AT CATCH BASINS	34.4110362274, -118.499574891	SUSMP	7/25/2002	SCV SPORTS PARK COMPLEX
D47	S	DR	SC	(2) KRISTAR FOSSIL FILTER FLOGARD MODEL FF-2424 HC	34.411064873, -118.509628455	SUSMP	1/1/2006	LOT 10 OF FERRY COURT (26415 SUMMIT CIRLCE)
D48	S	DR	SC	(1) FLOGARD TRENCH DRAIN FITLER INSERT FF-TD12 (5) KRISTAR FLOGARD CATCH BASIN INSERT FF-2424 HC	34.4111971845, -118.508021766	SUSMP	1/1/2006	LOT 2 OF FERRY COURT (26420 SUMMIT CIRLCE)

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ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D49	S	DR	SC	(6) FLO-GARD PLUS FILTER INSERTS MODEL FGP-21F	34.4113749751, -118.510410179	SUSMP	1/13/2009	PACKAGING SYSTEMS INC
D50	S	DR	SC	(5) KRISTAR FLOGARD CATCH BASIN FILTER INSERT MODEL FF-2424 HC	34.411658563, -118.508767481	SUSMP	1/1/2004	SUMMIT CIRCLE LOTS 11, 12, 13 AND 14
D51	S	DR	SC	(8) KRISTAR FLOGARD CATCH BASIN FILTER FF-2424 HC	34.4122782031, -118.508185131	SUSMP	1/1/2004	SUMMIT CIRCLE LOTS 3 AND 4
D52	S	DR	SC	(4) FLO-ARD FILTER MODEL FGP-21F	34.4123212762, -118.510012182	SUSMP	10/4/2005	CENTRE POINTE PROPERTYS LLC
D53	S	DR	SC	(13) FLOGARD FOSSIL FITLER CATCH BASIN INSERT MODEL F-2424 HC (2) FLOGARD FOSSIL FILTER CATCH BASIN INSERT MODEL FF-2436 HC	34.412598, -118.509649	SUSMP	1/1/2008	26481-535 SUMMIT CIRCLE
D54	S	DR	SC	(3) KRISTAR FLOGARD CATCH BASIN FILTER FF-2424 HC	34.4127130165, -118.508514033	SUSMP	1/1/2004	SUMMIT CIRCLE LOT 5
D55	S	DR	SC	(10) KRISTAR FLOGARD CATCH BASIN FILTER INSERT MODEL FF-18D	34.4130047703, -118.497021287	SUSMP	1/1/2005	BERNARDS CENTRE POINTE LLC.
D56	S	DR	SC	(1) CDS UNIT WITH OIL BAFFLES (CDS UNIT OFFSITE)	34.4135468286, -118.503044672	SUSMP	10/5/2005	LA FITNESS- CANYON COUNTRY
D57	S	DR	SC	(1) CDS UNIT	34.4135708867, -118.560491914	SUSMP		WESTFIELD VALENCIA TWN CTR EXP
D58	S	DR	SC	(5) FOSSIL FILTER LINED CATCH BASINS (1) CDS UNIT AT THE SOUTH END OF SITE IN LANDSCAPE AREA.	34.4137790746, -118.574982519	SUSMP	1/28/2003	QUEST DIAGNOSTICS
D59	S	DR	Bio		34.4139901376, -118.562448895	SUSMP	8/7/2012	MCBEAN PARK-N-RIDE EXPANSION
D60	S	DR	D		34.4139901376, -118.562448895	SUSMP	8/7/2012	MCBEAN PARK-N-RIDE EXPANSION
D61	S	DR	SC	(1) CDS UNIT 6.0 CFS (1) FOSSIL FILTER FLOGARD CATCH BASIN INSERT MODEL FF-2424 HC	34.414085, -118.506164	SUSMP	1/1/2004	WALMART #3523 (GOLDEN VALLEY)
D62	S	DR	SC	(5) ABTECH CATCH BASIN FILTER MODEL DI 2020	34.4143964075, -118.496803566	SUSMP	1/1/2004	CENTRE POINTE BUSINESS PARK
D63	S	DR	SC	(2) CDS UNIT (24) FOSSIL FILTER CATCH BASIN INSERT	34.4144153841, -118.506489398	SUSMP		WALMART AND SAMS CLUB GOLDEN VALLEY RD

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ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D64	S	DR	SC	(3) KRISTAR FOSSIL FILTER MODEL FB-24	34.4149796931, -118.553080416	SUSMP	1/1/2001	LA CO FIRE STATION #126
D65	S	DR	D		34.4153956277, -118.500431202	SUSMP	5/12/2009	GALAXY BUSINESS PARK
D66	S	DR	Bio		34.4153956277, -118.500431202	SUSMP	5/12/2009	GALAXY BUSINESS PARK
D67	S	DR	SC	(2) FOSSIL FILTER DROP-IN CATCH BASIN INSERTS	34.4154122486, -118.541781864	SUSMP	1/1/2001	UNITED OIL CO.
D68	S	DR	Bio		34.4154412269, -118.520160218	SUSMP	11/1/2012	VILLA METRO
D69	S	DR	SC	(1) FOSSIL FILTER CATCH BASIN INSERT	34.4154412269, -118.520160218	SUSMP	11/1/2012	VILLA METRO
D70	S	DR	SC	(1) CDS UNIT 6.0 CFS (1) FOSSIL FILTER CATCH BASIN INSERT MODEL FGP-24	34.4154518069, -118.503934751	SUSMP	1/1/2005	SAM'S CLUB #4284 (GOLDEN VALLEY)
D71	S	DR	SC	(2) 36 X 36 DROP IN DRAINS ABTECH INDUSTRIES (2) ULTRA-URBAN CO1414N CURB OPENING FILTERS	34.4157285491, -118.496875222	SUSMP	5/25/2005	JOHN PAUL MITCHELL SYSTEMS
D72	S	DR	SC	(1) FLOWMASTER TRENCHDRAIN FILTER (23) FOSSIL FILTER CATCH BASIN INSERT	34.415768, -118.505458	SUSMP	8/23/2006	RETAIL SHOPPING CENTER - GOLDEN VALLEY ROAD AND CARL BOYER DRIVE
D73	S	DR	SC	(2) CDS UNITS	34.4159624886, -118.546723132	SUSMP	1/1/2002	VALENCIA HONDA
D74	S	DR	SC	(2) CDS UNITS	34.415963, -118.560634	SUSMP	1/1/1992	WESTFIELD VALENCIA MALL
D75	S	DR	FT		34.4160609936, -118.55766623	SUSMP		VALENCIA TOWN CENTER - PATIO PHASE 2
D76	S	DR	SC	(1) FOSSIL FILTER CATCH BASIN INSERT	34.4160609936, -118.55766623	SUSMP		VALENCIA TOWN CENTER - PATIO PHASE 2
D77	S	DR	SC	(2) FOSSIL FILTER CATCH BASIN INSERT (1) CDS UNIT	34.4165849451, -118.507854414	SUSMP	4/23/2008	SOLEDAD CROSSING RETAIL CENTER
D78	S	DR	SC		34.416691839, -118.462231324	SUSMP	1/1/2001	CANYON CAR WASH
D79	S	DR	D		34.4176750207, -118.420817175	SUSMP	12/17/2010	CHURCH OF CANYONS
D80	S	DR	SC	(2) DRAIN INSERTS	34.4176750207, -118.420817175	SUSMP	12/17/2010	CHURCH OF CANYONS

Notes: S = Santa Clarita, Uninc = Unincorporated LA County, DR = Data Request, D = Detention, Bs = Bioswale, FT = Flow-Through Treatment BMP, SC = Source Control Structural BMP, Bio = Bioretention/Biofiltration, PP = Permeable Pavement, RH = Rainfall Harvest, SUSMP = Standard Urban Stormwater Mitigation Plan, Unk = Unknown

ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D81	S	DR	SC	(3) FOSSIL FILTER FLOGUARD FF-RF24D	34.4178881, -118.500805857	SUSMP	5/14/2003	KENNCO PLUMBING INC
D82	S	DR	SC	(3) DRAINPAC CATCH BASIN FILTERS (3) DRAINPAC CURB INLET FILTERS	34.4183352608, -118.505612414	SUSMP	12/11/2003	CLEMENT & MARY MOSER, ET AL
D83	S	DR	SC	(1) CDS MODEL PMSU 20 15, 0.7 CFS (6) ABTECH FILTERS	34.4186060823, -118.549478231	SUSMP	8/14/2003	FRONTIER TOYOTA
D84	S	DR	SC	(24) KRISTAR FLOGARD PLUS FILTER FGP-21 F (1) FLOGARD TRENCH DRAIN INSERT MODEL FF-TD12	34.4190679904, -118.50343794	SUSMP	1/1/2007	CENTER POINTE MARKETPLACE
D85	S	DR	Bio		34.4192163886, -118.579238503	SUSMP		TOURNEY PLAZA
D86	S	DR	SC	(6) ABTECH ULTRA URBAN CATCH BASIN INSERT	34.4192163886, -118.579238503	SUSMP		TOURNEY PLAZA
D87	S	DR	SC	(8) FOSSIL FITLER CATCH BASIN INSERTS MODEL FF-24D	34.4196873491, -118.544337502	SUSMP	1/1/2006	23333 CINEMA DR
D88	S	DR	SC	(1) 0.70 CFS TREATMENT CAPACITY CDS UNIT MODEL PMSU2015	34.4207982864, -118.549117298	SUSMP	3/24/2007	BMW VALENCIA
D89	S	DR	SC	(10) FILTERS MODELS FF-12D & FF-24D	34.4209294598, -118.546125112	SUSMP	9/8/2005	CINEMA PROFESSIONAL CENTER LLC
D90	S	DR	SC	(14) ABTECH FILTERS MODEL DI2020N	34.4209835024, -118.579976092	SUSMP	7/27/2005	TOURNEY PLAZA II LLC
D91	S	DR	SC	(8) ULTRA-URBAN FILTERS DI2020N FOR 27441/27451 TOURNEY ROAD. LETTER DATED 3/25/08-TOURNEY PLAZA I,LLC ASSUME RESPONSIBILITY	34.4215603009, -118.579796261	SUSMP	10/5/2004	TOURNEY PLAZA I LLC
D92	S	DR	SC	(9) FGP-21F FOSSIL FILTERS	34.421774714, -118.578362132	SUSMP	12/27/2006	TOURNEY MEDICAL SUITES
D93	S	DR	SC	(4) FLOGARD PLUS 24"X24" CATCH BASIN FILTERS MODEL FGP-24F	34.4220595605, -118.432999464	SUSMP	1/1/2006	17150 SOLEDAD CANYON RD
D94	S	DR	SC	CDS UNIT MODEL PMSU20 25	34.4220639182, -118.54763505	SUSMP	6/14/2005	MERCEDES BENZ OF VALENCIA
D95	S	DR	SC	(1) CDS UNIT (5) ABTECH ULTRA URBAN CATCH BASIN INSERT	34.4220639182, -118.54763505	SUSMP	2/22/2005	MERCEDES BENZ
D96	S	DR	SC	(1) CDS UNIT (5) KRISTAR FLOGUARD DOWNSPOUT FILTERS	34.4222523124, -118.548850607	SUSMP		MERCEDES BENZ - PARKING LOT EXPANSION

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ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D97	S	DR	SC	(1) ABTECH FILTER INSERT MODEL DI-2020 (2) ABTECH FILTER INSERT MODEL COI4I4	34.4222954992, -118.579035332	SUSMP	1/1/2007	27450 TOURNEY RD
D98	S	DR	SC	(7) KRISTAR FLOGARD PLUS CATCH BASIN FILTER INSERT MODEL FGP-21F (2) KRISTAR FOGARD PLUS CATCH BASIN FILTER INSERT MODEL FGP-12F (1) KRISTAR FLOGARD PLUS CATCH BASIN FILTER INSERT MODEL FCP-2448F	34.423026847, -118.577808347	SUSMP	1/1/2006	25350-60 MAGIC MOUNTAIN PKWY
D99	S	DR	SC	(4) FOSSIL FILTER CATCH BASIN INSERT	34.4239793975, -118.423157543	SUSMP	2/28/2013	ARCO STATION
D100	S	DR	Bs		34.4245391848, -118.494631058	SUSMP	12/13/2012	27053 HONBY
D101	S	DR	SC	(3) DRAIN INSERTS	34.4245391848, -118.494631058	SUSMP	12/13/2012	27053 HONBY
D102	S	DR	SC	(3) KRISTAR FOSSIL FILTER	34.4255774232, -118.539143292	SUSMP	1/1/2003	IN-N-OUT (BOUQUET CYN)
D103	S	DR	Bio		34.4259587974, -118.42513762	SUSMP	12/6/2012	VON'S EXPANSION AND REFACADE
D104	S	DR	SC	(8) KRISTAR FOSSIL FILTER CATCH BASIN INSERTS MODEL FB-24	34.426464308, -118.540171415	SUSMP	1/1/2007	LOWES HOME IMPROVEMENT
D105	S	DR	SC	(1) KRISTAR FOSSIL FILTER CATCH BASIN INSERT MODEL FF-18D (1) KRISTAR FOSSIL FILTER CATCH BASIN INSERT MODEL FF-2424 HC	34.4276117583, -118.539616564	SUSMP	10/8/2003	BOUQUET CANYON SOUTH LOT 20
D106	S	DR	SC	(4) KRISTAR FOSSIL FILTER FLOGARD CATCH BASIN INSERT (3) 3.5' WIDE S.D. CATCH BASIN W/ KRISTAR FOSSIL FILTER	34.4297717238, -118.553388948	SUSMP	10/17/2007	BRIDGEPORT MARKETPLACE
D107	S	DR	Bs		34.4329204032, -118.582435766	SUSMP	1/31/2011	ADI FACILITY
D108	S	DR	SC	(1) ABTECH ULTRA URBAN CATCH BASIN INSERT	34.4329204032, -118.582435766	SUSMP	1/31/2011	ADI FACILITY
D109	S	DR	SC	1500 GAL SAND AND GREASE INTERCEPTOR?	34.4361233028, -118.589151131	SUSMP	5/31/1983	SGL TECHNIC INC.
D110	S	DR	SC	(6) ABTECH ULTRA-URBAN FILTER SERIES DI2020.	34.4372748286, -118.562291378	SUSMP	4/2/2003	PASEO CLUB

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ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D111	S	DR	SC	DRAIN FILTERS (NUMBER UNKNOWN)	34.4393712355, -118.562488808	SUSMP	1/1/2007	27720 N. DICKASON DRIVE
D112	S	DR	SC	(7) KRISTAR FLOGARD BATCH BASIN INSERTS MODEL FF-24D	34.4394554943, -118.41759459	SUSMP		LA CO FIRE STATION 132
D113	S	DR	SC	(4) ABTECH DI-2020 FILTERS.	34.4398730122, -118.566965971	SUSMP	10/18/2004	VALENCIA SELF STORAGE
D114	S	DR	SC	(2) FG DRAIN FILTERS	34.4402418104, -118.567638272	SUSMP	1/16/2007	TMED
D115	S	DR	SC	(5) DROP INLET 24"X24" (3) 36"X36" PRECAST CONCRETE INLET PER JENSEN PRODUCTS (3) MODIFIED CURB INLET	34.4407637072, -118.573698711	SUSMP	12/12/2001	HOME DEPOT
D116	S	DR	SC	(14) ULTRA URBAN FILTER DI-2020	34.4416191723, -118.577513478	SUSMP	1/8/2009	GATEWAY VILLAGE, LLC
D117	S	DR	SC	(20) ABTECH ULTRA URBAN CATCH BASIN FILTER MODEL DI-2020	34.4419332441, -118.596136722	SUSMP	1/1/2005	WESTINGHOUSE INDUSTRIAL
D118	S	DR	SC	(1) 18'X18' STORM FILTER (1) CDS UNIT	34.4420334865, -118.600897306	SUSMP	8/22/2007	SUMMIT OAKS-ADVANCED BIONICS
D119	S	DR	SC	(5) CDS UNITS (1) 8'X18' STORMFILTER	34.442085, -118.600826	SUSMP	1/1/2008	ADVANCED BIONICS
D120	S	DR	SC	(14) ABTECH ULTRA URBAN DI2020 FILTERS IN CATCH BASINS	34.4425375455, -118.597710097	SUSMP	1/29/2003	RAYMOND SCURRIA
D121	S	DR	SC	DRAIN FILTERS (NUMBER UNKNOWN)	34.4430495415, -118.601709093	SUSMP	1/1/2006	COURTYARD BY MARRIOT
D122	S	DR	SC	(16) FLO-GARD PLUS MODEL FGP-2436W W/ MIRAFI FILTER WEAVE FW402	34.4435331124, -118.573456073	SUSMP	9/13/2005	HIGHRIDGE CROSSING
D123	S	DR	SC	(18) FOSSIL FILTER CATCH BASIN INSERT	34.4441423015, -118.577072005	SUSMP	10/7/2003	BUILDING INDUSTRIAL PARK
D124	S	DR	SC	(7) FLO-GARD PLUS CATCH BASIN FILTER INSERT MODEL FGP-24F	34.4441423015, -118.577072005	SUSMP	1/1/2004	WALMART #5162
D125	S	DR	FT	(2) FILTERRA BIORETENTION (4) FLOGARD CATCH BASIN INSERT (1) TRITON TRENCH DRAIN FILTER INSERT	34.4453069406, -118.580009654	SUSMP	1/1/2009	KEEP IT SELF STORAGE
D126	S	DR	Bio		34.4453069406, -118.580009654	SUSMP	1/1/2009	KEEP IT SELF STORAGE

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ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D127	S	DR	Bio		34.445719, -118.579669	SUSMP	5/13/2008	RYE CANYON SELF STORAGE
D128	S	DR	SC	(1) FLOWMASTER TRENCHDRAIN FILTER	34.445719, -118.579669	SUSMP	5/13/2008	RYE CANYON SELF STORAGE
D129	S	DR	SC	(1) KRISTAR FLOGARD FOSSIL FILTER	34.4459283836, -118.553846687	SUSMP	1/1/2005	SUMMERHILL RETIAL LOT 16
D130	S	DR	SC	(7) KRISTAR FLOGARD CATCH BASINF ILTER INSERT MODEL FGP-21F	34.44690802, -118.580506095	SUSMP	1/1/2006	28141 KELLY JOHNSON PKWY
D131	S	DR	SC	(1) CDS UNIT Q=1.96 CFS	34.4479818029, -118.575853876	SUSMP	1/1/2003	SC TRANSIT MAINTENANCE FACILITY
D132	S	DR	SC	(12) FLO-GARD PLUS MODEL FGP-21F	34.4489083471, -118.578689882	SUSMP	11/28/2005	RYE CANYON OFFICE PARTNERS
D133	S	DR	SC	(3) CDS UNITS	34.4495603388, -118.581084754	SUSMP	1/1/2005	RYE CANYON COMMERCE CENTER LOTS 10,11,24 &25
D134	S	DR	SC	(16) KRISTAR FOSSIL FITLER CATCH BASIN INSERTS	34.4506059714, -118.575179362	SUSMP	10/1/2003	DISCOVERY GATWAY SPECTRUM
D135	S	DR	SC	(8) FOSSIL FILTER MODEL FF-2424HC HIGH CAPACITY CATCH BASIN INSERTS	34.4508477817, -118.582106046	SUSMP	7/21/2005	STAATS CONSTRUCTION INC
D136	S	DR	SC	(4) KRISTAR FLOGARD CATCH BASIN FILTER INSERT MODEL FF-2424 HC	34.4517194704, -118.582171421	SUSMP	1/1/2005	28355 KELLY JOHNSON PKWY
D137	S	DR	SC	(2) FOSSI LFILTER FLOGARD MODEL FGP-3648F (1) FOSSIL FILTER FLOGARD MODEL FGP-6CI	34.4526763558, -118.57804363	SUSMP	1/1/2003	RYE CANYON BUSINESS PARK BLDG #1
D138	S	DR	SC	(1) FLOGARD PLUS FOSSIL FILTER MODEL FGP 5.0CI (28) KRISTAR FLOGARD FOSSIL FILTER MODEL FGP-24F	34.4527132087, -118.575059084	SUSMP	1/1/2006	CONSTELLATION RD
D139	S	DR	SC	(6) DRAIN PAC FILTERS	34.453425, -118.580161	SUSMP	8/10/2005	MANN BIOMEDICAL PARK LLC
D140	S	DR	SC	(4) FOSSIL FILTER FLOGARD MODEL FGP-2436F (2) FOSSIL FILTER FLOGARD MODEL 3648 F	34.4541092181, -118.579047562	SUSMP	1/1/2003	RYE CANYON BUSINESS PARK BLDG #2
D141	S	DR	Bs		34.4597558837, -118.535970698	SUSMP	10/14/2004	HA SECO

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ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D142	S	DR	SC	CDS MODEL PMSU20 15, .7 CFS CAPACITY STORM WATER TREATMENT UNIT.	34.4597558837, -118.535970698	SUSMP	10/14/2004	HA SECO
D143	S	DR	SC	(2) ABTECH CO1414H FILTERS	34.4598848889, -118.530628713	SUSMP	10/15/2007	BLESSED KATERI CHURCH
D144	S	DR	SC	(2) DI-2020H FILTERS	**Unknown**	SUSMP	2/13/2007	EMBASSY SUITES HOTEL
D145	S	DR	Bs		**Unknown**	SUSMP	1/21/2010	SOLEDAD CANYON ROAD, PARKING LOT EXPANSION FOR EXISTING BUILDINGS
D146	S	DR	SC	(4) DRAIN INSERTS	**Unknown**	SUSMP	1/21/2010	SOLEDAD CANYON ROAD, PARKING LOT EXPANSION FOR EXISTING BUILDINGS
D147	S	DR	Bs		**Unknown**	SUSMP	6/24/2011	UCLA ARCHIVE VAULT - PHASE 2
D148	S	DR	Bio		**Unknown**	SUSMP	6/24/2011	UCLA ARCHIVE VAULT - PHASE 2
D149	S	DR	SC	(11) FGP-21F FLO-GARD + PLUS FOSSIL FILTERS	**Unknown**	SUSMP	7/19/2007	TOURNEY ROAD RETAIL
D150	S	DR	SC		**Unknown**	SUSMP	2/21/2006	TRACT 53425
D151	S	DR	SC	(2) CDS UNIT	**Unknown**	SUSMP	2/21/2006	TRACT 53425
D152	Uninc	DR	SC	(1) FGP-36F8	34.3782395843, -118.566931068	SUSMP		
D153	Uninc	DR	SC	(3) FLOGARD+ FGP-18F8 FILTERS. FILTERED CAPACITY = 0.4 CFS/EACH. (1) LOPRO TR	34.380224343, -118.568706833	SUSMP		
D154	Uninc	DR	SC	FOSSIL FILTER FLO-GARD	34.4054503038, -118.592212902	SUSMP		
D155	Uninc	DR	SC	ABTECH FILTER BB59443, FLO GARD TRENCH DRAIN FF-TDPC600	34.4217636983, -118.584401268	SUSMP		
D156	Uninc	DR	SC	ONE STORM WATER CATCH BASIN FILTER. REST OF DRAINAGE LEAD TO MULTIPLE BIO	34.4315487758, -118.469972183	SUSMP		
D157	Uninc	DR	SC	FLO-GARD PLUS FILTER FGP-21F	34.4329753566, -118.395256532	SUSMP		
D158	Uninc	DR	Unk		34.4370570466, -118.614052733	SUSMP		

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ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D159	Uninc	DR	SC	ABTECH FILTERS AT FOUR LOCATIONS	34.4429393207, -118.632458327	SUSMP		
D160	Uninc	DR	SC	FLO-GARD FOSSIL FILTERS MODEL FF-2424HC	34.4459404607, -118.63973627	SUSMP		
D161	Uninc	DR	SC	ABTECH MODEL# DI1414H	34.4473942396, -118.634833364	SUSMP		
D162	Uninc	DR	SC	ABTECH FILTERS DI2020H	34.4510566329, -118.636631182	SUSMP		
D163	Uninc	DR	SC	10 ABTECH CATCH BASIN FILTERS	34.4514366748, -118.637846356	SUSMP		
D164	Uninc	DR	SC	(17) FLO-GARD +PLUS CATCH BASINS WITH FOSSIL FILTERS	34.4516286469, -118.625078064	SUSMP		
D165	Uninc	DR	FT	(1) 8"X16"CONTECH PRECAST SWFILTER WITH 18 CARTRIDGES & SORBENT HOODCOVER @ S-W	34.4532023546, -118.635645562	SUSMP		
D166	Uninc	DR	SC	CDS UNIT MODEL# PMS 20 20	34.4533578966, -118.635717481	SUSMP		
D167	Uninc	DR	Unk	Other (see comments)	34.4549, -118.634585465	SUSMP	6/3/2011	
D168	Uninc	DR	SC	1 CURB OPENING STORMWATER FILTER AND 4 C.B. STORMWATER FILTERS. LOCATED AT P	34.455401163, -118.63443649	SUSMP		
D169	Uninc	DR	SC	3 C.B. STORMWATER FILTERS (DRAINPAC) PARCEL 1	34.4555003811, -118.634587355	SUSMP		
D170	Uninc	DR	SC	TRENCH DRAIN FILTER INSERT KRISTAR FG-TDOF8	34.4606639894, -118.50777485	SUSMP		
D171	Uninc	DR	SC	FLO-GARD FILTER FF-2424HC	34.4626979611, -118.558905314	SUSMP		
D172	Uninc	DR	SC	ONE PARKWAY CULVERT STORMWATER INSERT	34.4660802342, -118.196946021	SUSMP		
D173	Uninc	DR	Unk	Other (see comments)	34.4685, -118.197574729	SUSMP	6/28/2013	
D174	Uninc	DR	SC	FLO-GARD TRENCH DRAIN AND FLO-GARD PLUS CATCH BASIN FILTER AND BIO-RETENTIO	34.4687906802, -118.514149288	SUSMP		
D175	Uninc	DR	SC	ABTECH FILTER DI2020	34.4808561046, -118.160898945	SUSMP		

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ID	Jurisdiction	Data Source	BMP Subcategory	BMP Name	Location (Latitude, Longitude)	Purpose of BMP (treatment objectives)	Date Facility Placed in Service	Comments and Notes
D176	Uninc	DR	SC	(1) 48"X48" CATCH BASIN AND DIAMOND FLOW STORM DRAIN FILTER	34.4808960753, -118.162597163	SUSMP		
D177	Uninc	DR	SC	KRISTAR FLOGARD FILTER INSERT MODEL FGP-12F	34.4840107972, -118.60675445	SUSMP		
D178	Uninc	DR	Unk	Other (see comments)	34.4859, -118.119990102	SUSMP	10/4/2012	
D179	Uninc	DR	SC	FLO GARD FF-2424HC, FF-12D	34.4887075167, -118.621279764	SUSMP		
D180	Uninc	DR	SC	(4) FLOGARD+ FILTER MODEL:FGP-24F, FILTERED CAPACITY 1.5 CFS/EACH.	34.490788451, -118.617814076	SUSMP		
D181	Uninc	DR	SC	(1) DIAMOND-FLOW FILTER,MODEL:DMND-FL1818. CLEAN FLOW RATE = 1.56CFS	34.4920483562, -118.127379475	SUSMP		
D182	Uninc	DR	SC	FLOGARD PLUS FGP-24F.	34.4930965936, -118.196449605	SUSMP		
D183	Uninc	DR	SC	FLO-GARD CATCH BASIN INSERT FF-2436HC, FF-2424 HC	34.4945875944, -118.626333088	SUSMP		
D184	Uninc	DR	SC	(2) ABTECH FILTER (7) ABTECH 508T01 (13) SMART SPONGE FILTER INSERTS	34.4961857466, -118.622316874	SUSMP		
D185	Uninc	DR	SC	(2) FLOGARD+ FGP-30CI, CAP.=1.0 CFS/EACH. (2) FLOGARD LOPRO M1818, CAP.=0.1 CFS	34.4982422516, -118.623820663	SUSMP		
D186	Uninc	DR	SC	FLO GARD FILTERS FGP-21F (3), FGP-12F (3)	34.4990679651, -118.624695478	SUSMP		
D187	Uninc	DR	SC	(2) KRISTAR'S LO PRO FG-M2424 SHALLOW C/B FILTERS. FILTERED CAP	34.4994418867, -118.62500898	SUSMP		
D188	Uninc	DR	Bio	Rain Garden	34.5055, -118.151081871	SUSMP	2/23/2010	
D189	Uninc	DR	Bio	Rain Garden	34.5114, -118.171274802	SUSMP	3/11/2013	
D191	Uninc	DR	Bio	Rain Garden	34.5163, -118.236896706	SUSMP	9/19/2012	

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ID	**Jurisdiction**	**Data Source**	**BMP Subcategory**	**BMP Name**	**Location (Latitude, Longitude)**	**Purpose of BMP (treatment objectives)**	**Date Facility Placed in Service**	**Comments and Notes**
D192	Uninc	NOI	SC	Trash removal BMPs for up to 110 storm drain inlets in commercial and industrial park	**Various Locations**	Trash removal	7/1/2015	These BMPs were the Group's Early Action project per Permit Provision VI.C.4.b.iii(5)
D193	S	NOI	SC	Trash removal BMPs for up to 79 storm drain inlets in commercial and industrial park	**Various Locations**	Trash removal	7/1/2015	These BMPs were the Group's Early Action project per Permit Provision VI.C.4.b.iii(5)

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APPENDIX C6

Tier A Regional BMP Fact Sheets

This appendix presents fact sheets for each of the candidate Tier A regional BMPs. The fact sheets present basic site information for each of the candidate Tier A regional parcels prior to conceptual design and the RAA. Six of the Tier A sites were selected for conceptual design and the more detailed information based on the conceptual design for those sites are included in Appendix C-9.

NOTE: Site-scale modeling was used to determine the BMP size required to capture the 85th percentile storm. The recommended sizes for long-term bacteria reduction do not consider the "bacteria storm" sizing criteria discussed in the EWMP and are merely presented to compare the side-by-side performance of all sites. When designing future projects, sizing should be based on the RAA results in Appendix D-1.

INTRODUCTION
"TIER A" REGIONAL CONTROL MEASURE FACT SHEETS

SYNOPSIS

Regional control measures on public property (surface infiltration basins or subsurface infiltration galleries) are cost-effective components of the Upper Santa Clara EWMP. In addition to water quality benefits, these centralized facilities have the potential to recharge groundwater aquifers and provide multi-use benefits. To identify potential regional control measures in the EWMP area, public parcels were screened and ranked using quantitative prioritization criteria; each site was then modeled to predict water quality benefits. These fact sheets communicate the site details and modeling results for 16 of the top-ranked potential sites. The results were used to prioritize sites for further investigation and can guide future site design. Please see Appendix C9 for detailed conceptual design fact sheets for six Tier A candidate projects.


Example Surface Infiltration Basin

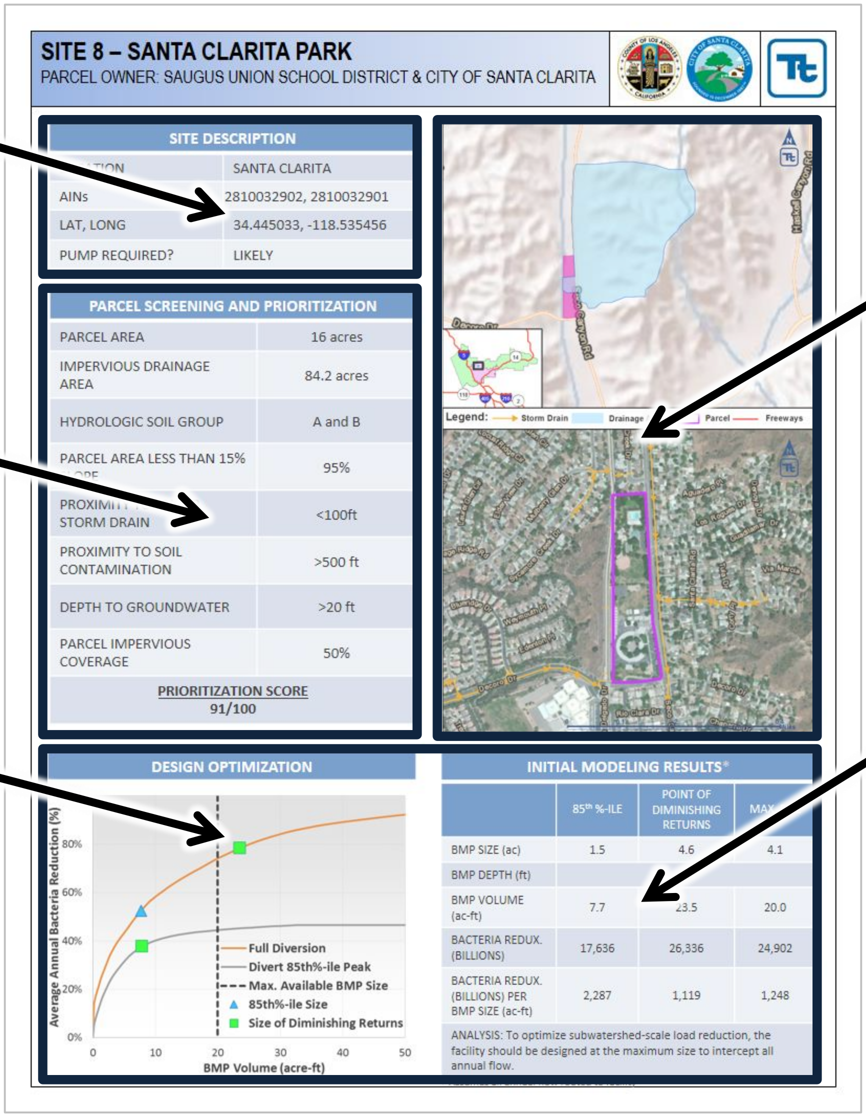

Example Subsurface Infiltration Gallery

HOW TO USE THESE FACT SHEETS

Basic information for identifying the parcel is provided here.

These were the key factors used to **screen and prioritize** public parcels in the EWMP area. Note that prior-itization scores were normalized to 100

A **size-effectiveness curve** demonstrates how pollutant removal performance varies as the facility size increases. The *size of diminishing returns* shown on the curve is the size that effectively maximizes performance – in other words, any facility larger than this size would achieve less pollutant removal per dollar spent.



SITE 8 – SANTA CLARITA PARK

PARCEL OWNER: SAUGUS UNION SCHOOL DISTRICT & CITY OF SANTA CLARITA

SITE DESCRIPTION	
TION	SANTA CLARITA
AINs	2810032902, 2810032901
LAT, LONG	34.445033, -118.535456
PUMP REQUIRED?	LIKELY

PARCEL SCREENING AND PRIORITIZATION	
PARCEL AREA	16 acres
IMPERVIOUS DRAINAGE AREA	84.2 acres
HYDROLOGIC SOIL GROUP	A and B
PARCEL AREA LESS THAN 15%	95%
PROXIMI STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	50%
PRIORITIZATION SCORE 91/100	

DESIGN OPTIMIZATION

INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX
BMP SIZE (ac)	1.5	4.6	4.1
BMP DEPTH (ft)			
BMP VOLUME (ac-ft)	7.7	23.5	20.0
BACTERIA REDUX. (BILLIONS)	17,636	26,336	24,902
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	2,287	1,119	1,248

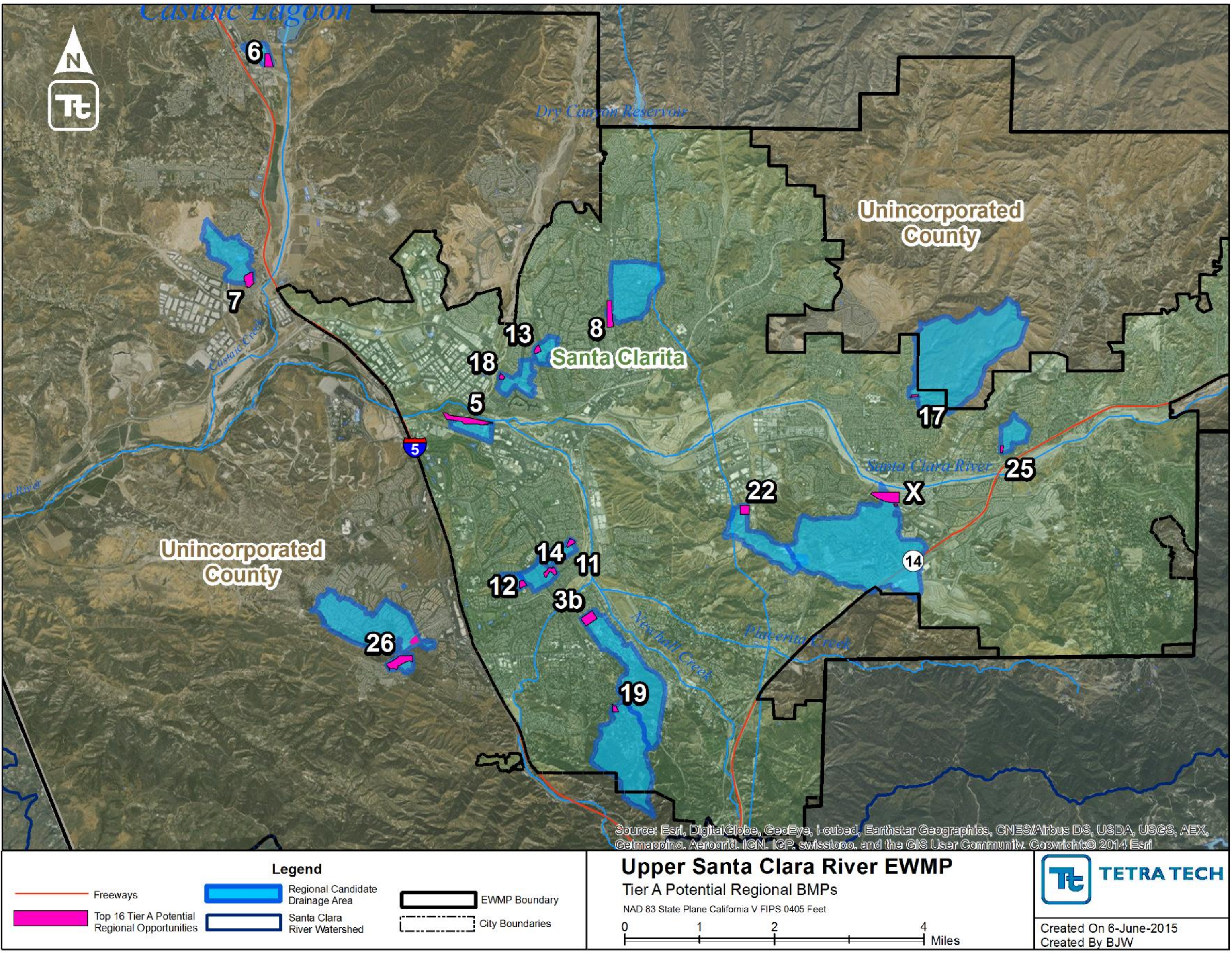
ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the maximum size to intercept all annual flow.

Maps show the area that drains runoff to the candidate parcel and an aerial image of the existing site layout.

This table summarizes the **modeling results** for the important points on the size-effectiveness curve. The *85th percentile size* represents the facility size required to retain the regulatory design storm. The *maximum size* is a situation in which the total available space has been converted to a regional facility.

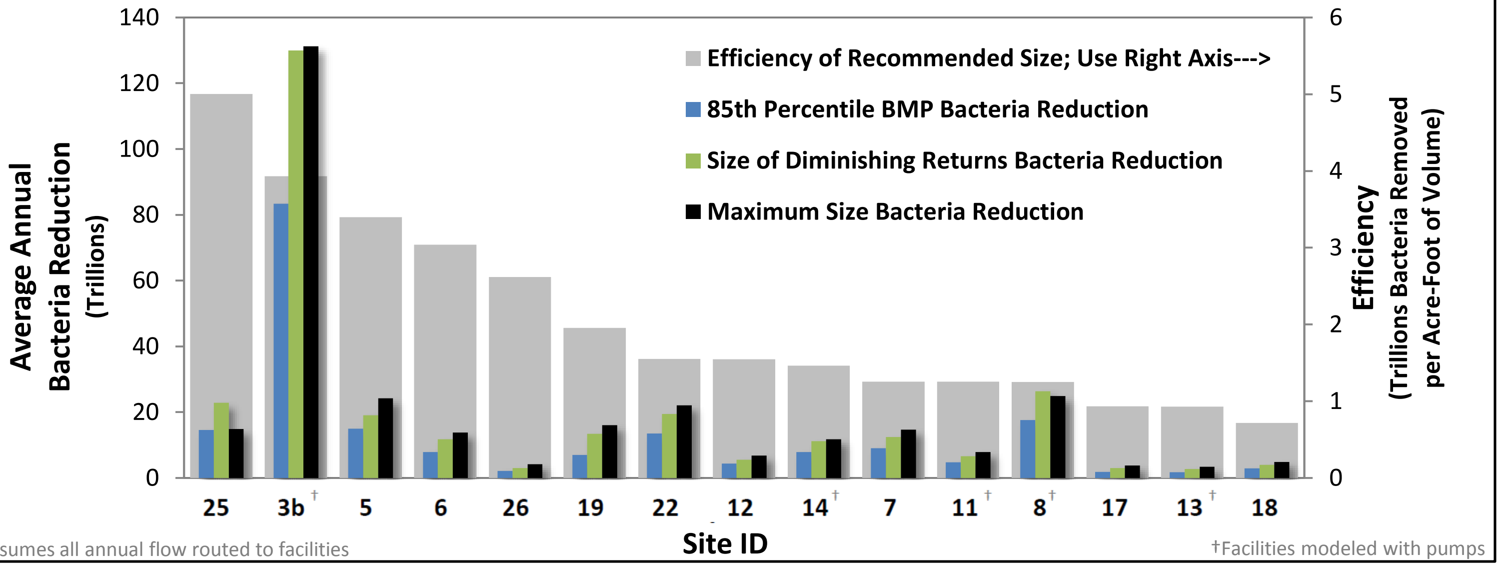
COMPARATIVE SUMMARY OF ALL SITES
"TIER A" REGIONAL CONTROL MEASURE FACT SHEETS

OVERALL LOCATION MAP



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Copyright:© 2014 Esri

PRELIMINARY WATER QUALITY PERFORMANCE SUMMARY



*Assumes all annual flow routed to facilities

†Facilities modeled with pumps

SITE 3b – NEWHALL MEMORIAL PARK

PARCEL OWNER: CITY OF SANTA CLARITA

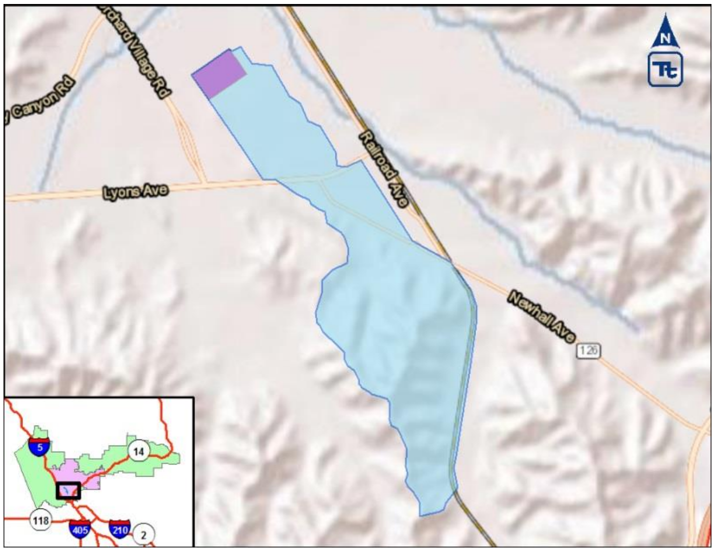
SITE DESCRIPTION

LOCATION	SANTA CLARITA
AINs	2855006902, 2855006901
LAT, LONG	34.386174, -118.539885
PUMP REQUIRED?	LIKELY

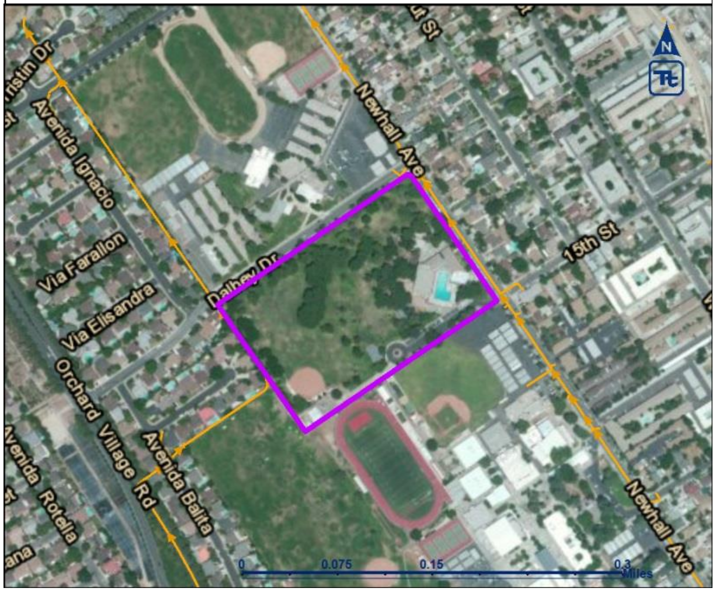
PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	14 acres
IMPERVIOUS DRAINAGE AREA	111 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	<100 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	10%

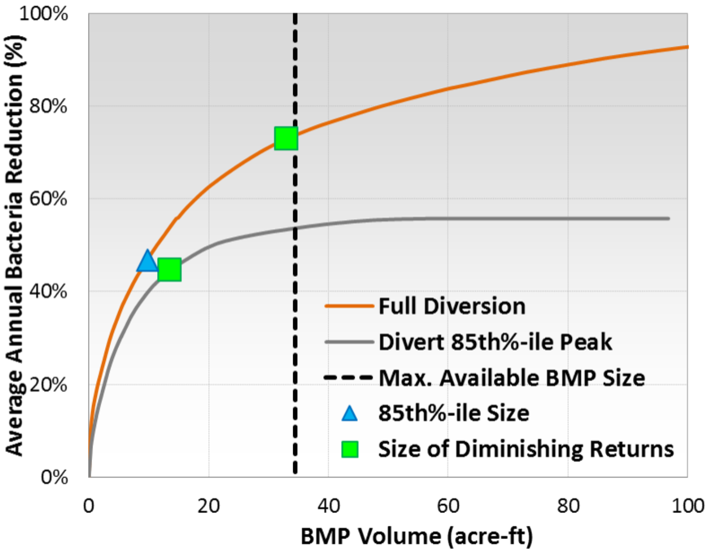
PRIORITIZATION SCORE
89/100



Legend: → Storm Drain ▭ Drainage Area ▭ Parcel — Freeways



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	1.9	6.5	6.7
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	9.7	33.0	34.4
BACTERIA REDUX. (BILLIONS)	83,390	129,949	131,260
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	8,580	3,933	3,813

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow. See Appendix C9 for conceptual sizing.

*Assumes all annual flow routed to facility

SITE 5 – OPEN SPACE AT SOUTH FORK TRAIL
PARCEL OWNER: CITY OF SANTA CLARITA

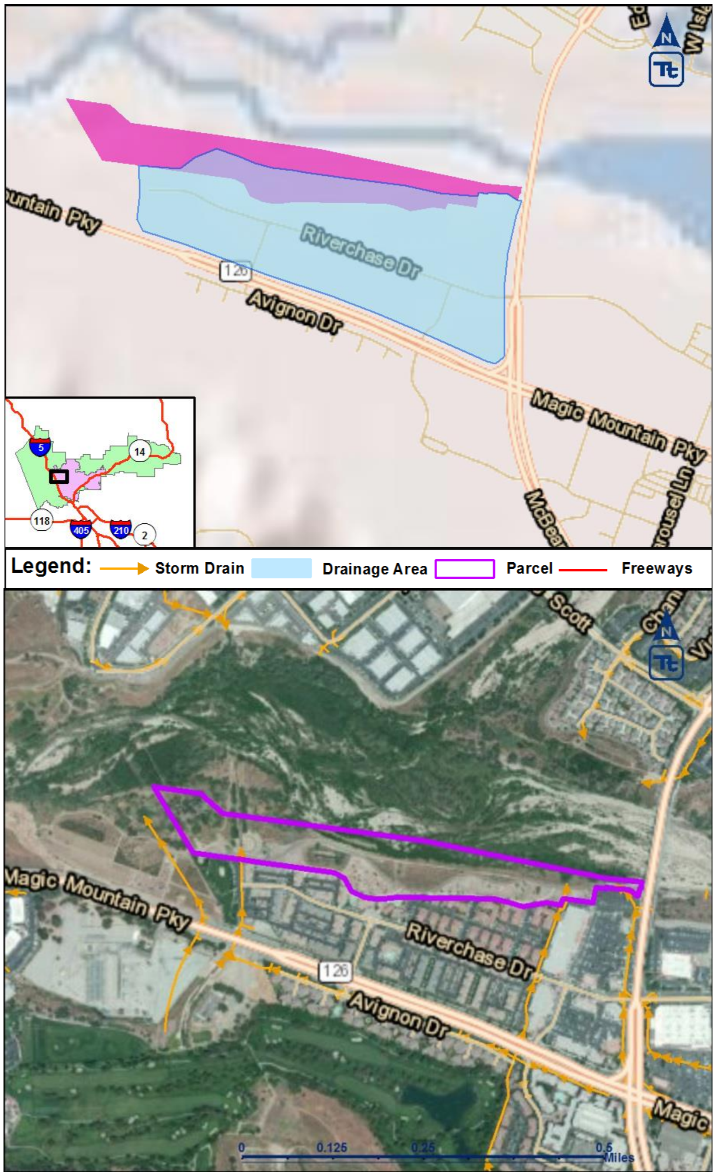
SITE DESCRIPTION

LOCATION	SANTA CLARITA
AINs	2811083902
LAT, LONG	34.424476, -118.568965
PUMP REQUIRED?	UNLIKELY

PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	25 acres
IMPERVIOUS DRAINAGE AREA	48 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	85%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	10-20 ft
PARCEL IMPERVIOUS COVERAGE	7%

PRIORITIZATION SCORE
87/100



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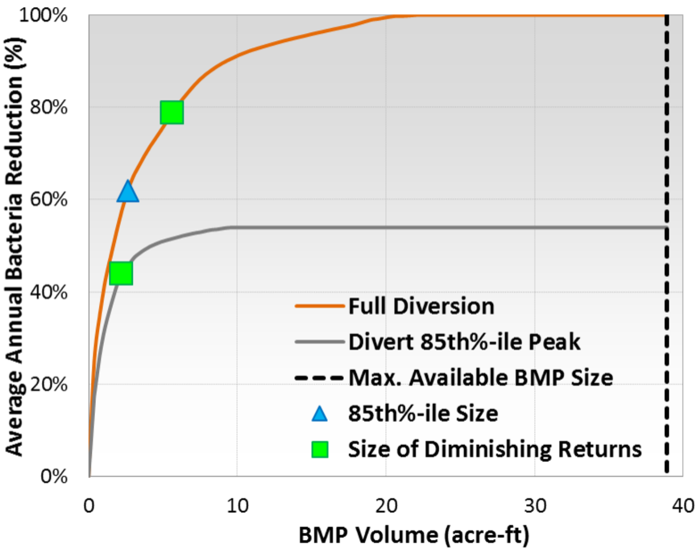


INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.6	1.3	6.9
BMP DEPTH (ft)	4		
BMP VOLUME (ac-ft)	2.6	5.6	38.9
BACTERIA REDUX. (BILLIONS)	14,975	19,066	24,216
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	5,716	3,396	623

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

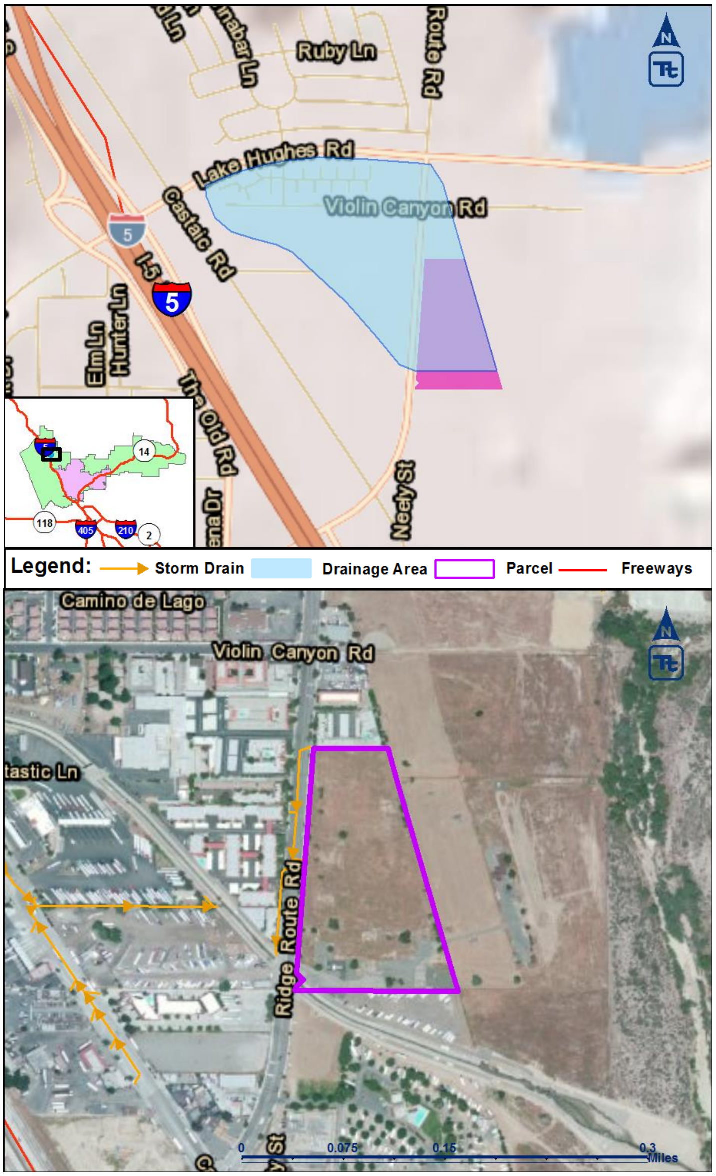
SITE 6 – OPEN SPACE AT RIDGE ROUTE RD
PARCEL OWNER: NEWHALL CO WATER DISTRICT

SITE DESCRIPTION

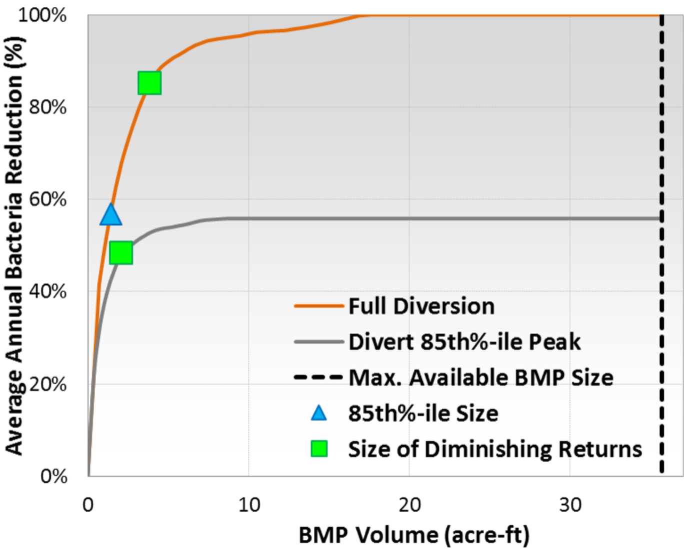
LOCATION	UNINCORPORATED
AINs	2865007906, 2865007900, 2865007905
LAT, LONG	34.49386, -118.615712
PUMP REQUIRED?	UNLIKELY

PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	10 acres
IMPERVIOUS DRAINAGE AREA	21 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100 ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	1%
PRIORITIZATION SCORE **87/100**	



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.3	0.8	5.4
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	1.4	3.9	35.7
BACTERIA REDUX. (BILLIONS)	7,830	11,733	13,786
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	5,578	3,039	386

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 7 – HASLEY CANYON PARK

PARCEL OWNER: CASTAIC UNION SCHOOL DISTRICT & L A COUNTY

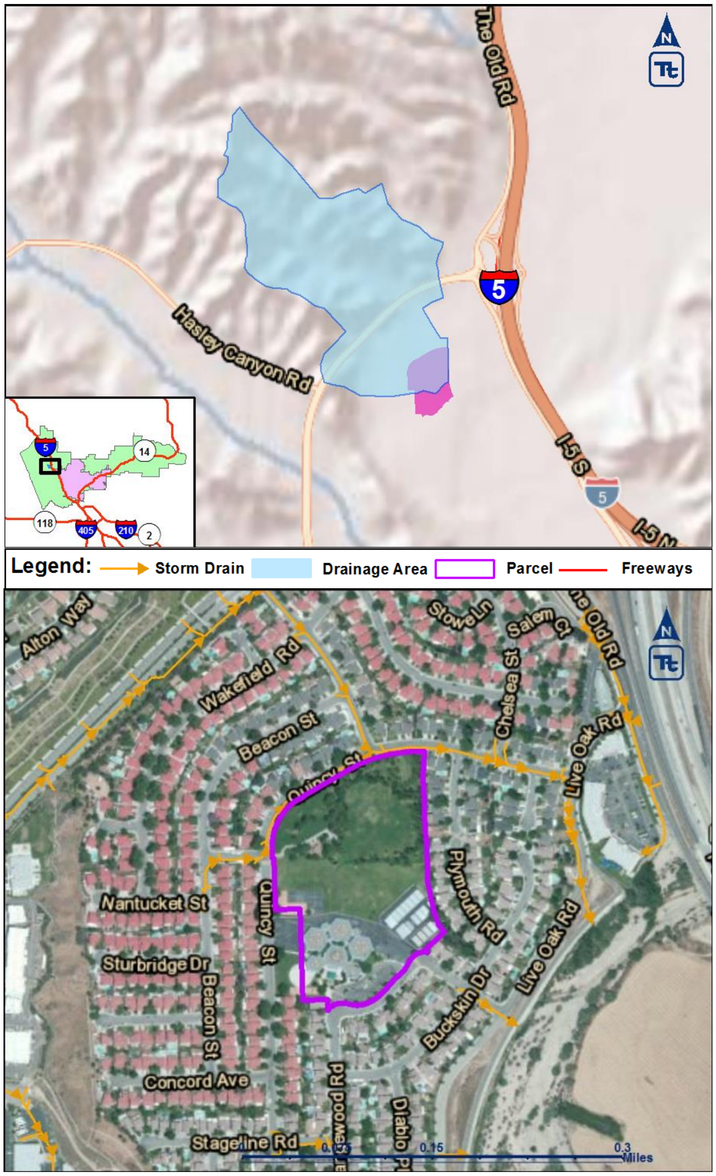
SITE DESCRIPTION

LOCATION	UNINCORPORATED
AINs	2866014934, 2866015900, 2866014900, 2866020908, 2866020910, 2866020909, 2866020907
LAT, LONG	34.451415, -118.619881
PUMP REQUIRED?	UNLIKELY

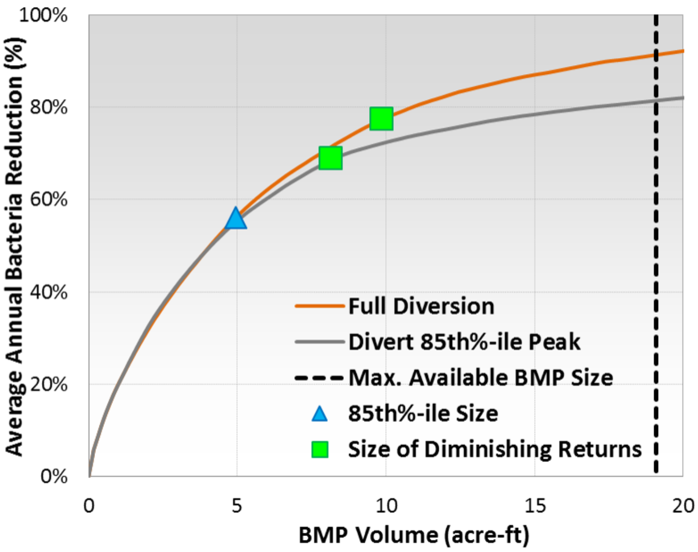
PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	12 acres
IMPERVIOUS DRAINAGE AREA	57 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100 ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	<10 ft
PARCEL IMPERVIOUS COVERAGE	50%

PRIORITIZATION SCORE
83/100



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	1.7	3.3	5.6
BMP DEPTH (ft)	3		
BMP VOLUME (ac-ft)	4.9	9.9	19.1
BACTERIA REDUX. (BILLIONS)	8,978	12,408	14,634
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	1,817	1,256	767

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow. See Appendix C9 for conceptual sizing.

*Assumes all annual flow routed to facility

SITE 8 – SANTA CLARITA PARK

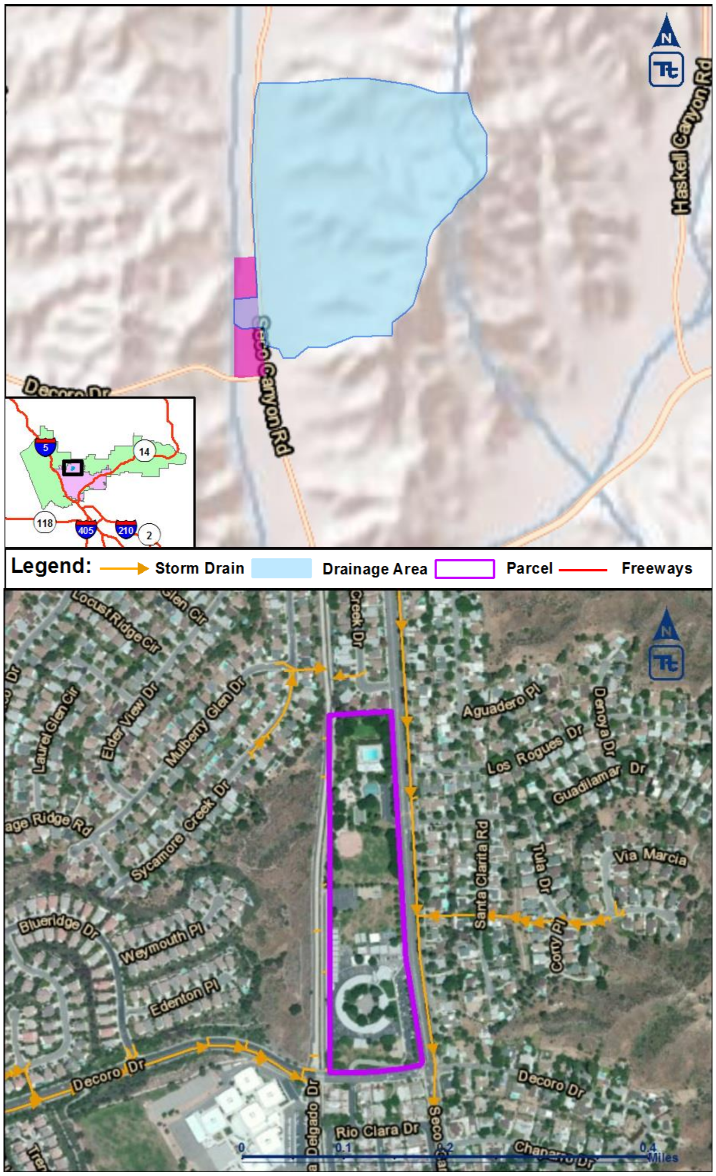
PARCEL OWNER: SAUGUS UNION SCHOOL DISTRICT & CITY OF SANTA CLARITA

SITE DESCRIPTION

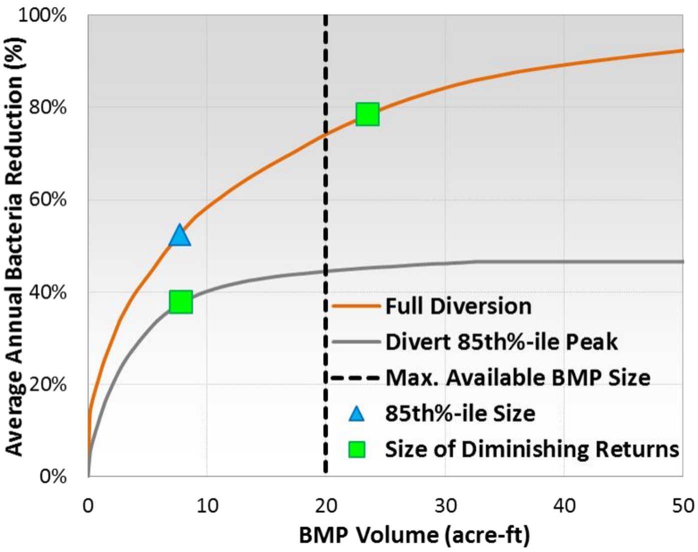
LOCATION	SANTA CLARITA
AINs	2810032902, 2810032901
LAT, LONG	34.445033, -118.535456
PUMP REQUIRED?	LIKELY

PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	16 acres
IMPERVIOUS DRAINAGE AREA	84.2 acres
HYDROLOGIC SOIL GROUP	A and B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	50%
PRIORITIZATION SCORE **91/100**	



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	1.5	4.6	4.1
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	7.7	23.5	20.0
BACTERIA REDUX. (BILLIONS)	17,636	26,336	24,902
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	2,287	1,119	1,248

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the maximum size to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 11 – ALMENDRA PARK
PARCEL OWNER: CITY OF SANTA CLARITA

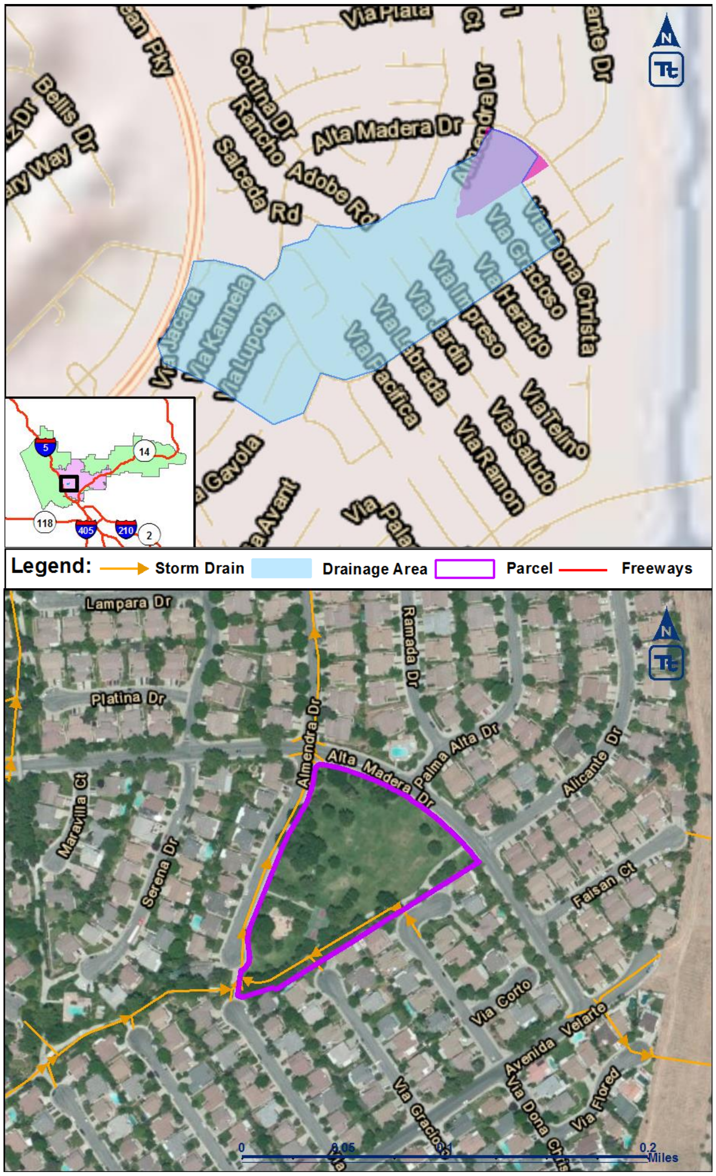
SITE DESCRIPTION

LOCATION	SANTA CLARITA
AINs	2860003902, 2860003900
LAT, LONG	34.400793, -118.544278
PUMP REQUIRED?	LIKELY

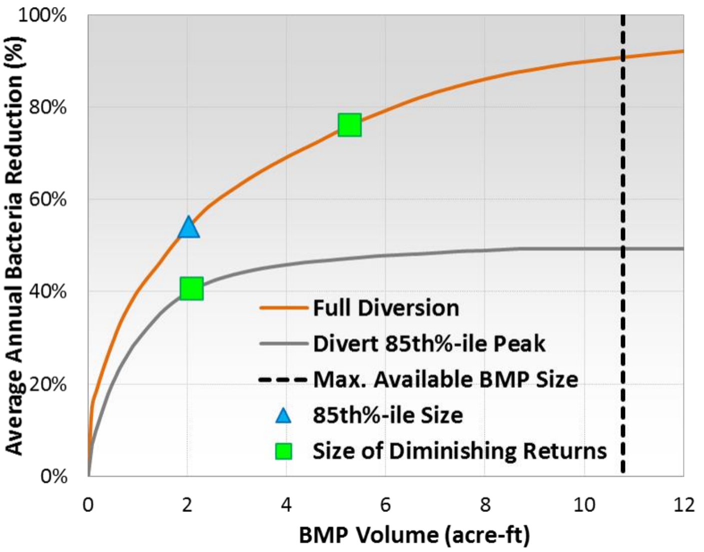
PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	4 acres
IMPERVIOUS DRAINAGE AREA	22 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100 ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	11%

PRIORITIZATION SCORE
91/100



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.4	1.1	1.9
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	2.0	5.3	10.8
BACTERIA REDUX. (BILLIONS)	4,710	6,622	7,903
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	2,317	1,253	734

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 12 – VALENCIA MEADOWS PARK
PARCEL OWNER: CITY OF SANTA CLARITA

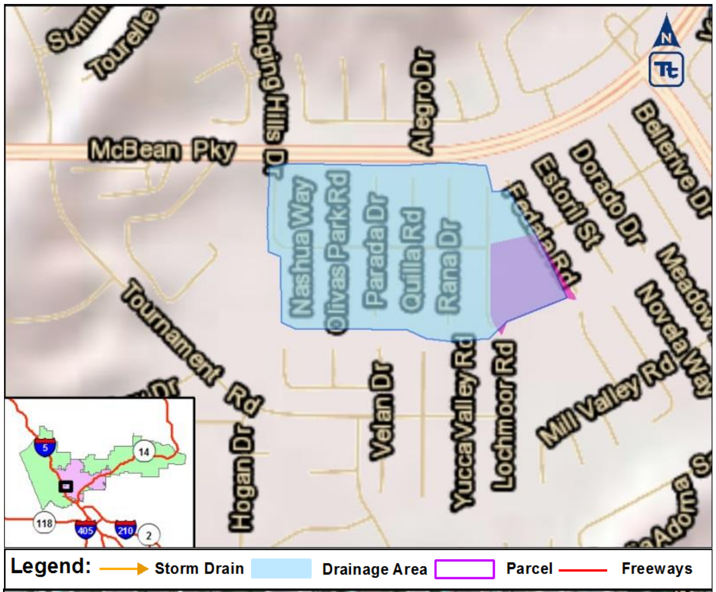
SITE DESCRIPTION

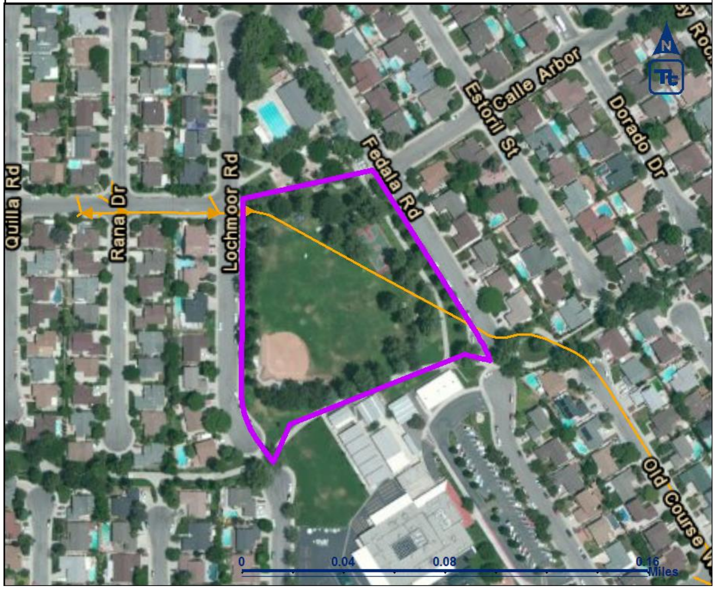
LOCATION	SANTA CLARITA
AINs	2858007900
LAT, LONG	34.39272, -118.555537
PUMP REQUIRED?	UNLIKELY

PARCEL SCREENING AND PRIORITIZATION

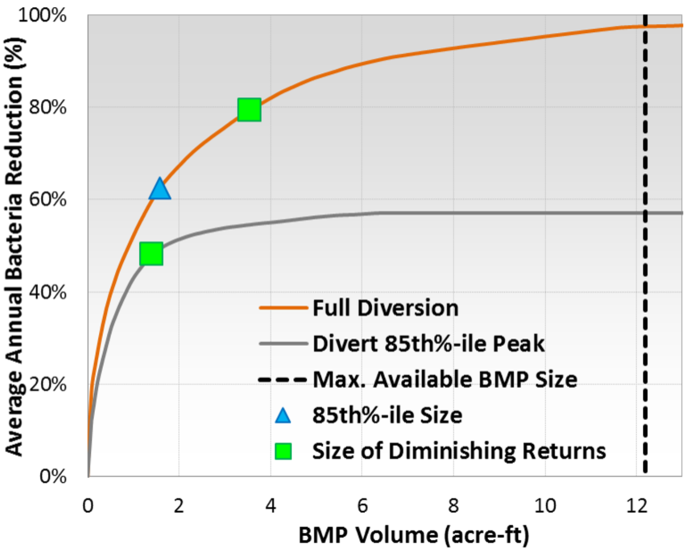
PARCEL AREA	4 acres
IMPERVIOUS DRAINAGE AREA	14 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100 ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	10%

PRIORITIZATION SCORE
91/100





DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85^{th} %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.3	0.7	1.7
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	1.6	3.6	12.2
BACTERIA REDUX. (BILLIONS)	4,325	5,498	6,753
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	2,754	1,547	554

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 13 – NORTHBRIDGE PARK
PARCEL OWNER: CITY OF SANTA CLARITA

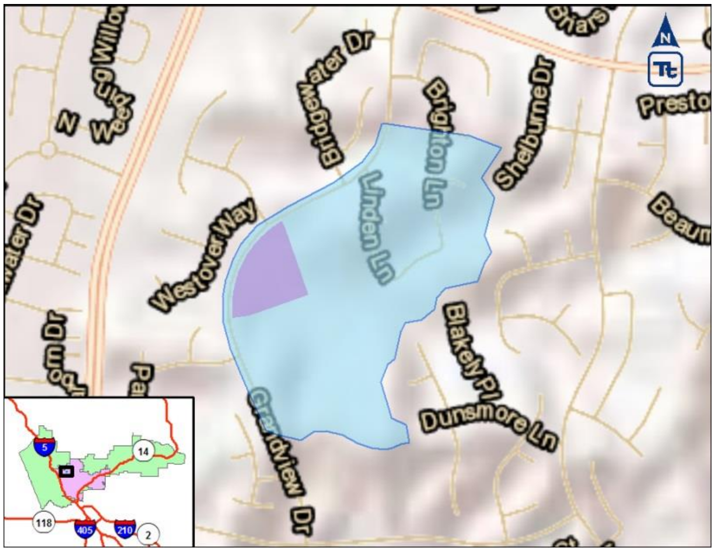
SITE DESCRIPTION

LOCATION	SANTA CLARITA
AINs	2811029900
LAT, LONG	34.438189, -118.552277
PUMP REQUIRED?	LIKELY

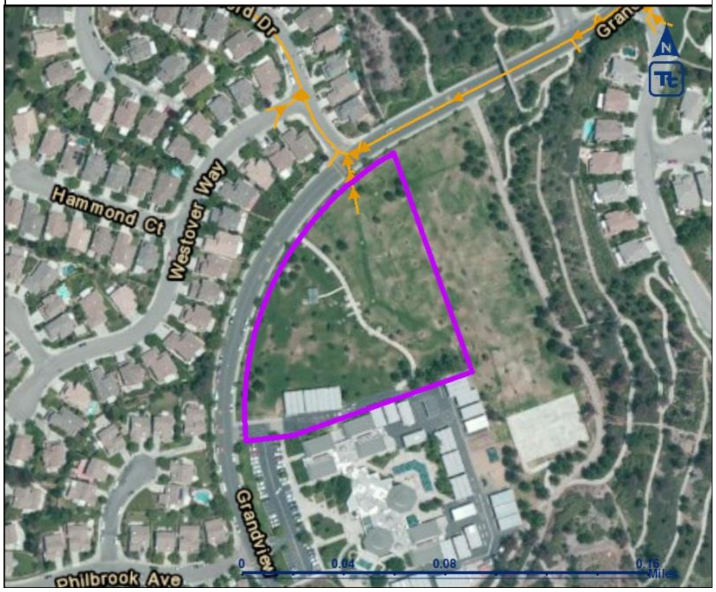
PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	4 acres
IMPERVIOUS DRAINAGE AREA	7 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	65%
PROXIMITY TO MAJOR STORM DRAIN	100-250 ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	2%

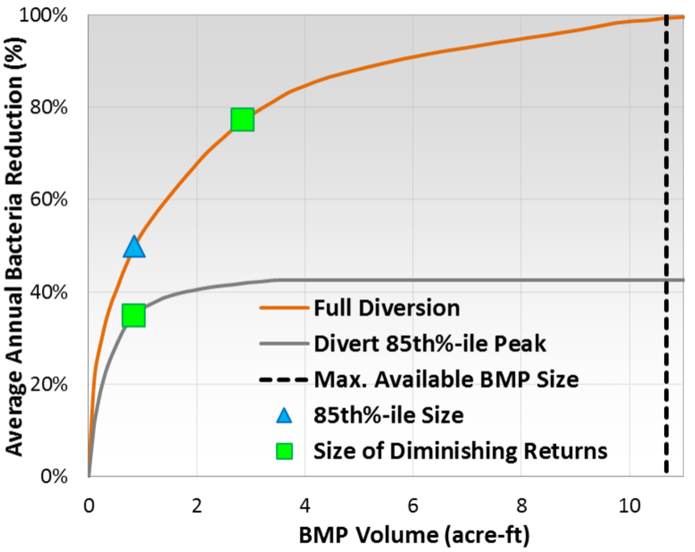
PRIORITIZATION SCORE
85/100



Legend: Storm Drain Drainage Area Parcel Freeways



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.2	0.5	1.7
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	0.8	2.9	10.7
BACTERIA REDUX. (BILLIONS)	1,716	2,654	3,418
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	2,022	927	320

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 14 – VALENCIA GLEN PARK
PARCEL OWNER: CITY OF SANTA CLARITA & LA COUNTY

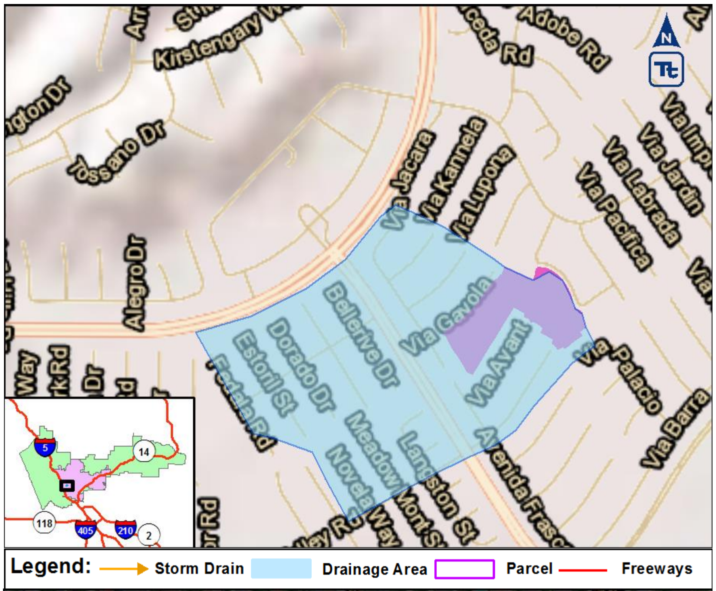
SITE DESCRIPTION

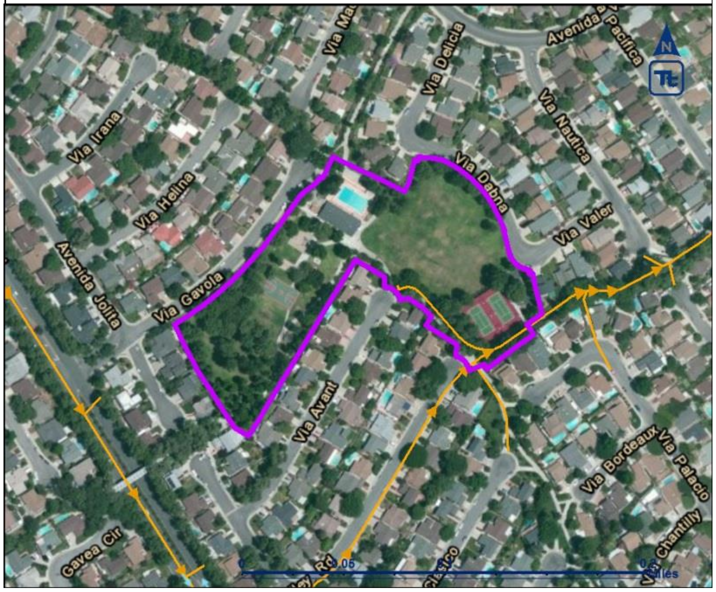
LOCATION	SANTA CLARITA
AINs	2859008900, 2859014900, 2859030902, 2859030901, 2859030900
LAT, LONG	34.395154, -118.549012
PUMP REQUIRED?	LIKELY

PARCEL SCREENING AND PRIORITIZATION

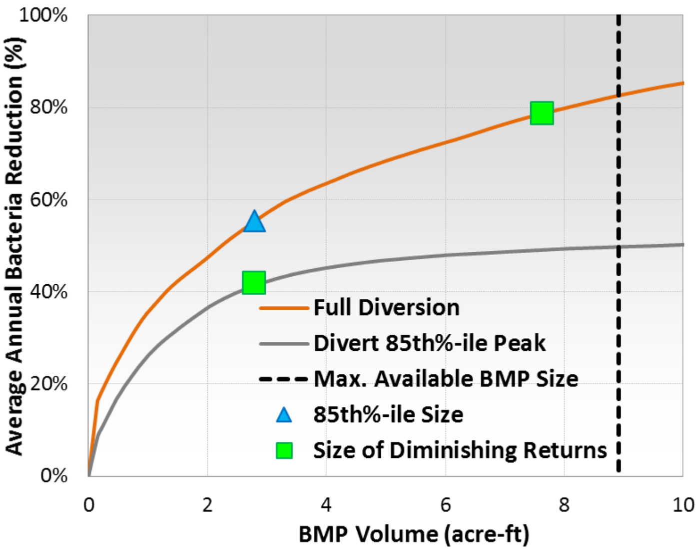
PARCEL AREA	7 acres
IMPERVIOUS DRAINAGE AREA	29 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	30%

PRIORITIZATION SCORE
91/100





DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.6	1.6	1.7
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	2.8	7.6	8.9
BACTERIA REDUX. (BILLIONS)	7,850	11,160	11,720
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	2,809	1,463	1,315

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 17 – OPEN SPACE AT DAMAR CT

PARCEL OWNER: L A COUNTY FLOOD CONTROL DISTRICT

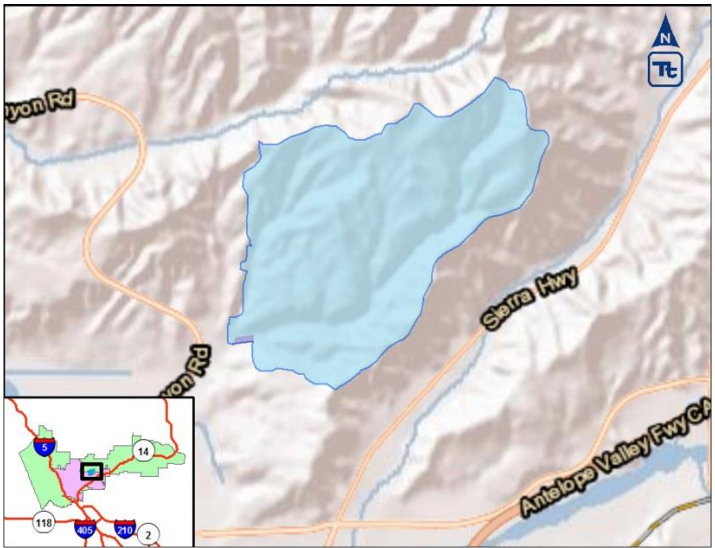
SITE DESCRIPTION

LOCATION	SANTA CLARITA
AINs	2802003908
LAT, LONG	34.429635, -118.46397
PUMP REQUIRED?	UNLIKELY

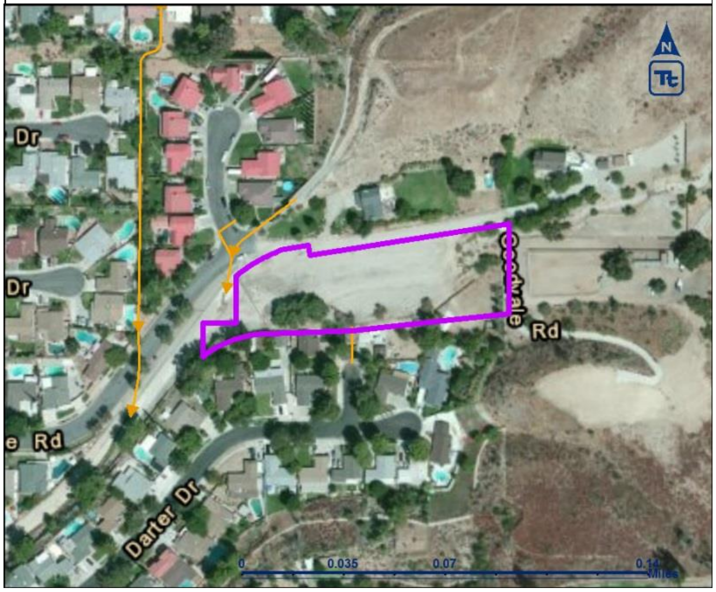
PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	2 acres
IMPERVIOUS DRAINAGE AREA	19 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	65%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	10%

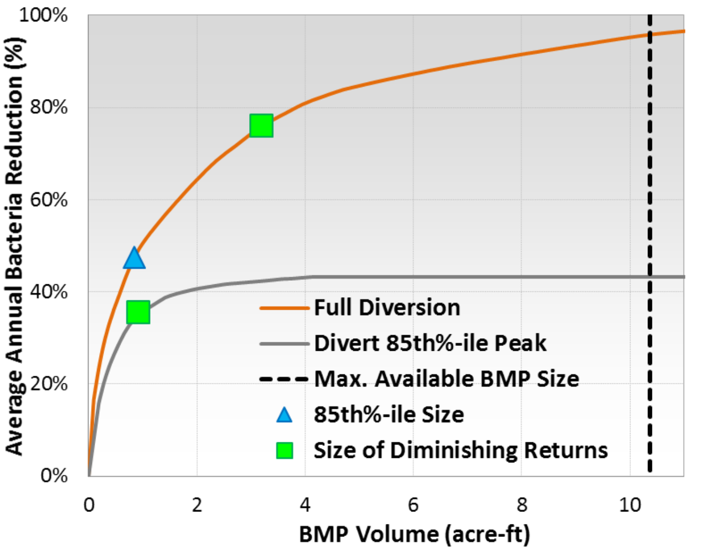
PRIORITIZATION SCORE
85/100



Legend: Storm Drain, Drainage Area, Parcel, Freeways



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.1	0.5	1.4
BMP DEPTH (ft)		6	
BMP VOLUME (ac-ft)	0.8	3.2	10.4
BACTERIA REDUX. (BILLIONS)	1,865	2,985	3,768
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	2,204	934	364

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 18 – VALENCIA HERITAGE PARK
PARCEL OWNER: CITY OF SANTA CLARITA

SITE DESCRIPTION

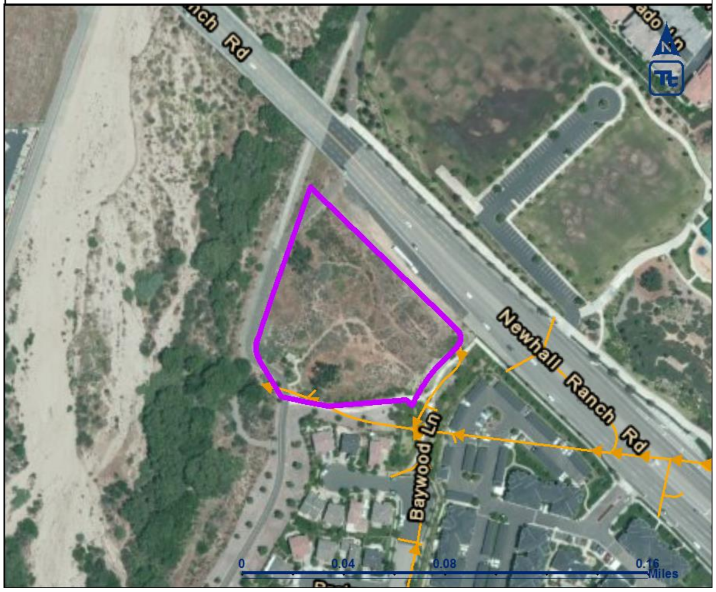
LOCATION	SANTA CLARITA
AINs	2811062904, 2811062905, 2811062906
LAT, LONG	34.432862, -118.560601
PUMP REQUIRED?	UNLIKELY

PARCEL SCREENING AND PRIORITIZATION

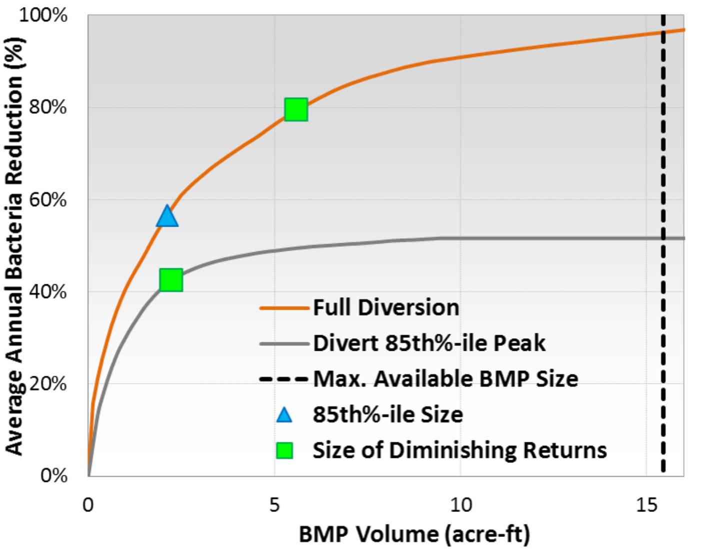
PARCEL AREA	3 acres
IMPERVIOUS DRAINAGE AREA	12 acres
HYDROLOGIC SOIL GROUP	B and C
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	10-20 ft
PARCEL IMPERVIOUS COVERAGE	4%

PRIORITIZATION SCORE
87/100

Legend: Storm Drain Drainage Area Parcel Freeways



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85^{th} %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.4	1.1	2.3
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	2.1	5.6	15.4
BACTERIA REDUX. (BILLIONS)	2,856	4,011	4,864
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	1,349	716	315

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 19 – BASIN AT DAVEY AVE
PARCEL OWNER: L A COUNTY FLOOD CONTROL DISTRICT

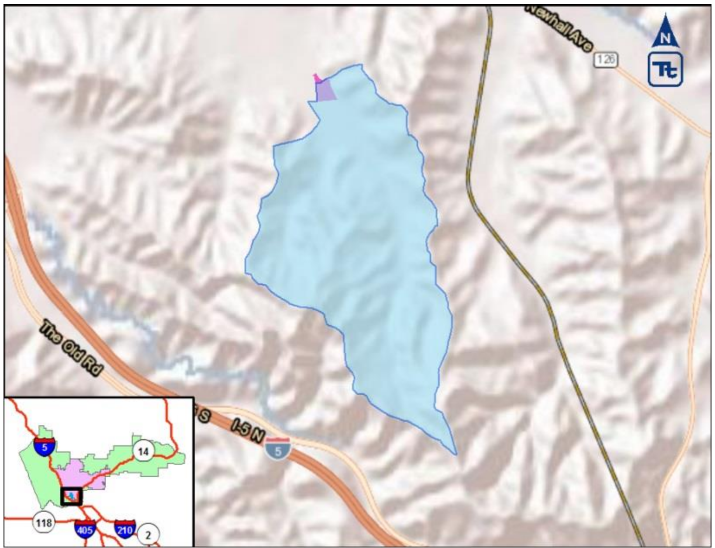
SITE DESCRIPTION

LOCATION	SANTA CLARITA
AINs	2827022901, 2827022900
LAT, LONG	34.368626, -118.53372
PUMP REQUIRED?	UNLIKELY

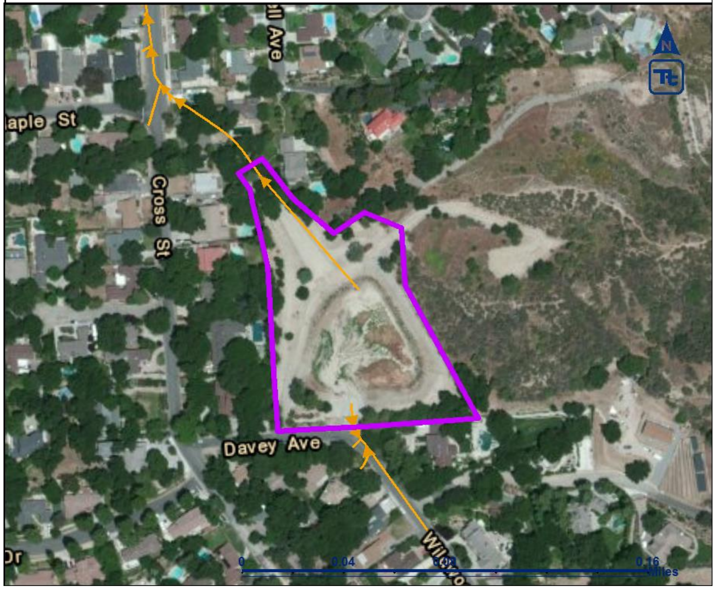
PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	3 acres
IMPERVIOUS DRAINAGE AREA	15 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	85%

PRIORITIZATION SCORE
75/100



Legend: → Storm Drain 🟦 Drainage Area ☐ Parcel — Freeways



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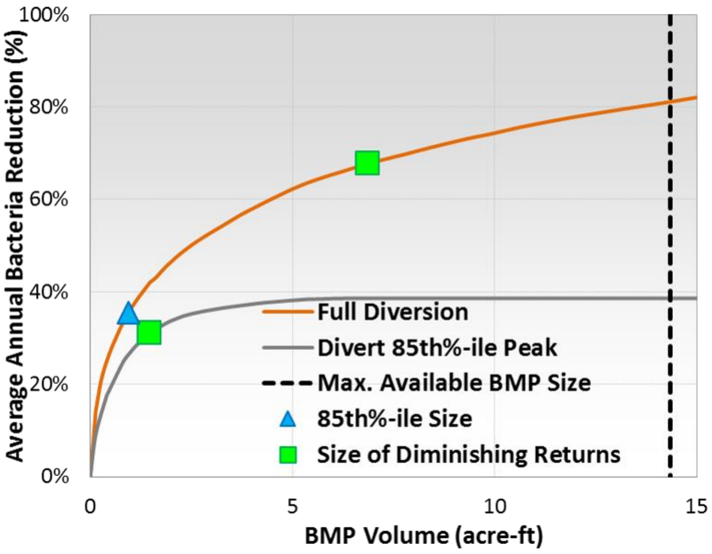


INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.1	1.0	2.0
BMP DEPTH (ft)	7		
BMP VOLUME (ac-ft)	0.9	6.9	14.3
BACTERIA REDUX. (BILLIONS)	7,028	13,414	16,074
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	7,468	1,957	1,121

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 22 – LA COUNTY FIRE #104 & DEBRIS BASIN
PARCEL OWNER: CITY OF SANTA CLARITA

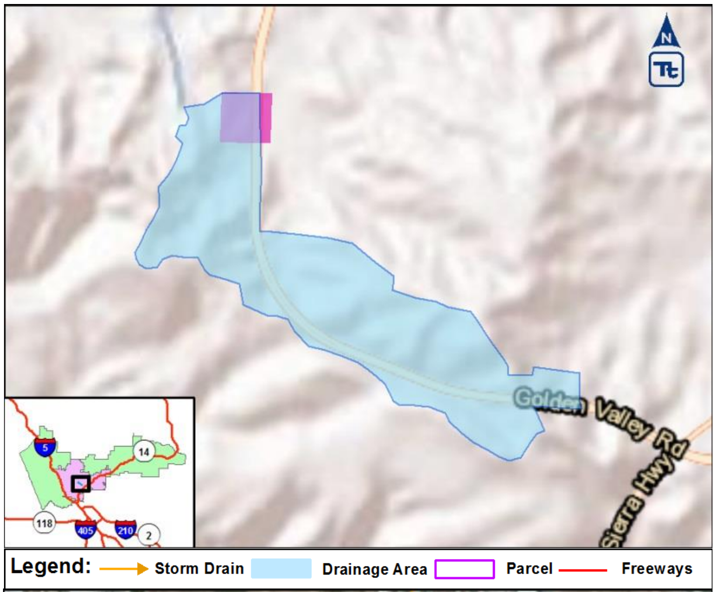
SITE DESCRIPTION

LOCATION	SANTA CLARITA
AINs	2836012905
LAT, LONG	34.407326, -118.503641
PUMP REQUIRED?	UNLIKELY

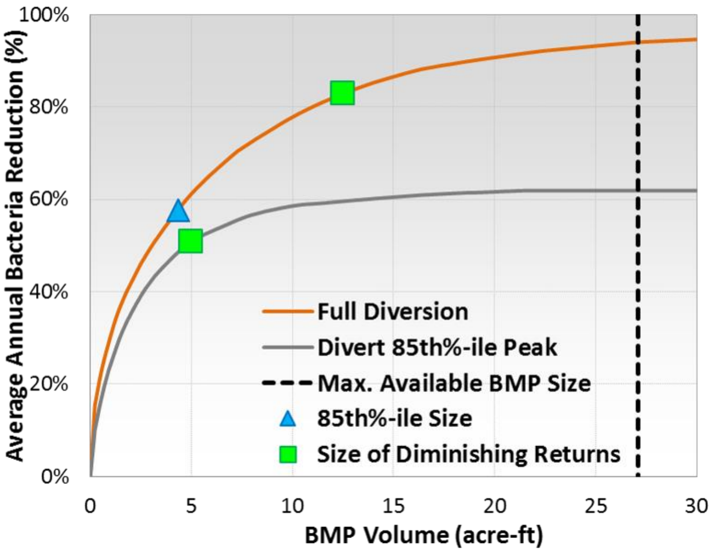
PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	9 acres
IMPERVIOUS DRAINAGE AREA	102 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	<65%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	10-20 ft
PARCEL IMPERVIOUS COVERAGE	1%

PRIORITIZATION SCORE
79/100



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.8	2.3	4.1
BMP DEPTH (ft)	5		
BMP VOLUME (ac-ft)	4.3	12.5	27.1
BACTERIA REDUX. (BILLIONS)	13,504	19,427	22,040
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	3,121	1,551	813

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow.

*Assumes all annual flow routed to facility

SITE 25 – CANYON COUNTRY PARK
PARCEL OWNER: CITY OF SANTA CLARITA

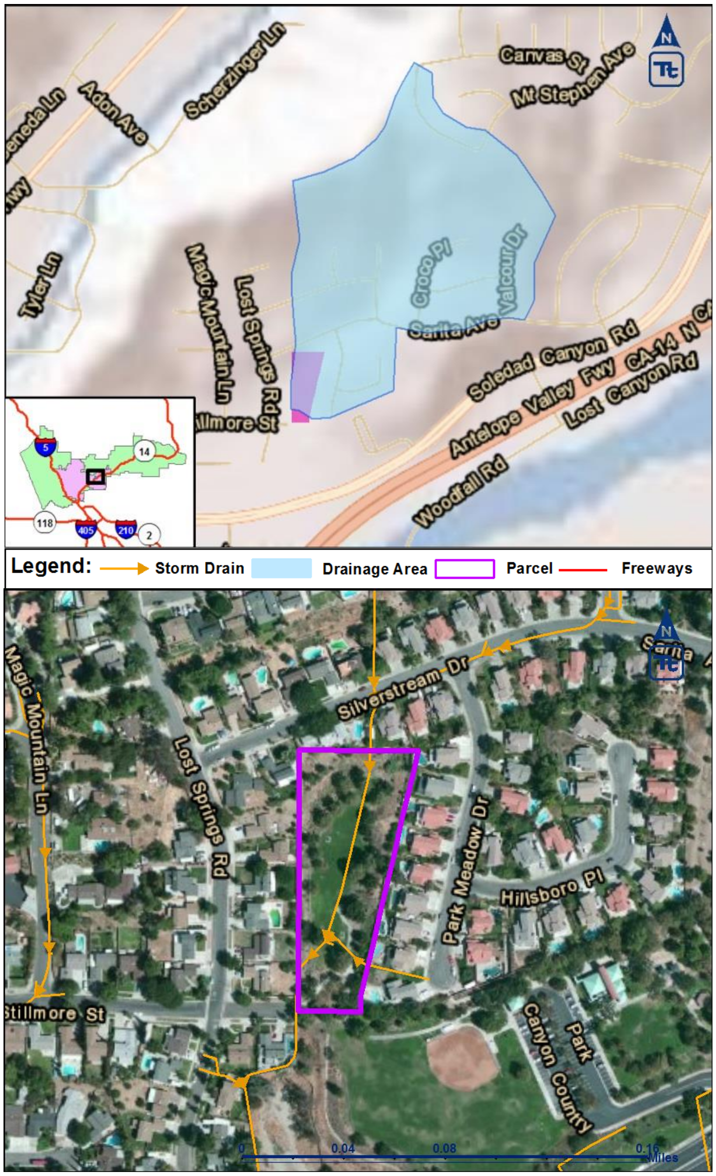
SITE DESCRIPTION

LOCATION	SANTA CLARITA
AINs	2844013901, 2844013900
LAT, LONG	34.419385, -118.443521
PUMP REQUIRED?	UNLIKELY

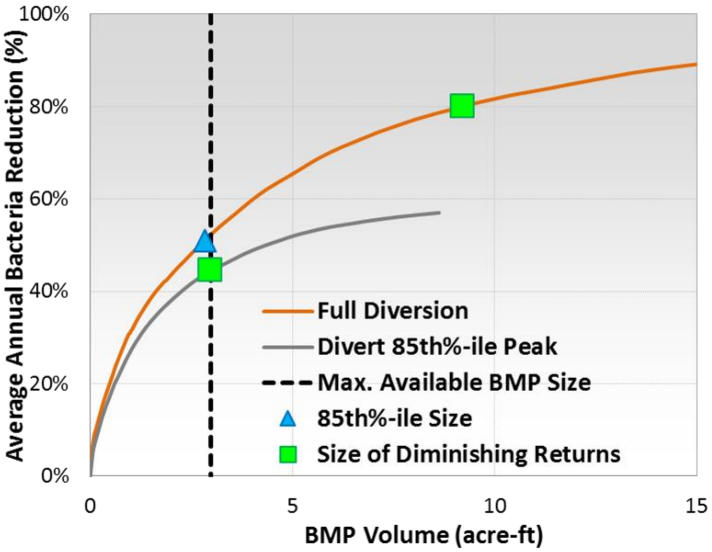
PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA	2 acres
IMPERVIOUS DRAINAGE AREA	20 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN	<100ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	10-20 ft
PARCEL IMPERVIOUS COVERAGE	16%

PRIORITIZATION SCORE
91/100



DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.9	3.0	1.4
BMP DEPTH (ft)	3		
BMP VOLUME (ac-ft)	2.8	9.2	3.0
BACTERIA REDUX. (BILLIONS)	14,528	22,800	14,880
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	5,140	2,472	5,001

ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the maximum size to intercept all annual flow. See Appendix C9 for conceptual sizing.

*Assumes all annual flow routed to facility

SITE 26 – PICO CANYON PARK
PARCEL OWNER: LA COUNTY

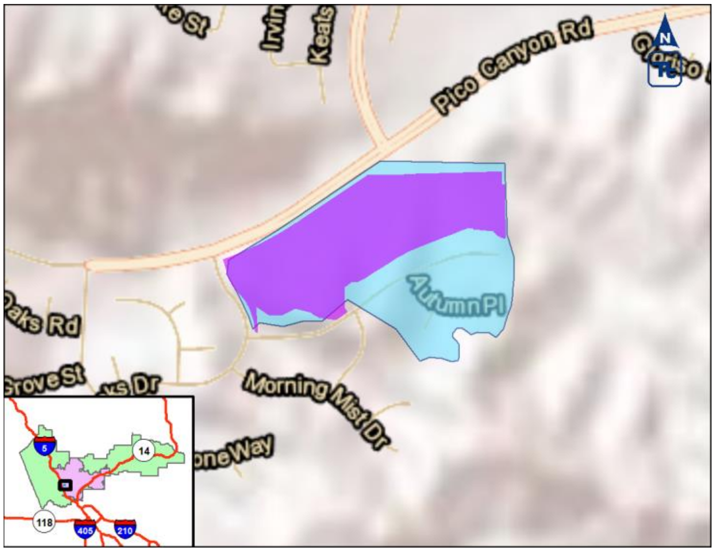
SITE DESCRIPTION

LOCATION	UNINCORPORATED
AINs	2826119900
LAT, LONG	34.377543, -118.584186
PUMP REQUIRED?	UNLIKELY

PARCEL SCREENING AND PRIORITIZATION

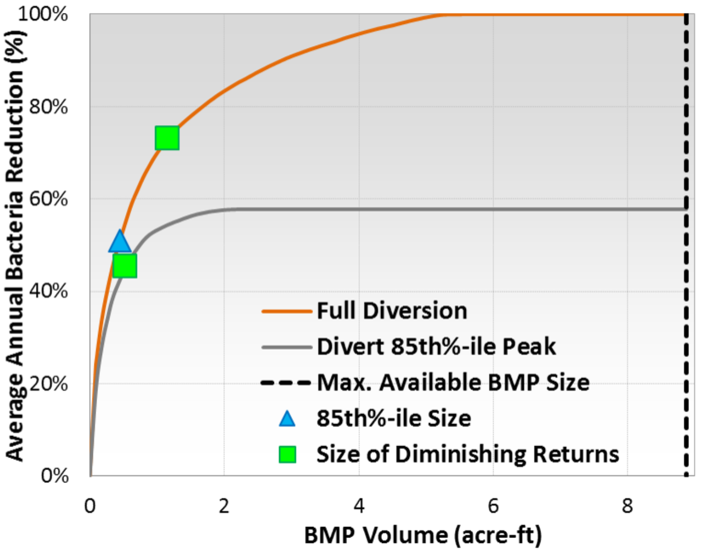
PARCEL AREA	21 acres
IMPERVIOUS DRAINAGE AREA	6 acres
HYDROLOGIC SOIL GROUP	C
PARCEL AREA LESS THAN 10% SLOPE	<65%
PROXIMITY TO MAJOR STORM DRAIN	<100 ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	1%

PRIORITIZATION SCORE
72/100



Legend: Storm Drain, 🟦 Drainage Area, ☐ Parcel, Freeways

DESIGN OPTIMIZATION



INITIAL MODELING RESULTS*

	85th %-ILE	POINT OF DIMINISHING RETURNS	MAX. SIZE
BMP SIZE (ac)	0.1	0.3	1.5
BMP DEPTH (ft)	4		
BMP VOLUME (ac-ft)	0.4	1.2	8.9
BACTERIA REDUX. (BILLIONS)	2,100	3,017	4,127
BACTERIA REDUX. (BILLIONS) PER BMP SIZE (ac-ft)	4,735	2,616	465

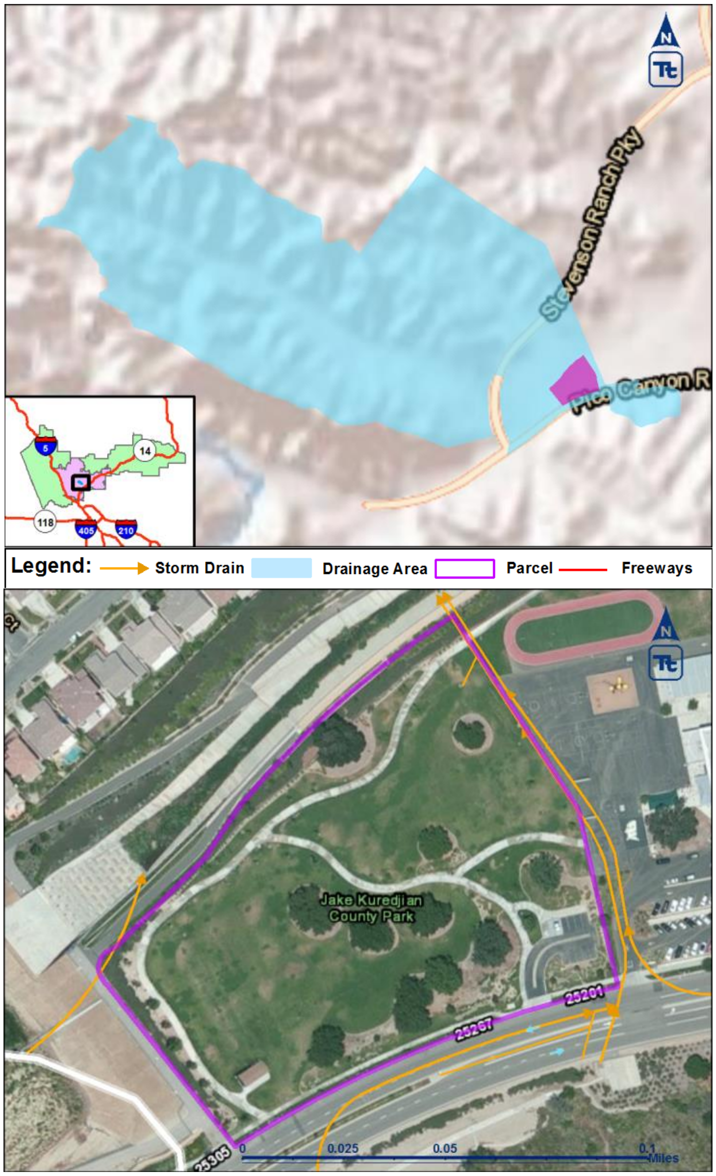
ANALYSIS: To optimize subwatershed-scale load reduction, the facility should be designed at the size of diminishing returns to intercept all annual flow. See Appendix C9 for conceptual sizing.

*Assumes all annual flow routed to facility

SITE 26 – JAKE KUREDJIAN PARK
PARCEL OWNER: LA COUNTY

SITE DESCRIPTION	
LOCATION	UNINCORPORATED
AINs	2826160901
LAT, LONG	34.3814, -118.5808
PUMP REQUIRED?	UNLIKELY

PARCEL SCREENING AND PRIORITIZATION	
PARCEL AREA	6 acres
IMPERVIOUS DRAINAGE AREA	131 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	<95%
PROXIMITY TO MAJOR STORM DRAIN	100-250 ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	>20 ft
PARCEL IMPERVIOUS COVERAGE	55%
PRIORITIZATION SCORE **92/100**	

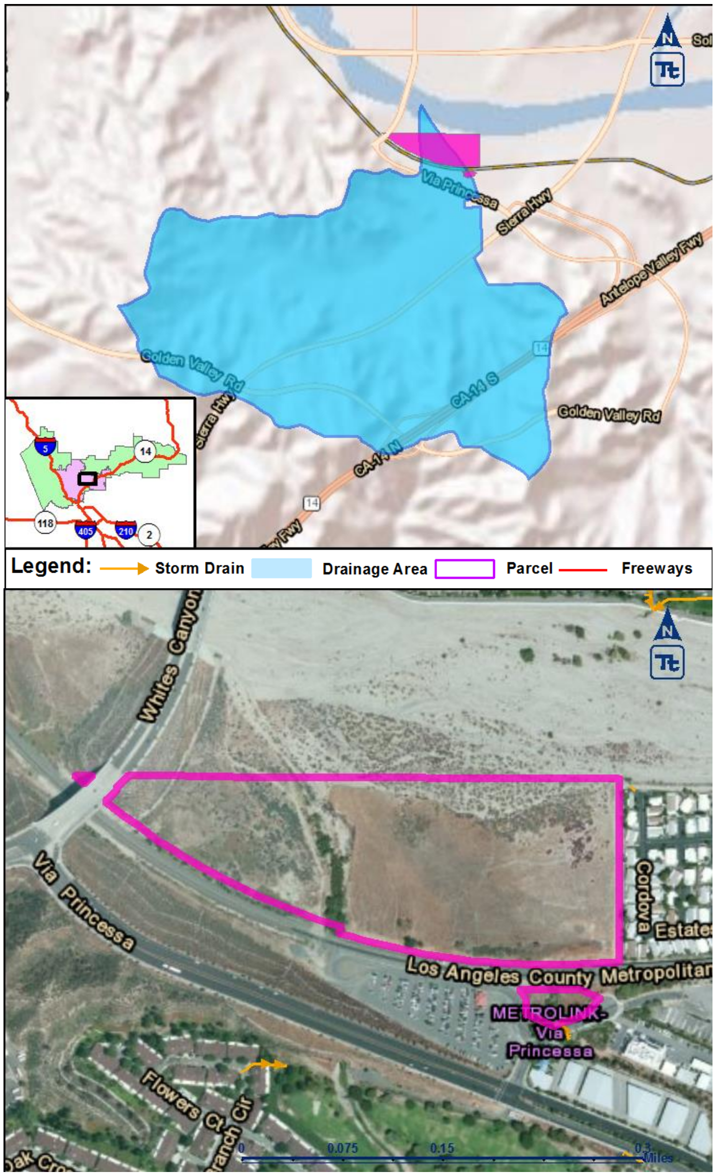


The Facility was Sized to Attain Water Quality Objectives Based on RAA Results; therefore No Comparative Modeling Was Performed – Please see Appendix C9 for Sizing Details

SITE X – SANTA CLARA RIVER FLOODPLAIN
PARCEL OWNER: LA COUNTY

SITE DESCRIPTION	
LOCATION	SANTA CLARITA
AINs	2836002922,2836002907, 2864003919
LAT, LONG	34.409692, -118.469621
PUMP REQUIRED?	UNLIKELY

PARCEL SCREENING AND PRIORITIZATION	
PARCEL AREA	27 acres
IMPERVIOUS DRAINAGE AREA	192 acres
HYDROLOGIC SOIL GROUP	B
PARCEL AREA LESS THAN 10% SLOPE	100%
PROXIMITY TO MAJOR STORM DRAIN	<100 ft
PROXIMITY TO SOIL CONTAMINATION	>500 ft
DEPTH TO GROUNDWATER	10-20 ft
PARCEL IMPERVIOUS COVERAGE	1%
PRIORITIZATION SCORE **92/100**	



The Facility will Capture the 85th Percentile Design Storm; therefore No Comparative Modeling Was Performed – Please see Appendix C9 for Sizing Details

APPENDIX C7

BMP Cost Optimization Curves

This appendix presents cost optimization curves for each watershed and jurisdiction, as follows:

NOTE: These curves report capacities and costs prior to re-allocating regional BMP capacity to other jurisdictions for those BMPs that have multi-jurisdictional tributary areas. For example, these curves allocate 100% of the capacity of a regional BMP whose footprint is located in the City of Santa Clarita to the City. For the EWMP Implementation Plan, however, if 50% of the upstream drainage area for the regional BMP was located in the County, then 50% of the regional BMP capacity is re-allocated to the County (because that regional BMP is providing pollutant reduction to the County). As such, the capacities reported at each target will *not* necessarily align with the EWMP Implementation Plan.

Figure C8- 1. BMP Capacities: Santa Clarita (Bouquet Creek) 2
Figure C8- 2. BMP Capacities: Santa Clarita (Castaic Creek) 2
Figure C8- 3. BMP Capacities: Santa Clarita (Mint Canyon) 3
Figure C8- 4. BMP Capacities: Santa Clarita (S. F. Santa Clara River).. 3
Figure C8- 5. BMP Capacities: Santa Clarita (San Francisquito Creek)....................................... 4
Figure C8- 6. BMP Capacities: Santa Clarita (SCR at County Line).. 4
Figure C8- 7. BMP Capacities: Uninc. Los Angeles County (Bouquet Creek) 5
Figure C8- 8. BMP Capacities: Uninc. Los Angeles County (Castaic Creek) 5
Figure C8- 9. BMP Capacities: Uninc. Los Angeles County (Mint Canyon) 6
Figure C8- 10. BMP Capacities: Uninc. Los Angeles County (Piru Creek) 6
Figure C8- 11. BMP Capacities: Uninc. Los Angeles County (S. F. Santa Clara River).............. 7
Figure C8- 12. BMP Capacities: Uninc. Los Angeles County (San Francisquito Creek)............. 7
Figure C8- 13. BMP Capacities: Uninc. Los Angeles County (SCR at County Line).................. 8
Figure C8- 14. BMP Capacities: Uninc. Los Angeles County (SCR at Reach 7)......................... 8

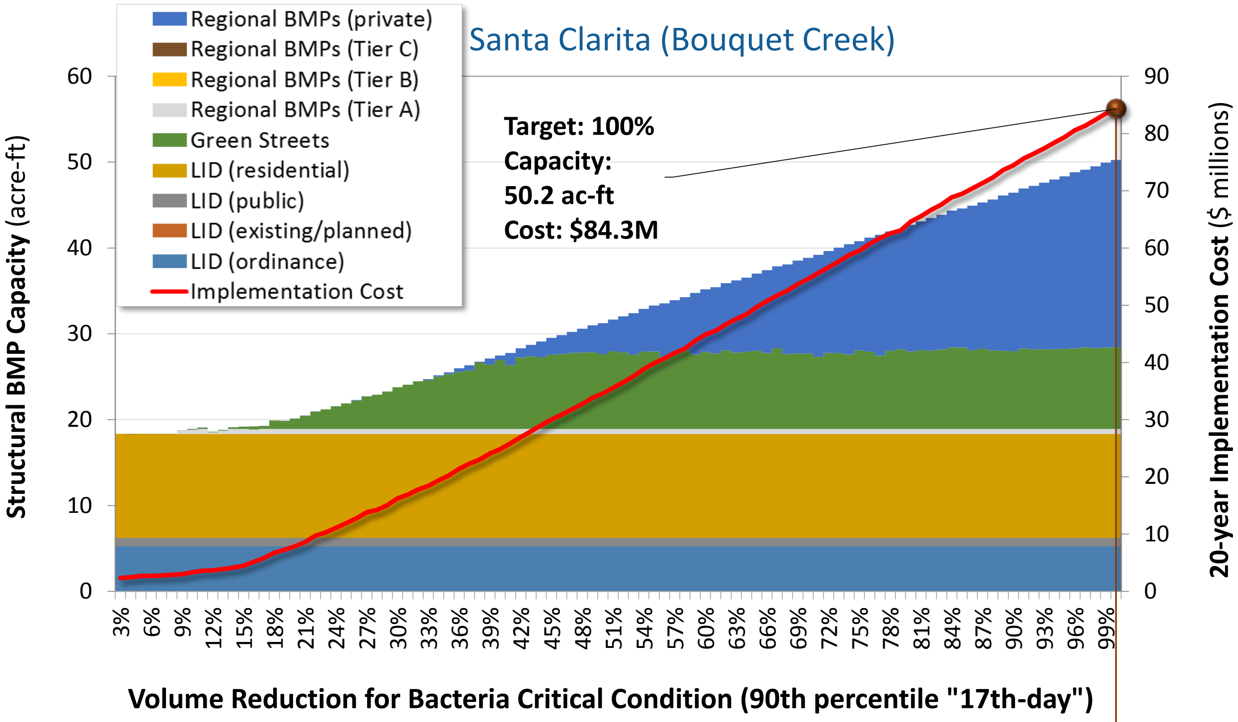


Figure C8- 1. BMP Capacities: Santa Clarita (Bouquet Creek)

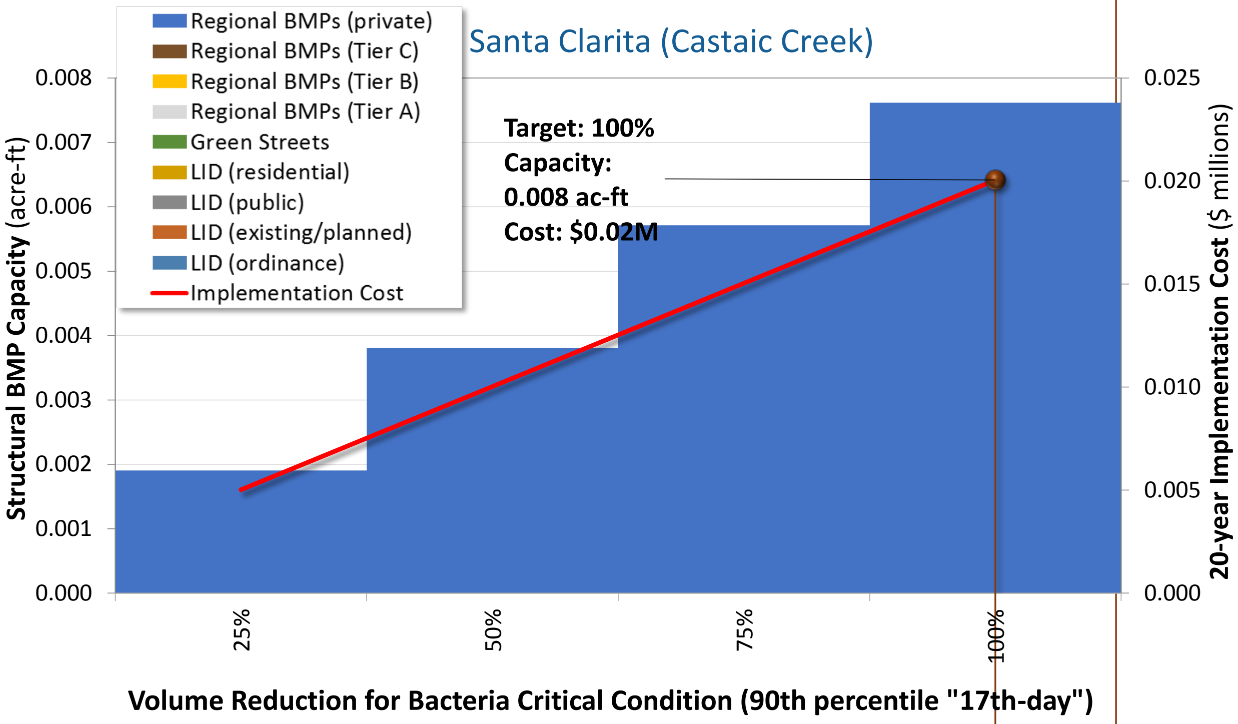


Figure C8- 2. BMP Capacities: Santa Clarita (Castaic Creek)

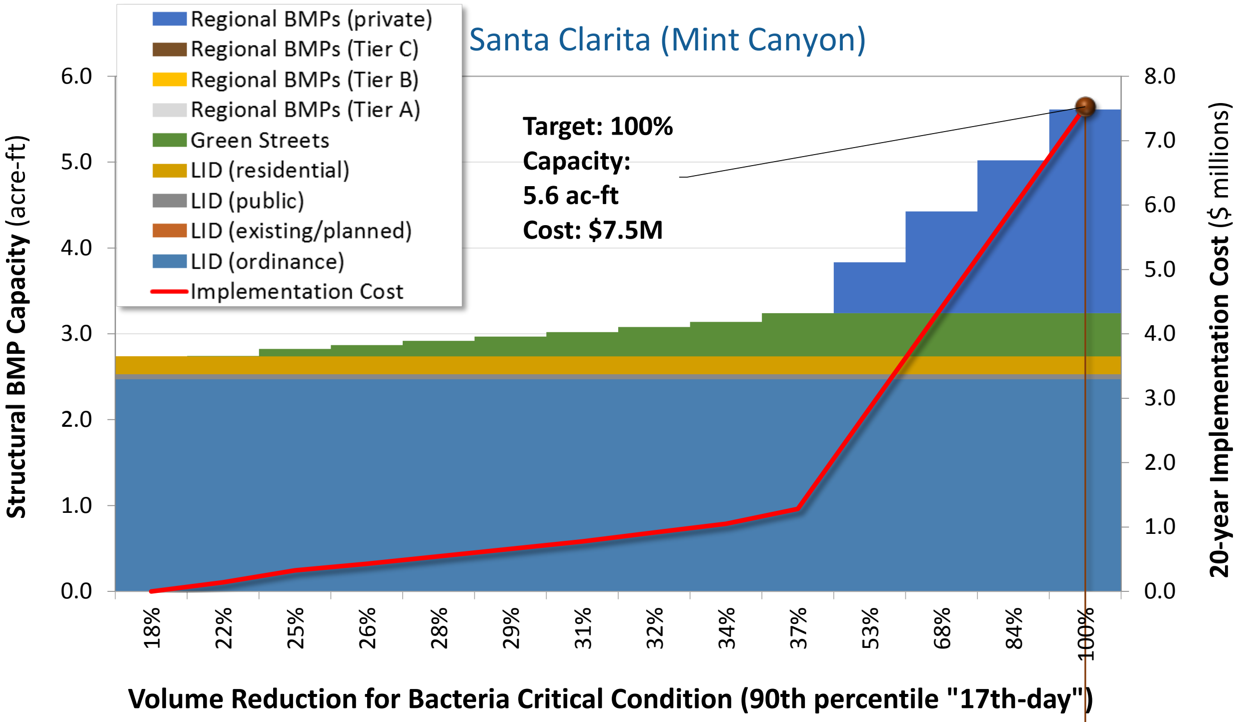


Figure C8- 3. BMP Capacities: Santa Clarita (Mint Canyon)

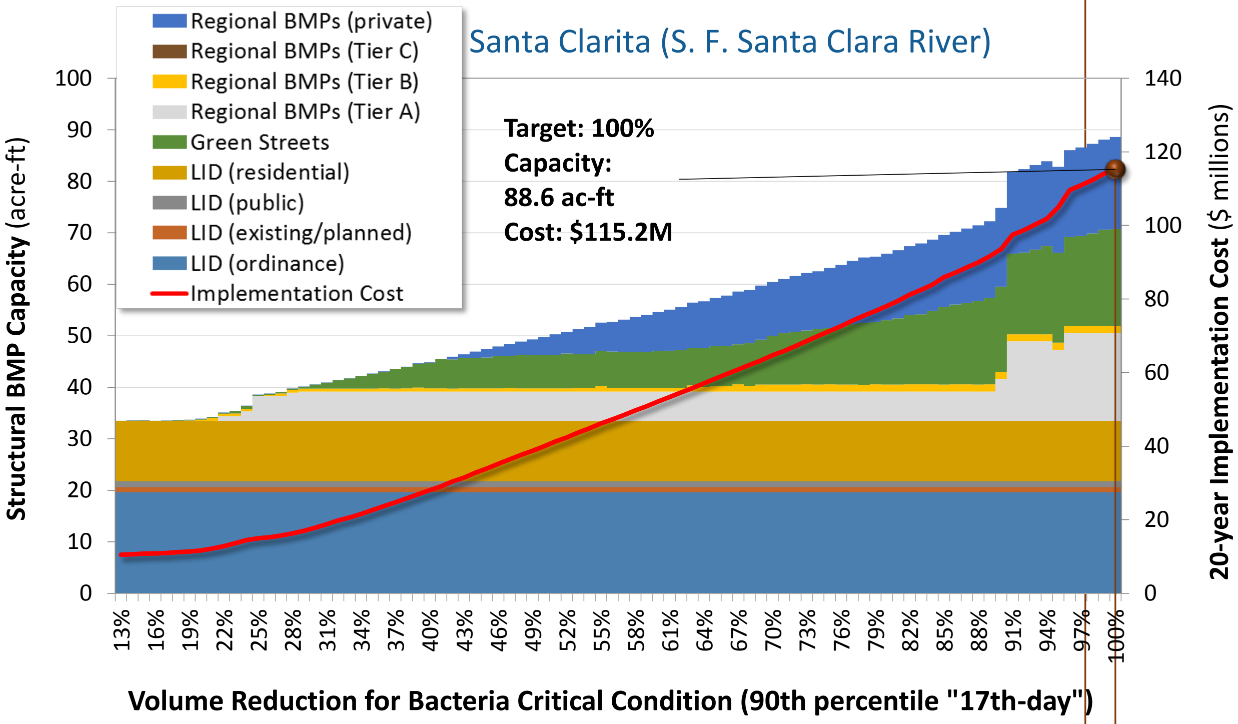


Figure C8- 4. BMP Capacities: Santa Clarita (S. F. Santa Clara River)

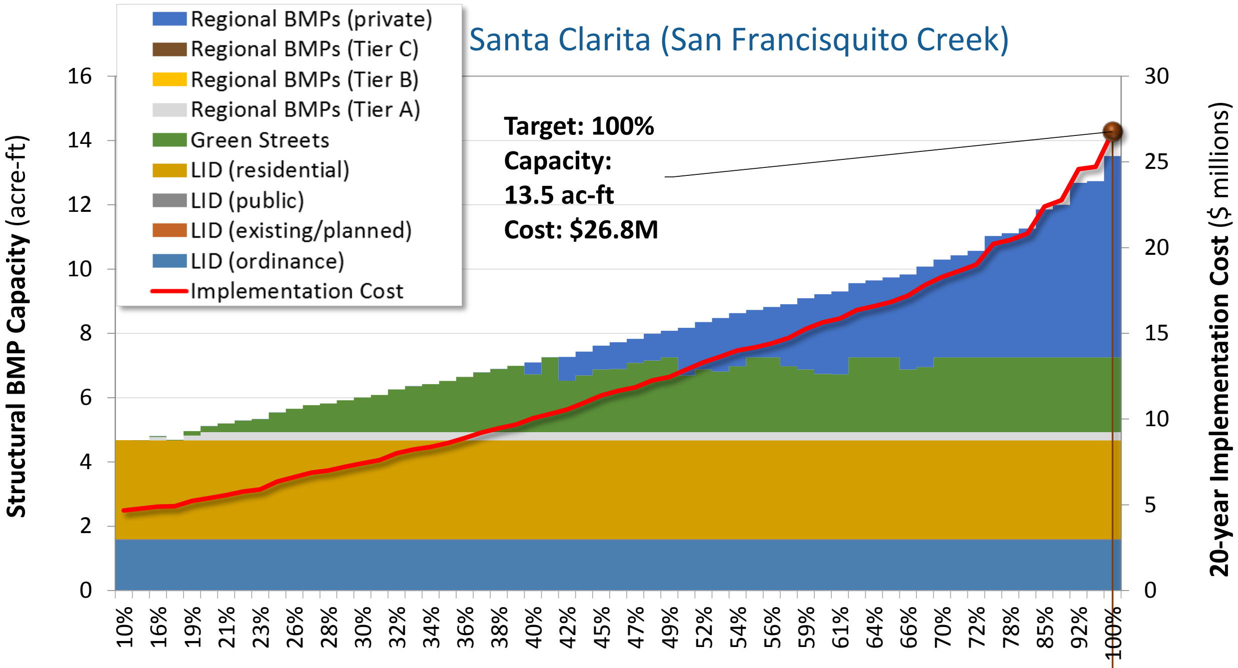


Figure C8- 5. BMP Capacities: Santa Clarita (San Francisquito Creek)

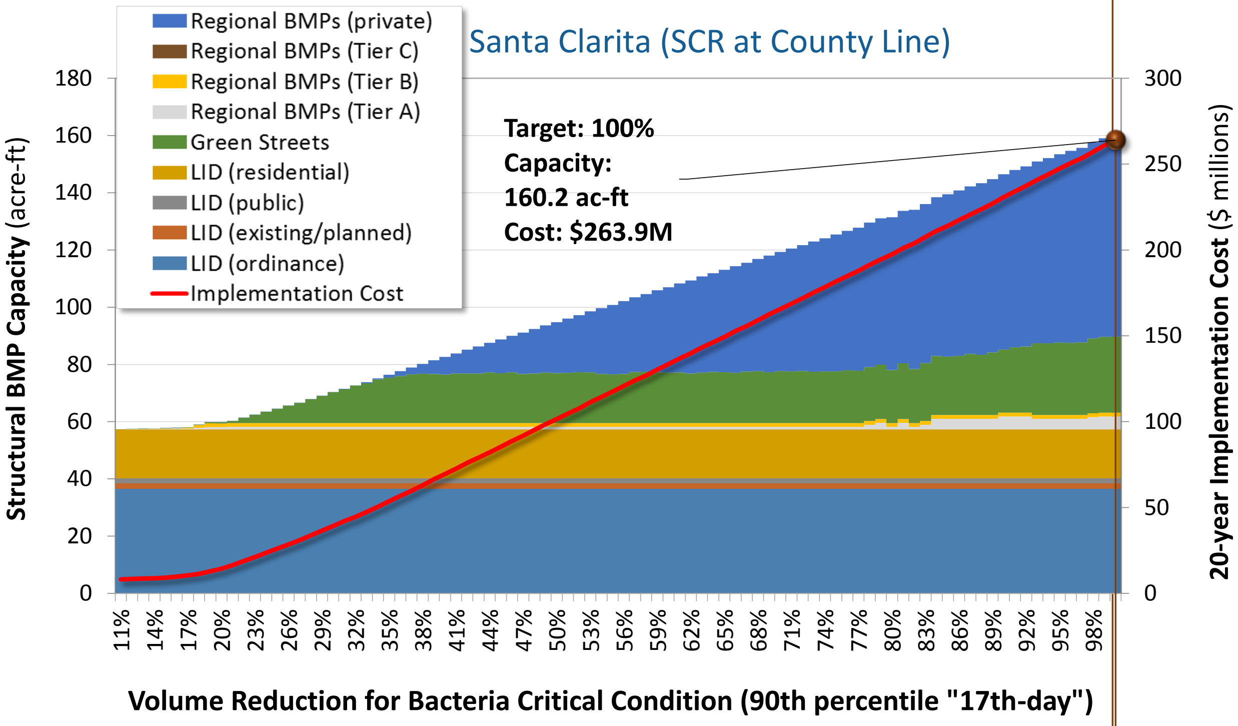


Figure C8- 6. BMP Capacities: Santa Clarita (SCR at County Line)

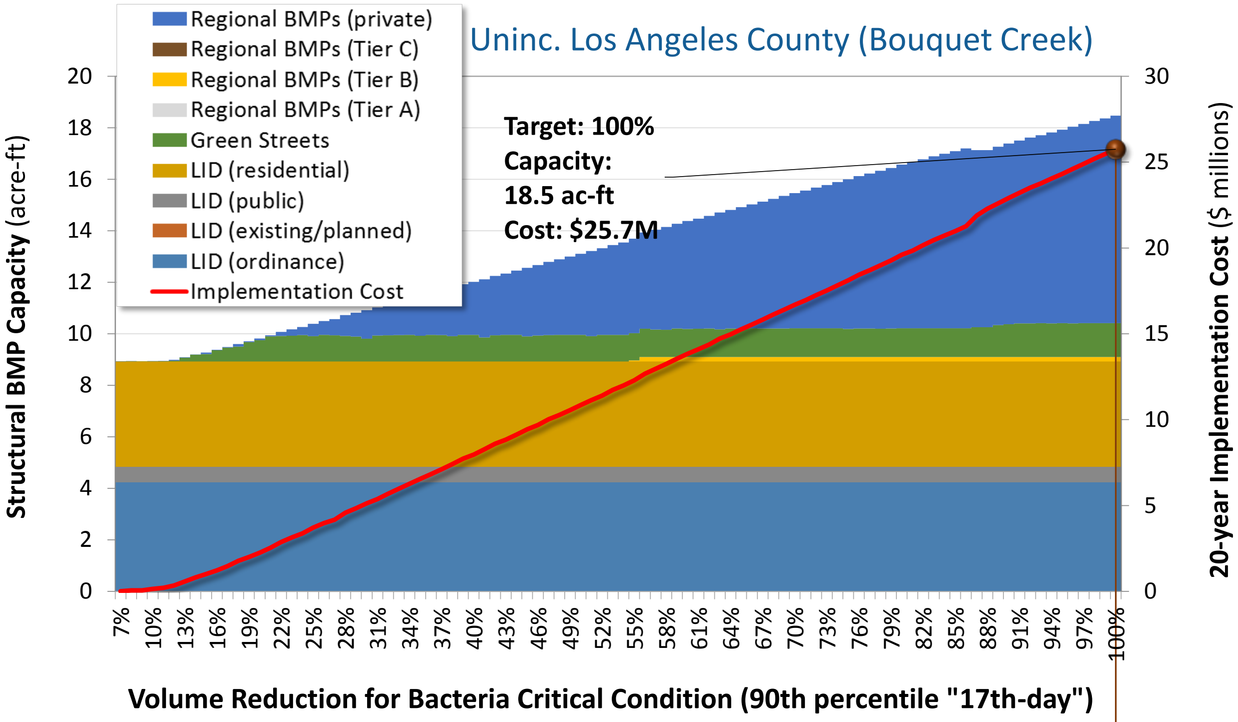


Figure C8- 7. BMP Capacities: Uninc. Los Angeles County (Bouquet Creek)

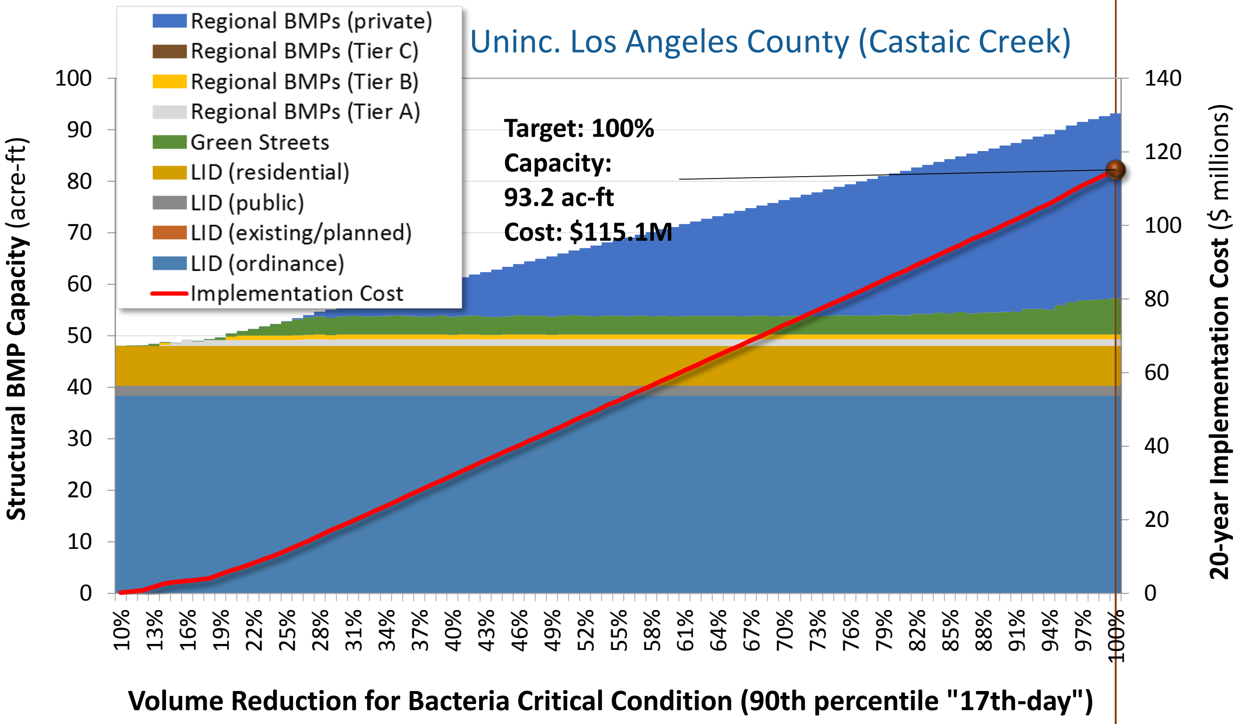


Figure C8- 8. BMP Capacities: Uninc. Los Angeles County (Castaic Creek)

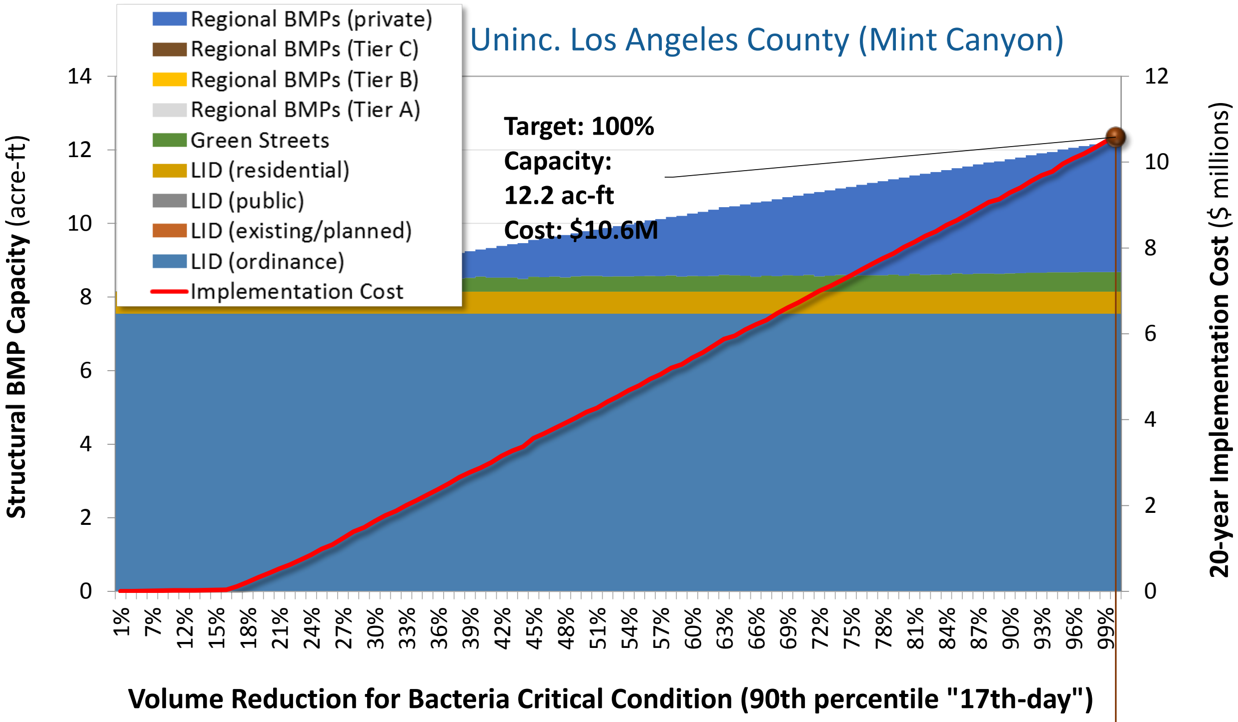


Figure C8- 9. BMP Capacities: Uninc. Los Angeles County (Mint Canyon)

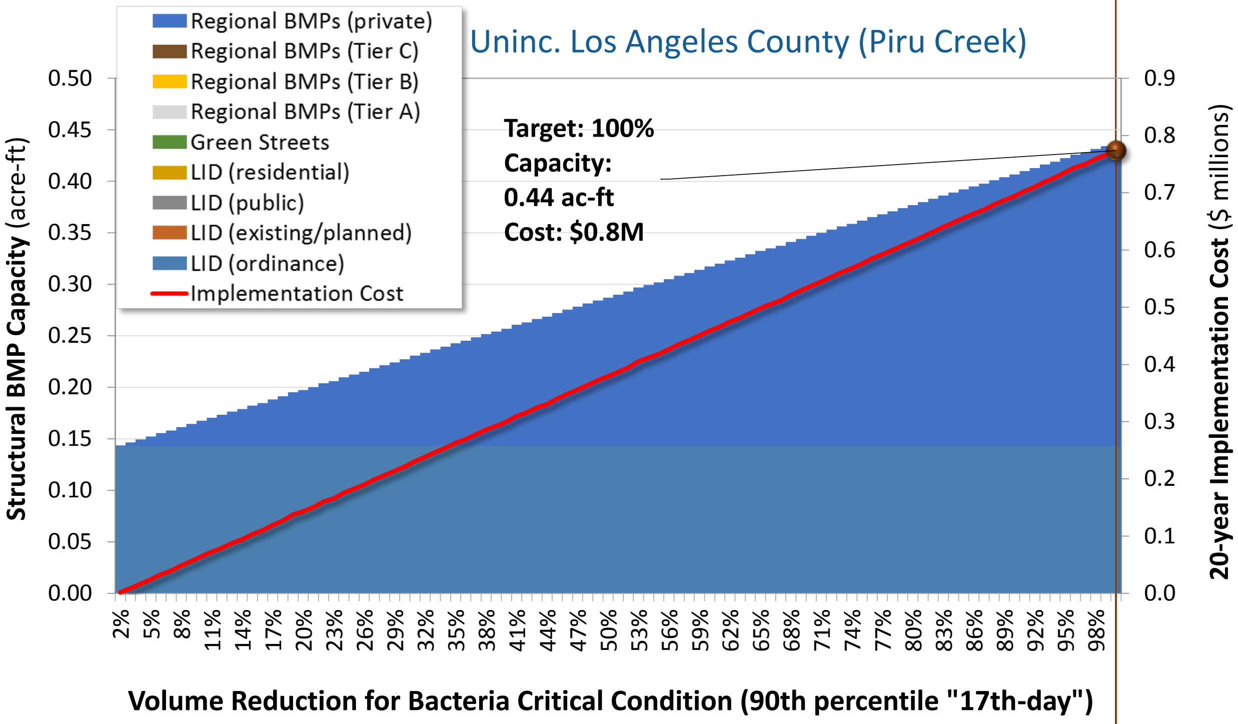


Figure C8- 10. BMP Capacities: Uninc. Los Angeles County (Piru Creek)

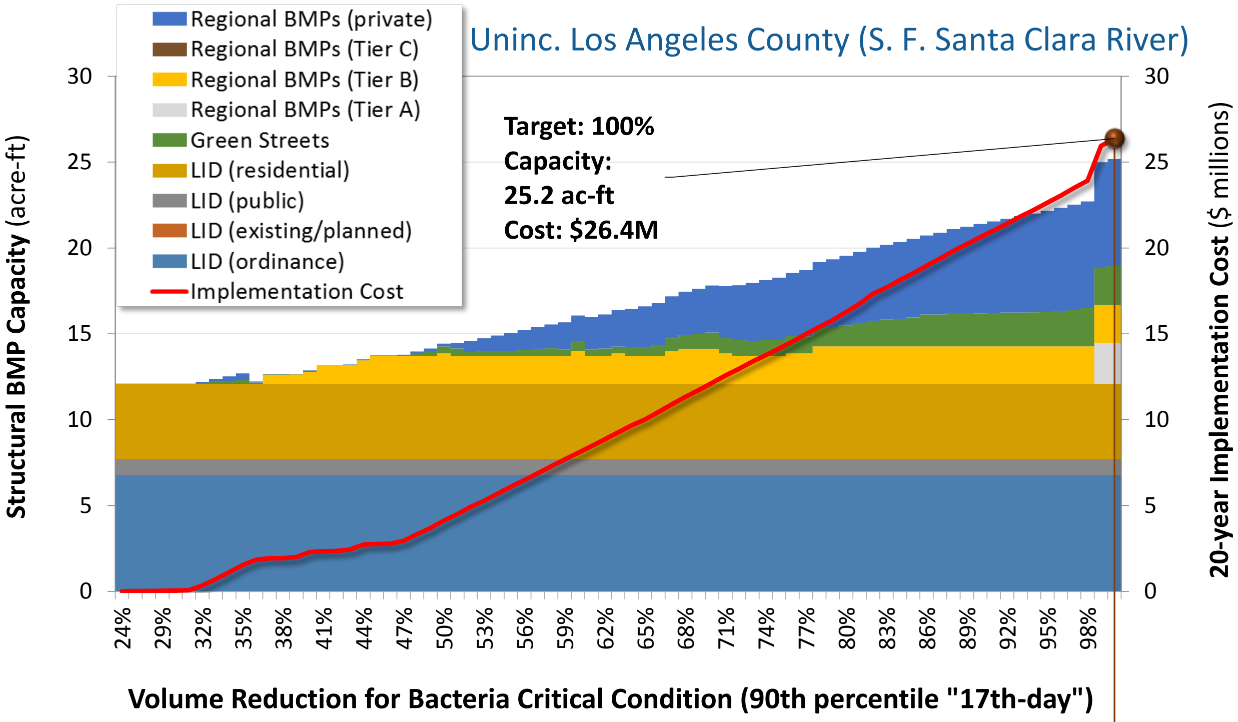


Figure C8- 11. BMP Capacities: Uninc. Los Angeles County (S. F. Santa Clara River)

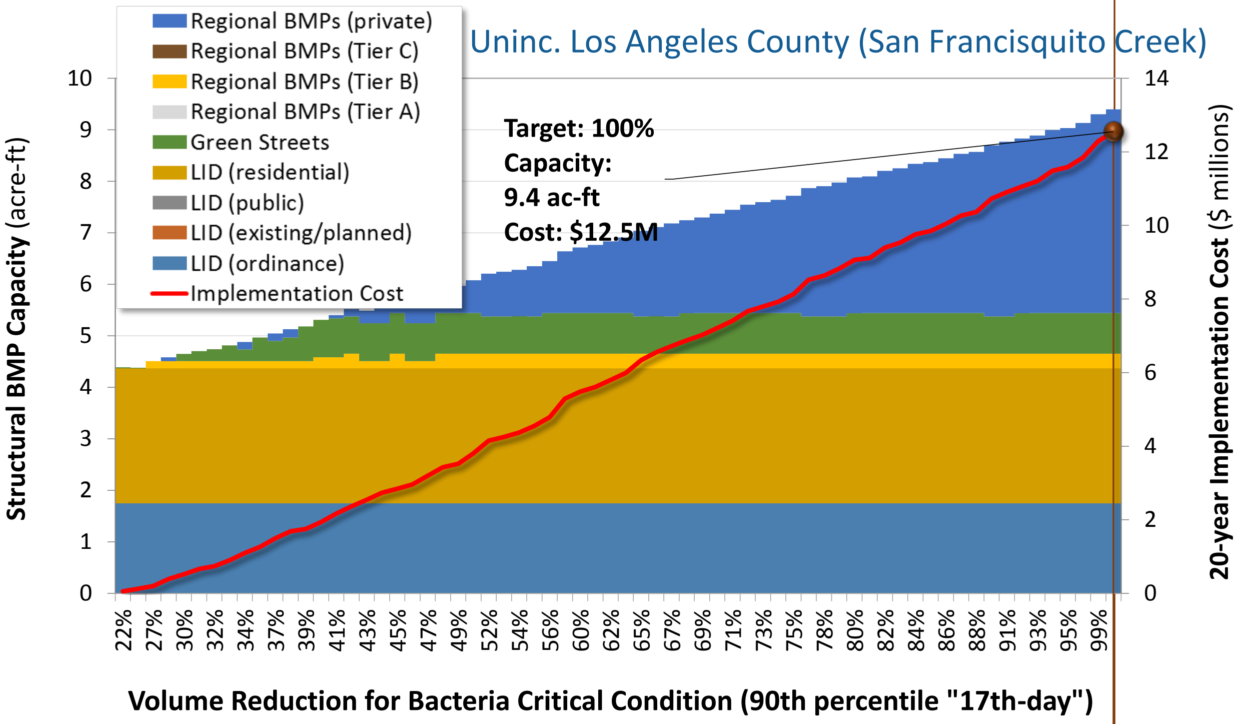


Figure C8- 12. BMP Capacities: Uninc. Los Angeles County (San Francisquito Creek)

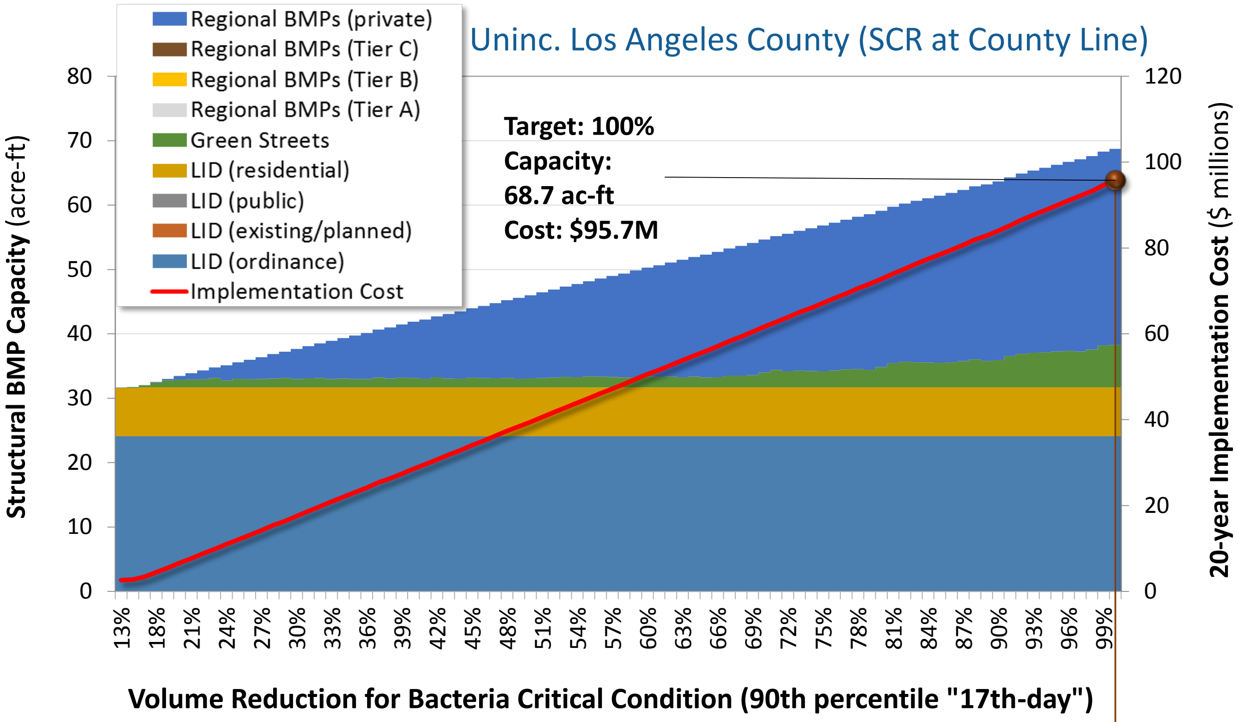


Figure C8- 13. BMP Capacities: Uninc. Los Angeles County (SCR at County Line)

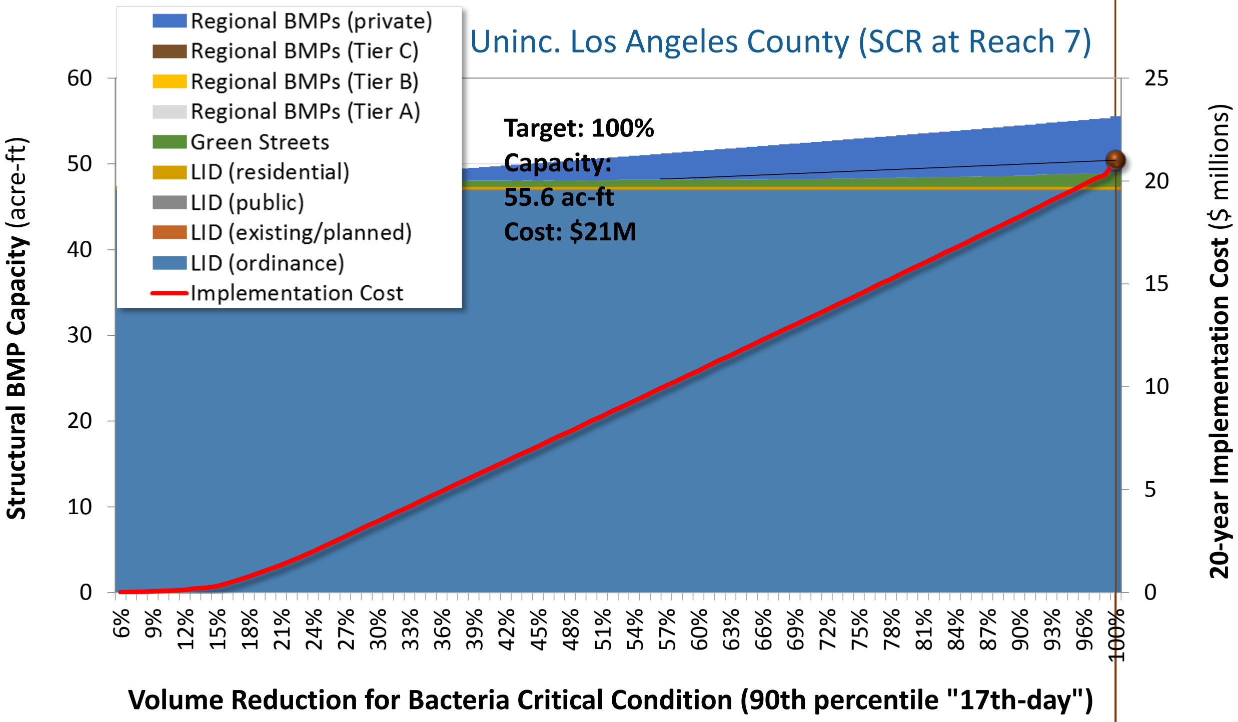


Figure C8- 14. BMP Capacities: Uninc. Los Angeles County (SCR at Reach 7)

APPENDIX C8

Effectiveness of Enhanced MCMs

C8-1 Introduction

The 2012 Permit includes requirements for new MCMs that are enhancements to the City and County's current programs. These MCM enhancements are summarized in **Table 7-1** of the EWMP. Identification of the potential effectiveness of MCMs and other source control measures in addressing Water Quality Priorities usually cannot be measured by direct water quality measures like structural control measures. As a result, another method of developing estimated effectiveness information was used. Literature information was reviewed to develop an effectiveness rating for each enhanced MCM. The effectiveness ratings for the enhanced MCMs are presented in Attachment A**.** The effectiveness rating consists of the product of the participation factor and the loading factor for an MCM (Water Environment Research Foundation, 2000).

- The participation factor is the amount of the target audience who would implement the MCM, representing the overall behavior change resulting from implementation of the MCM. For example, outreach to residents might result in 5 to 10% of residents changing their behavior (5-10% participation factor). On the other hand, changing maintenance practices at a municipal facility over which the City has complete control would have a participation factor of closer to 100%.
- The loading factor is how much of the pollutant load would be reduced if 100% of the target audience changed their behavior. For example, if residents properly applied pesticides, they may be able to reduce the pesticide runoff by 50% (loading factor 50%), but if they stopped applying the pesticide all together, then the loading factor would be 100%.

The effectiveness ratings for the enhanced MCMs are discussed by program element in the following sections.

C8-2 MCM Program Elements

C8-2.1 PROGRESSIVE ENFORCEMENT

Permittees are required to develop and implement a progressive enforcement policy as part of their industrial/commercial facilities, planning and land development, development construction, and illicit discharge programs. The use of progressive enforcement tends to increase participation rates within these MCMs, improving the overall effectiveness rating of the programs. In some cases, participation factors as high as 80% have been used where regulatory requirements are enforced. (Brosseau, 1997) Participation rates for MCMs reflect progressive enforcement where it is applicable. Progressive enforcement programs generally have no effect on the loading factors assigned to the MCMs.

C8-2.2 PUBLIC INFORMATION AND PARTICIPATION (PPP)

Enhancements to the PIPP programs focus on outreach programs for residential target audiences. Program effectiveness has been shown to increase as more focused outreach is performed, whether targeted to specific audiences, which would increase the participation factor, or targeted to specific pollutants and sources, which would increase the loading factor. In general, broad outreach programs to the general public have been found to be less effective, even though the audience may be larger. (Larry Walker Associates, 1998; Caraco, 2013)

Consistent with literature values, low participation factors (i.e., 1-10%) were used for broad based residential outreach programs. Participation factors were increased for more targeted outreach programs, such as those with specific audiences (e.g., Homeowner’s Associations). The loading factors also generally increased with the specificity of the outreach program. For example, a loading factor of 80-90% was assigned to implementation of the Keep California Beautiful program, which specifically targets trash.

C8-2.3 INDUSTRIAL/COMMERCIAL FACILITIES

The proposed industrial/commercial facilities programs will be modified to better address key sources contributing to the priority water quality conditions in the watershed. As with outreach, the focus on specific activities and pollutant sources is expected to lead to a more effective program. New or enhanced industrial commercial facilities activities generally fall into two categories: outreach and inspections.

The outreach programs will focus content and distribution on the priority sources within the watershed, as driven by the priority water quality conditions. Similar to residential outreach, business outreach will be more effective when targeted to specific sources. Based on findings in the literature, a relatively higher level of participation is expected in business outreach programs when combined with a business assistance program. (Brosseau, 1997) Assuming not all businesses would be targeted every year, the analysis utilized participation factors ranging from 10-30%, more conservative than literature values (which ranged from 30-80%). Corresponding loading factors are generally high for targeted outreach to businesses as implementation of the recommended or required BMPs will often eliminate the source of the pollutant. Loading factors of 80-100% were used, consistent with literature values.

For inspections programs, new aspects include tracking of critical sources (e.g., nurseries will be added to the inventories) and tailored inspections frequencies based on the potential for a facility to be a source of pollutants identified as water quality priorities. When paired with a progressive enforcement program, annual participation factors were assumed to be 15-20%, based on the projected number of business inspections to be performed (20-25% of the inventory annually with nearly all compliant or becoming compliant). Loading factors were assumed to be 80-90% due to the targeted nature of the inspections, consistent with literature values for programs in Palo Alto and Sacramento, CA.

C8-2.4 PLANNING AND LAND DEVELOPMENT

New planning and land development requirements are implemented in two phases: planning and implementation. When post construction BMPs that are properly designed and approved in the planning stages of projects are coupled with an inspection and verification program to verify proper construction that uses progressive enforcement, the participation factor tends to increase. Further, low impact development and hydromodification BMPs are designed to reduce runoff volume, thereby reducing associated pollutants, addressing the majority of pollutant loading contributing to water quality priorities. Given the high participation and loading factors, the effectiveness ranges for the planning and land development program are between 40 – 90%, consistent with literature values. (Battiata, 2010)

C8-2.5 DEVELOPMENT CONSTRUCTION

In estimating the effective ratings, the development construction program was considered to be similar to other inspection programs, such as the industrial commercial facilities program. New aspects of the development construction program include implementing targeted training for municipal and contract staff as well as prioritized inspections for sites less than one acre, targeting sites with a higher potential to contribute pollutants that are water quality priorities. Participation and loading factors ranged from 50 – 80% as both the outreach/training and the inspection programs will be highly focused to target specific audiences and pollutant sources. This results in an effectiveness range for the development construction program as a whole in the range of 25-72%, consistent with findings from other programs such as the Sacramento Stormwater Program (64%) (Larry Walker Associates, 1998) and with assumptions used in the Center for Watershed Protection’s Watershed Treatment Model (70%) (Caraco, 2013).

C8-2.6 PUBLIC AGENCY ACTIVITIES

New activities to be implemented under the public agencies activities programs span a range of measures, from implementing Adopt-a-Creek programs to improving street sweeping measures. These activities vary in effectiveness and will be tailored where possible to improve their effectiveness in addressing the priority pollutants. These programs are further discussed below, beginning with those that are anticipated to be most effective in addressing priority water quality conditions.

Adopt-a-Creek Program – The City of Santa Clarita will implement an adopt-a-creek program targeting priority water quality conditions such as trash within the watershed. This program will include signage posted at access points to waterbodies that are sponsored in the program. The participation factor is estimated at 50%, assuming that the program will be implemented at approximately half of creeks within the City’s jurisdiction. The loading factor is estimated to be

50-75%, resulting in an overall effectiveness rating within the range of 25-38%. Although not specifically addressed in the literature, these estimates were developed consistent with methods used in other programs that are included with the literature review.

***Infrastructure Maintenance Programs* –** Several of the infrastructure maintenance programs have been enhanced under the EWMP including programs to limit infiltration from sanitary sewer system to storm drains, BMP inspection and maintenance programs, and street maintenance programs. Effectiveness ratings for each of these programs were derived based on literature values.

Programs to limit infiltration and seepage from the sanitary sewer to the storm drain are limited by the amount of the system that can be assessed and maintained in a given year, resulting in a low participation factor (5-10%). However, for those areas that are addressed, a high loading factor (90%) is appropriate as any issues related to cross contamination would be addressed, resulting in an overall effectiveness rating of 4-10%. In contrast, a new program, such as an inspection and maintenance program for agency owned BMPs, consists of a much more targeted approach. Consistent with methods used in the literature, this type of program would have a participation factor in the range of 80-90%, assuming that the majority of BMPs are maintained annually and are functioning as designed. Due to the wide range of removal efficiencies across the range of BMPs, a loading factor of 50% was used. (Larry Walker Associates, 1998)

Effectiveness ratings were also developed for road maintenance and construction BMPs. The City of Santa Clarita will enhance its street sweeping program through the use of more effective methods, including the use of vacuum sweepers. Based on studies performed by the City of San Diego (City of San Diego, 2010), the effectiveness of street sweeping is increased by 20-50% for flat or well-maintained surfaces though the use of vacuum sweepers. Using this range as a loading factor, combined with a 50% participation factor, assuming that 50% of the streets will be swept with vacuum equipment, the overall effectiveness rating for the enhanced street sweeping program is estimated to be 10-25%. New road construction and maintenance BMPs (e.g., precipitation based activity restrictions) will also be implemented as part of the program. It is expected that these BMPs will be highly effective (64-72%) based on high participation rates (80-90%) (i.e., implementation) and targeted BMPs that have high loading factors (90%). These values were derived from literature estimates related to construction BMPs. (Caraco, 2013)

***Other Programs* –** Several municipal programs such as converting public facilities to use weather based irrigation controllers, river/creek restoration projects, open space acquisition and conservation, and contractor training have varied levels of effectiveness and were not well represented in the literature. Effectiveness ratings for these BMPs were derived from the methods used in the literature using best professional judgment. For example, the use of irrigation controllers in public spaces has a moderate effectiveness rating (16-18%) based on the conversion of 20% of public facilities per year (i.e., participation factor) and a loading factor of 80-90%. Creek restoration projects were estimated to have only a 4-5% effectiveness rating due to the limited application (i.e., participation rate of 10%) and a moderate loading factor of 40-50%. For some of the more unique and innovative programs (e.g., pollution trading), effectiveness ratings were not developed as there was limited to no guidance in the literature. As with all program effectiveness estimates, data and assumptions may be revised and refined over time as implementation progresses, resulting in more accurate effectiveness ratings.

C8-2.7 ILLICIT CONNECTIONS AND ILLICIT DISCHARGES (ICID) ELIMINATION

The new aspects of the ICID program include targeted training, newly developed implementation and enforcement programs, and new methods to facilitate public reporting. The ICID program will be more formalized, with documented procedures and focused training for key staff, and will include a new program to address over-irrigation. New signage will also be placed adjacent to prioritized open channels to facilitate public reporting of illegal dumping or other activities with the potential to impact water quality. The facets that are more targeted in nature, either addressing key staff or specific water quality issues are considered more effective than those that are more general in nature, such as posting signage to report illegal activities. The differences are reflected in the participation and loading factors assigned to each.

Targeted training and runoff reduction programs have participation rates ranging from 80-90%, assuming that the majority of staff will participate and implement as trained; however, the loading factor used was only 50%, assuming that only half of the illicit discharges will be reported and eliminated. These values were estimated based on the literature review and are more conservative than similar estimates for the Sacramento Stormwater Program (Larry Walker Associates, 1998). These assumptions result in an effectiveness rating of 40-45% for the targeted ICID programs. In contrast, the less focused programs were assigned lower participation factors, consistent with literature values. Coupled with mid to high range loading factors based on the literature review (Brosseau, 1997), the programs designed to facilitate public reporting have an overall lower effectiveness rating, ranging from 2 -15%.

C8-3 Load Reductions

The effectiveness rating is similar to the percent reduction that could be achieved by a structural BMP. In order to figure out how much the implementation of an MCM will reduce the loading to the receiving water, the effectiveness rating can be multiplied by the loading to the receiving water. For example, if residential pesticide applications accounted for 50% of the pesticide load to the receiving water, then the effectiveness rating would be multiplied by 50% to get the overall load reduction to the receiving water. Therefore, the effectiveness ratings in Attachment A can be multiplied by the source loads to estimate the load reductions.

Load reductions for modeled pollutants were calculated for each program element. Pollutants modeled include sediment (which can be used as a surrogate for pollutants such as pyrethroids), total lead, total copper, total zinc, and fecal coliform. Land use based model results were used, providing the estimated percentages of the total MS4 load that would be attributable to each land use, by agency. Where necessary, land uses were aggregated to provide estimates for residential, commercial, industrial, transportation, and other urban sources. For example, the residential land use category was modeled using high and low density as well as multi-family residential – these categories were combined into an overall residential category for this analysis. Model results are presented Table C8-1 and Table C8-2 **f**or each land use and constituent as a percentage of the load for each jurisdiction.

Table C8-1. Model Results, City of Santa Clarita (Percentage of Pollutant Load by Land Use)

Pollutant	Land Use					
	Residential	Commercial	Industrial	Transportation	Other Urban	Total MS4
Sediment Load (tons/year)	7.4%	6.1%	7.2%	12.3%	37.6%	70.6%
Total Lead (lbs/year)	17.7%	20.4%	4.3%	32.7%	24.6%	99.7%
Total Copper (lbs/year)	12.0%	14.7%	6.1%	20.7%	45.7%	99.1%
Total Zinc (lbs/year)	16.3%	20.7%	12.1%	30.5%	19.7%	99.4%
Fecal coliform (#/year)	36.8%	42.5%	2.9%	2.2%	13.4%	97.6%

Table C8-2. Model Results, County of Los Angeles (Percentage of Pollutant Load by Land Use)

Pollutant	Land Use					
	Residential	Commercial	Industrial	Transportation	Other Urban	Total MS4
Sediment Load (tons/year)	1.4%	1.3%	2.0%	3.7%	11.7%	20.1%
Total Lead (lbs/year)	11.4%	16.3%	4.4%	35.9%	28.7%	96.8%
Total Copper (lbs/year)	7.4%	10.6%	5.6%	20.4%	48.3%	92.3%
Total Zinc (lbs/year)	10.4%	16.7%	12.5%	33.6%	20.9%	94.1%
Fecal coliform (#/year)	20.6%	35.6%	3.3%	2.5%	18.5%	80.6%

The MCM effectiveness ratings were combined by program element to provide an overall range and average effectiveness value for each program element. This produced a set of program effectiveness ranges for each agency as shown in **Table C8-3.**

Table C8-3. Effectiveness Ratings by Program Element

Program Element	City of Santa Clarita			County of Los Angeles		
	Low	High	Average	Low	High	Average
Public Information and Participation	1%	25%	13%	3%	20%	12%
Industrial Commercial Facilities	8%	30%	19%	12%	30%	21%
Planning/Land Development	40%	90%	65%	40%	90%	65%
Development Construction	25%	72%	49%	25%	72%	49%
Public Agency Activities	2%	72%	37%	2%	72%	37%
ICID	2%	45%	24%	2%	45%	24%

Program elements were then assigned to the land uses in the model, based on their target audiences and land uses to be affected (Table C8-4)

Table C8-4. Program Elements by Land Use

Program Element	Land Use				
	Residential	Commercial	Industrial	Transportation	Other Urban
Public Information and Participation	X				X
Industrial Commercial Facilities		X	X		
Public Agency Activities				X	
ICID	X	X	X	X	X
Planning/Land Development	X	X	X	X	X
Development Construction	X	X	X	X	X

The planning and land development and development construction programs were not assigned to a specific land use, as these programs are implemented across all land uses. The planning and land development control measures and residential LID retrofits were modeled as discussed in Section 6 of the EWMP and are not included in the analysis of the enhanced MCMs. For the development construction program, it is unclear how it will be distributed among land uses within the watershed, so it was not included in the load reduction analysis. Because the development construction program is estimated to have high effectiveness ratings, the exclusion of these programs yields conservative load reduction estimates.

The effectiveness ratings for each program element were multiplied by the percentage of the load affected by the program, resulting in load reduction estimates for each land use by jurisdiction. The land use based load reduction estimates were then summed by pollutant to provide the range of expected load reductions for each pollutant resulting from the implementation of new and enhanced MCMs. These results are shown in **Figure C8-1** and **Figure C8-2.** The average expected load reduction for all pollutants is well above the 5% assumed in the EWMP, with averages for fecal coliform and metals in the 25-50% range. All low ends for these constituents are at or above the expected 5% load reduction (the lowest reduction is for total copper in Santa Clarita, at 4.63%). The anticipated ranges for the sediment load reduction are lower and smaller than the reductions for other pollutants; however, average sediment load reductions are well above 5% for both agencies.

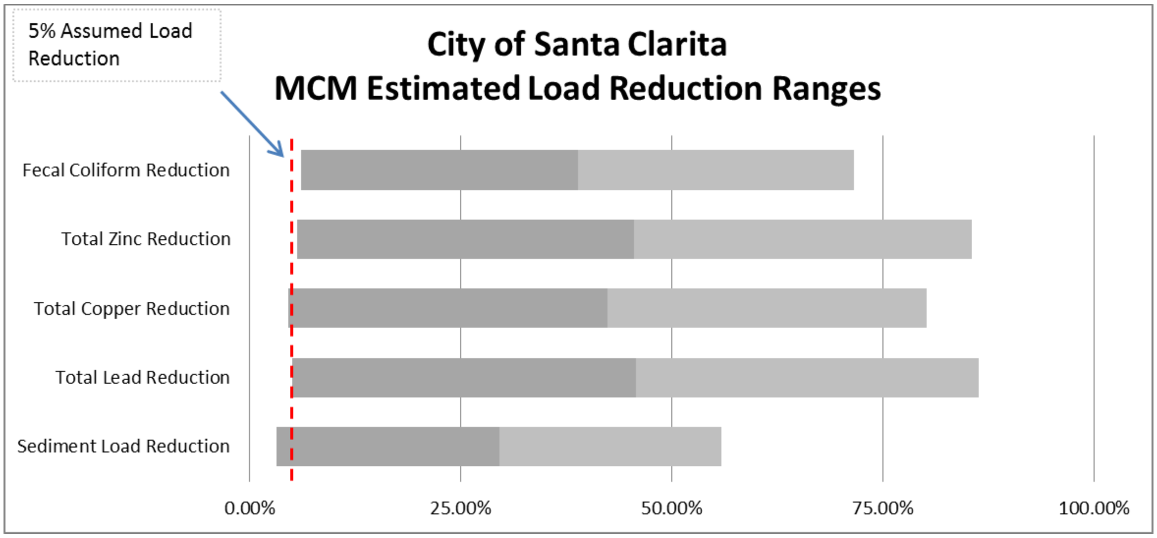


Figure C8-1. Estimated Load Reductions, City of Santa Clarita

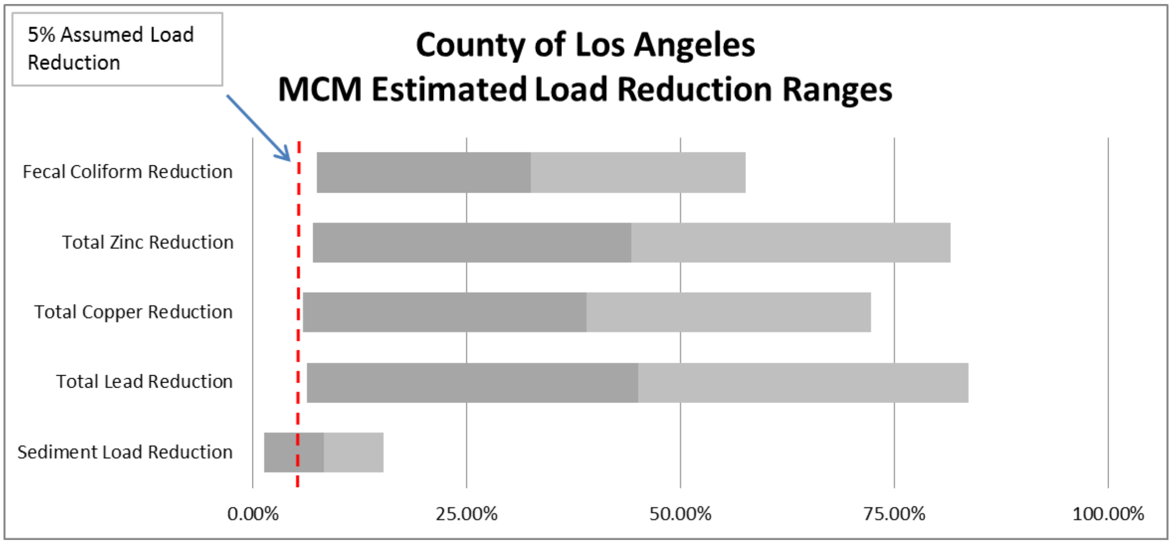


Figure C8-2. Estimated Load Reductions, City of Santa Clarita

The enhanced MCMs address a wide range of pollutant sources and can be expected that most of the potential MS4 sources of pollutants will be addressed by an enhanced MCM in some capacity. Even using the low end of the effectiveness ranges, it is expected enhanced MCM implementation will result in a 3-8% reduction in loads to the receiving water. Because several of the MCMs have much higher effectiveness ratings, the load reductions from implementing enhanced MCMs are expected to be higher than that low end range, and it is reasonable to expect that a 5% reduction in loadings to receiving waters can be achieved through implementing enhanced MCMs. As programs are implemented, these estimates may be refined based on new information.

C8-4 References

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Larry Walker Associates, 1998. Technical memorandum: copper control measure identification. Sacramento Stormwater Monitoring Program. Prepared for Sacramento Comprehensive Stormwater Management Program

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Appendix C8 Attachment A-MCM Effectiveness Rating

		Water Quality Priority Pollutants											Comments	
		Salts	Trash	Nutrients	Metals		Pesticides		Other		Bacteria	Potential Effectiveness	Dependent on program element - See specific categories below. Notes: [a] if still being used [b] if present in sediment [c] if contained in runoff from historic sources	Effectiveness Citations/Notes
	MCMs New 2012 Permit Requirement, or potential Enhancement from 2001 Permit Requirement				Metals, except Se	Se	OP Pesticides	Pyrethroids	Cyanide	Bis-2				
D.2 Progressive Enforcement (Applies to D.4.d, D.6, D.7, D.8, and D.10)														
	Develop and maintain a Progressive Enforcement Policy	X	X	X	X		X	X	X		X		Depends on sources in watershed	
	Conduct follow-up inspection within 4 weeks of date of initial inspection	X	X	X	X		X	X	X		X		Depends on sources in watershed	
	Provide education program in conjunction with enforcement program	X	X	X	X		X	X	X		X		Depends on sources in watershed	
D.4.a and D.5 Public Information and Participation Program (PIPP)														
	Residential Outreach (Individually or with group):												N/A: General, see specific requirements below.	
	Develop/Modify Public education materials to focus on watershed priorities; subject matter may include: vehicle fluids; household waste; construction waste; pesticides, fertilizers, and integrated pest management (IPM); green wastes; and animal wastes.	X	X	X	X		X [a]	X			X	3-20%	Effectiveness is varied depending on whether specific sources can be clearly targeted and the magnitude of the source. In general, more targeted outreach programs will be on the higher end of the effectiveness range, while more general programs will be on the lower end.	Palo Alto Mercury Control Program; Sacramento Stormwater Program, Copper Control Measures Caraco, DS. 2013. The Watershed Treatment Model 2013 Documentation.
	Distribute public education materials at points of purchase that will provide focus on sources of pollutants related to watershed priorities. Distribution may include: automotive parts stores, home improvement centers, landscaping/garden centers, pet shops/feed stores., as appropriate.	X	X	X	X			X			X		Only listed for pollutants that have sources that can be actively purchased now. Could potentially be used as an avenue for educating on historically purchased products (i.e. organophosphate pesticides, but those are not identified since this would likely not be the target of a point of purchase campaign). Effectiveness is varied depending on whether specific sources can be clearly targeted and the magnitude of the source. In general, more targeted outreach programs will be on the higher end of the effectiveness range, while more general programs will be on the lower end.	Palo Alto Mercury Control Program; Sacramento Stormwater Program, Copper Control Measures Caraco, DS. 2013. The Watershed Treatment Model 2013 Documentation.
	GENERAL PUBLIC OUTREACH ACTIVITIES:											1-5%		
	Keep California Beautiful participation		X		X						X			Low participation factor (5%); High loading factor 80-90% (4-5% total)
	Rain Barrel artist decoration, Kids Water Art, Street Fair													Low particpation factor (5%); Low loading factor (5%) (2-3% total)
	Advertise National Wildlife Foundation Backyard Habitat Certification program			X							X			Low particpation factor (5%); Low loading factor (5%) (2-3% total)
	Residential Rain Barrel Program			X			X	X			X			Low particpation factor (1%); Low loading factor (10%) (1% total)
	TARGETED PUBLIC OUTREACH ACTIVITIES											5-25%		
	Homeowners Association Outreach Program		X	X				X			X			Medium participation factor (50%); Low to medium loading factor (25-50%)(12-25% total)
	Work with Community College Santa Clarita Environmental Education Consortium (SCEEC) to find opportunities for water quality related education		X	X	X						X			Low participation factor (5-10%); Low loading factor (10%) (5-10% total)
D.6 Industrial/ Commercial Facilities														
	Educate - notify critical sources of BMP requirements; focus outreach material content and distribution based on potential to contribute to pollutants identified as water quality priorities.	X	X	X	X			X	X	X	X	24-30%	If pollutant is being used at the site	Estimated based on literature review (methods) and BPJ; assumed 30% Participation rateb, 80 - 100% loading factor
	Make accessible water quality training related to businesses through local business organizations (i.e. Chamber of Commerce, etc.)		X	X	X			X			X	8-16%		Low to mid range participation factor (10-20); High range loading factor (80)
	Track critical sources - include nurseries/nursery centers and other facilities determined to contribute substantial pollutant load		X	X	X			X			X	12-18%		Mid to high range participation factor (especially paired with progressive enforcement) (15-20% annual); Mid to high range loading factor (80-90%)
	Conduct inspection program with frequencies based on potential for facility to be a source of pollutants identified as water quality priorities.		X	X	X			X			X			
D.7 Planning and Land Development														
	Update ordinance/design standards to conform with new requirements (LID and Hydromod)	X		X	X	X	X [a]	X	X	X	X	40-90%	Expect LID/Hydromod to reduce runoff, reducing associated pollutants. Would apply to entire PLD section.	Mid to high range participation factor (especially paired with progressive enforcement); Battiata et al. 2010. The Runoff Reduction Method.
	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													

Appendix C8 Attachment A-MCM Effectiveness Rating

	Water Quality Priority Pollutants											Comments	
	Salts	Trash	Nutrients	Metals		Pesticides		Other		Bacteria	Potential Effectiveness	Dependent on program element - See specific categories below. Notes: [a] if still being used [b] if present in sediment [c] if contained in runoff from historic sources	Effectiveness Citations/Notes
MCMs New 2012 Permit Requirement, or potential Enhancement from 2001 Permit Requirement				Metals, except Se	Se	OP Pesticides	Pyrethroids	Cyanide	Bis-2				
D.8 Development Construction													
UPDATED TRAINING, INSPECTIONS, ENFORCEMENT PROGRAM		X	X	X	X	X [a]	X			X	25-72%		Sacramento SW program PF=80; LF=80 (ER=64%)
Update erosion and sediment control ordinance/procedures to conform with new requirements		X	X	X	X	X [a]	X			X	N/A	MCMs that reduce sediment transport will reduce sediment-associated pollutants, if those pollutants are present in soils. Will apply to entire Construction section.	
Require operators of public and private construction sites to select, install, implement, and maintain BMPs that comply with the updated erosion and sediment control ordinance		X	X	X	X	X [a]	X			X			
Sites < 1 acre; inspect based upon water quality threat		X	X	X	X	X [a]	X			X	40-72%		Based on effectiveness rating of business inspections programs (Palo Alto Mercury Control Program; Sacramento Stormwater Program, Copper Control Measures); validated with effectiveness rating for control of construction site runoff from Sacramento Stormwater Program (64%); assumes robust inspections and enforcement program.
Establish priority inspection process based on the potential for a site to be a source of pollutants identified as water quality priorities.		X	X	X			X			X			
Develop/implement SOPs/inspection checklist		X	X	X	X	X [a]	X			X	25-56%		
For sites 1 acre or more, maintain inventory of grading, encroachment, demolition, building, or construction permits (and any other applicable authorization to move soil or disturb land)			X	X	X	X [a]	X			X	40-72%		
For sites 1 acre or more, require submittal and approval of an Erosion and Sediment Control Plan (ESCP) prior to land disturbance.		X	X	X	X	X [a]	X			X			
For sites 1 acre or more, implement technical standards for the selection, installation, and maintenance of construction BMPs		X	X	X	X	X [a]	X			X			
For sites 1 acre or more, implement inspections program at frequencies per Table 17 to include subsequent inspection requirements in Part VI.D.8.j.		X	X	X			X			X			
Implement targeted training program for municipal and contract staff.		X	X	X			X			X	25-56%		Mid to high range participation and loading factors; (50-75%; 50-75% = 25-56%)
D.4.c and D.9 Public Agency Activities													
Develop retrofit opportunity inventory; evaluate and rank	X		X	X	X	X [a]	X			X		Depends on type of retrofit and BMPs included	Structural; Not estimated as part of MCMs.
Develop procedures to assess impact of flood mgt projects on water quality of receiving waters; evaluate to determine if retrofitting is feasible		X		X	X	X [a]	X [b]			X		If implemented, would likely address sediment transported pollutants. If infiltration is incorporated, all pollutants would be addressed.	Incentive program estimated based on literature review and BPJ; assumed 5-10% public participation rate, 50% loading factor for their site.
Evaluate existing structural flood control facilities to determine if retrofitting facility to provide additional pollutant removal is feasible		X		X	X	X [a]	X [b]			X		If implemented, would likely address sediment transported pollutants. If infiltration is incorporated, all pollutants would be addressed.	
Where opportunities arise, cooperate with private land owners to encourage site specific retrofitting; includes pilot projects and outreach	X		X	X	X	X [a]	X			X	2-4%	Depends on type of retrofit and BMPs included	Estimated based on literature review (methods) and BPJ; assumed 5% participation rate, 50-80% loading factor. Could be better if targeted to specific sources and areas of the watershed.
Update catch basin map add GPS locations and update priority		X	X							X			
Develop and implement Adopt-a-Creek Program to include posting signs at access points to water bodies (open channels, creeks; lakes)	X	X	X							X	25-38%		Estimated based on literature review (methods) and BPJ; assumed 50% participation rate (implement along 1/2 of the Creeks w/in jurisdiction), 50-75% loading factor.
Implement controls to limit infiltration of seepage from sanitary sewers to the storm drains	X		X							X	4-10%		Estimated based on literature review (methods) and BPJ; assumed 5-10% participation rate, 90% loading factor.
Implement routine preventative maintenance for both systems, survey sanitary sewer and MS4. May use SSO General WDR to fulfill this requirement.	X		X					X		X			
Add PACE Sewer to program - property assessments or low cost loans on parcel to pay for transition from septic to sewer systems			X							X			
Implement inspection and maintenance program for Permittee owned BMPs		X	X	X		X [b]	X [b]			X	40-45%	Depends on BMP type. Will address sediment-transported pollutants, if they are present in sediment.	Estimated based on literature review (methods) and BPJ; 80-90% participation factor (assumes majority of BMPs are maintained and functioning properly, 50% loading factor used due to wide range of removal efficiencies (Sacramento Stormwater Program, Copper Control Measures)
Manage residual water in treatment control BMPs removed during maintenance	X		X	X	X	X [a]	X [b]			X		Will prevent discharge of any pollutants present in the water.	
Enhance current street sweeping program with advanced sweeping technology in areas that require additional pollutant reduction		X		X						X	10-25%		20-50% increase in effectiveness using vacuum truck on flat or well maintained surfaces; Estimated based on literature review (methods) and BPJ; assumed 50% participation rate (50% of the streets to be swept with vacuum sweepers, 20-50% loading factor (City of San Diego, Targeted Aggressive Street Sweeping Pilot Study Effectiveness Assessment, Final Report, June 18, 2010).
Implement road construction maintenance BMPs (e.g., restrict paving activity to exclude periods of rain)			X	X	X	X [a]	X			X	64-72%	Will address sediment-transported pollutants, if they are present in sediment.	Estimated based on literature review (methods) and BPJ; 80-90% participation factor (assumes majority of BMPs are maintained and functioning properly, 50% loading factor used due to wide range of removal efficiencies (Sacramento Stormwater Program, Copper Control Measures)
Open space conservation/acquisition													
Install satellite based irrigation controllers for public spaces	X		X								16-18%	will increase each year as more sites are retrofit	Assumes 20% conversion rate per year (PF=20%) and high LF (80-90%)
River and creek restoration projects (e.g., invasive species removal, reforestation)		X								X	4-5%	dependent on scope of program	assumes 10% of contributing areas addressed per year, 40-50% LF
Add contractors to existing training program.	X	X	X	X			X			X			

		Water Quality Priority Pollutants											Comments	
		Salts	Trash	Nutrients	Metals		Pesticides		Other		Bacteria	**Potential Effectiveness**	Dependent on program element - See specific categories below. Notes: [a] if still being used [b] if present in sediment [c] if contained in runoff from historic sources	**Effectiveness Citations/Notes**
	MCMs New 2012 Permit Requirement, or potential Enhancement from 2001 Permit Requirement				Metals, except Se	Se	OP Pesticides	Pyrethroids	Cyanide	Bis-2				
D.10 Illicit Connections and Illicit Discharges Elimination														
	TARGETED TRAINING AND ICID ENFORCEMENT	X	X	X	X		X [a]	X	X		X	40-45%		
	Written procedures for conducting investigations and eliminations	X	X	X	X		X [a]	X	X		X			Estimated based on literature review and BPJ; assumed 80-90% of targeted staff participation rate, 50% loading factor (assumes program only catches 1/2 of the illicit discharges). Of note - Sacramento Stormwater Program assigns 100% loading factor to NSW discharges, assuming that then entire source would be eliminated by 100% participation.
	Create list of relevent staff and contractors for training; provide enhanced training to a subset of field staff	X	X	X	X						X			
	Work with the SCV Family of Water Providers to address over irrigation	X		X				X			X			
	PUBLIC REPORTING PROGRAM	X	X	X	X		X [a]	X	X		X	2-15%		
	Facilitate public reporting via hotline	X	X	X	X		X [a]	X	X		X	5-15%		Assumed 10-20% participation rate (Palo Alto), 50-75% loading factor.
	Document calls and actions associated with hotline	X	X	X	X		X [a]	X	X		X			
	Signage adjacent to prioritized open channels provide info re: public reporting	X	X	X	X		X [a]	X	X		X	2-4%		Estimated based on literature review and BPJ; assumed 5% participation rate (Palo Alto), 50-75% loading factor.

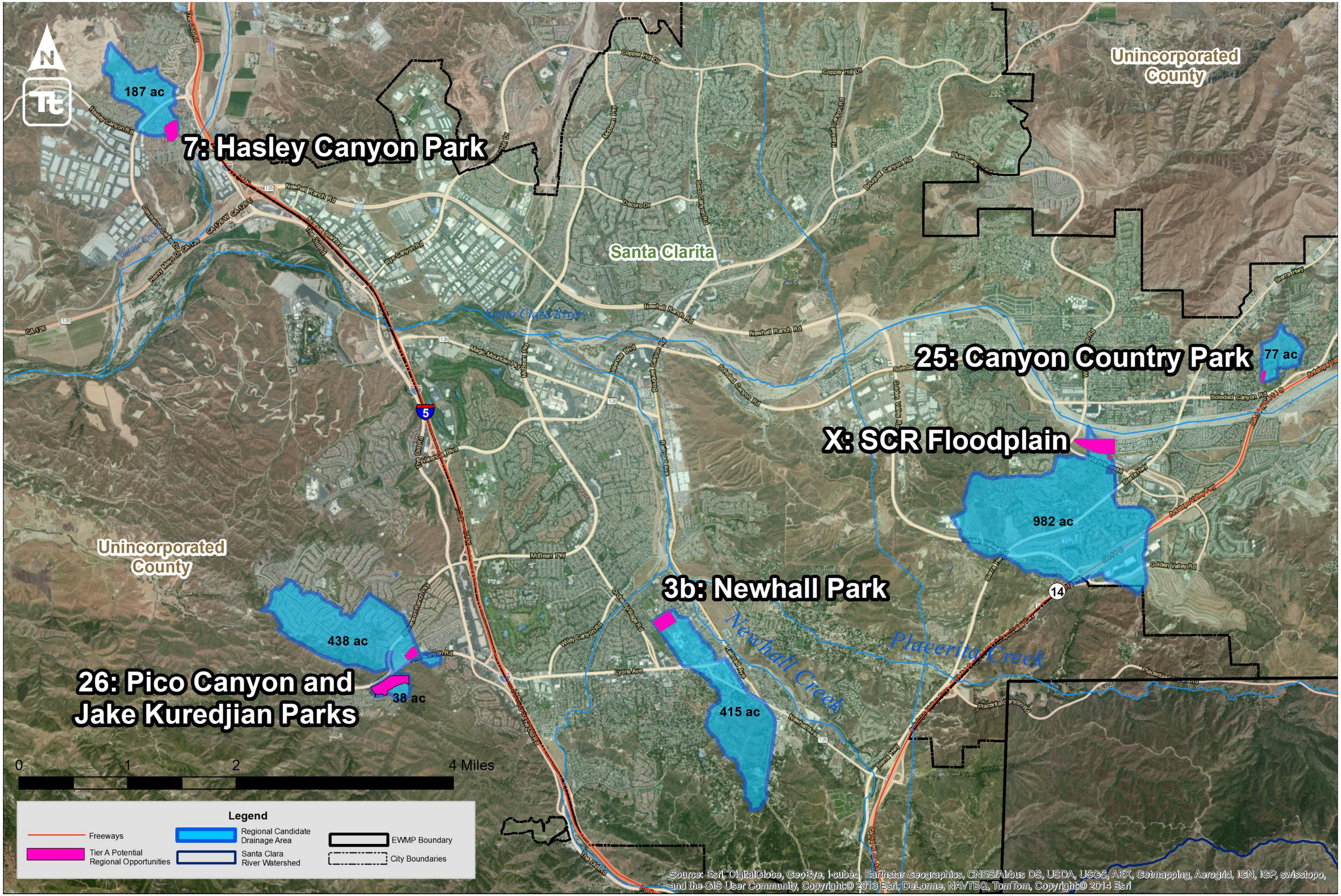
APPENDIX C9

Conceptual Design Fact Sheets

TIER A CONCEPTUAL DESIGN FACT SHEETS

UPPER SANTA CLARA RIVER EWMP

SUMMARY OF ALL TIER A CANDIDATE PROJECTS

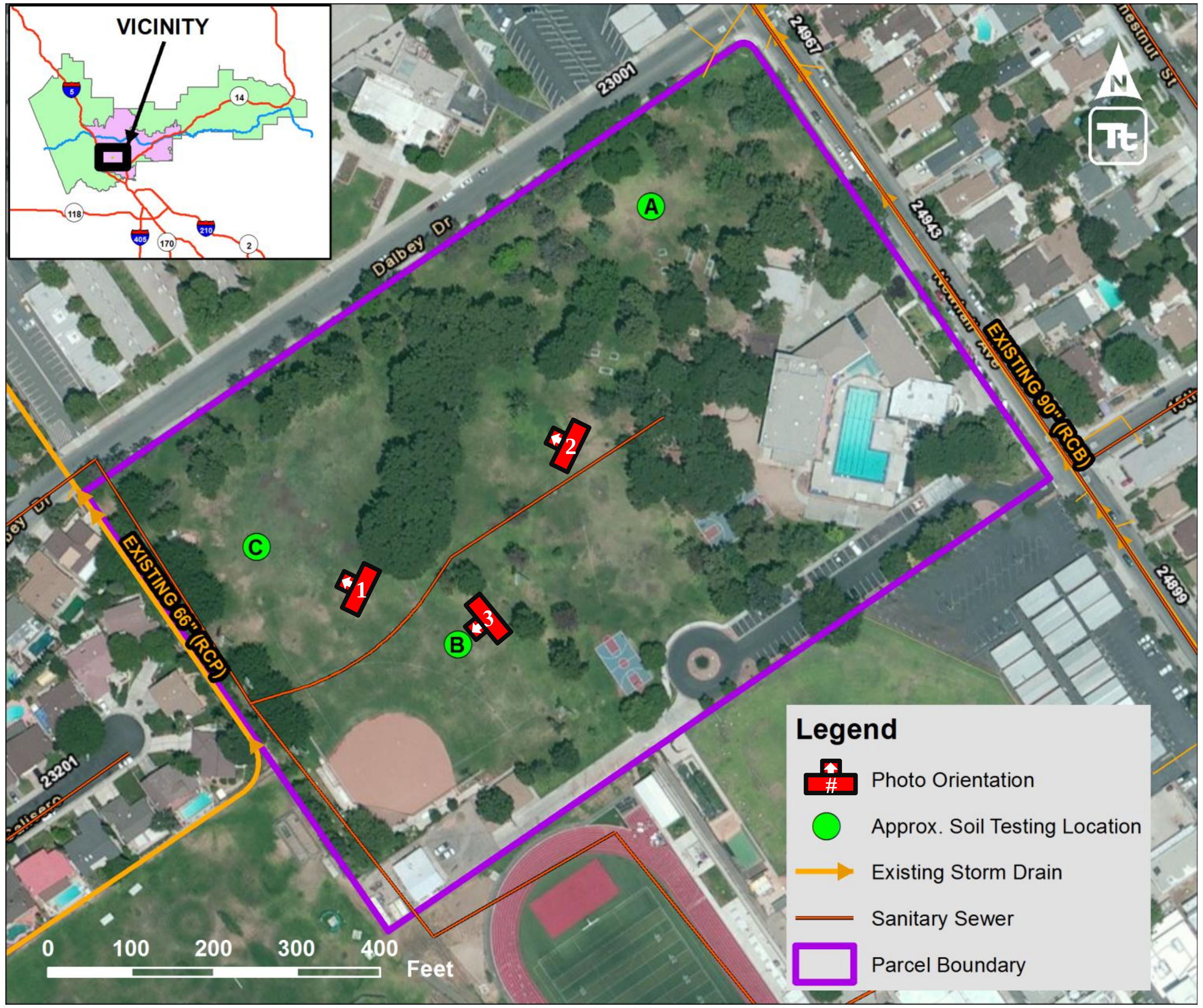


Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Copyright:© 2013 Esri, DeLorme, NAVTEQ, TomTom, Copyright:© 2014 Esri

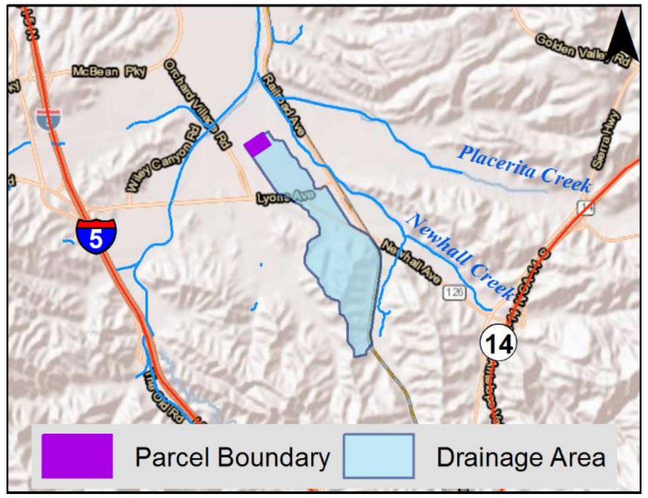
SITE 3b – NEWHALL MEMORIAL PARK

PARCEL OWNER: CITY OF SANTA CLARITA

EXISTING SITE CONDITIONS AND SOIL TESTING LOCATIONS



DRAINAGE AREA



SYNOPSIS AND PARCEL DESCRIPTION

Runoff will be diverted to a subsurface cistern or infiltration chamber from an existing 90-inch storm drain. This project has potential to augment local water supply both through groundwater recharge or storage and use for onsite irrigation.

LOCATION	CITY OF SANTA CLARITA
ASSESSOR'S IDENTIFICATION NUMBERS	2855006902, 2855006901
LATITUDE, LONGITUDE	34.386174, -118.539885

DRAINAGE AREA CHARACTERIZATION

DRAINAGE AREA, acres	415
TOTAL IMPERVIOUS, %	27
IMPERVIOUS DRAINAGE AREA, acres	111
HYDROLOGIC SOIL GROUP (SSURGO)	B
REQUIRED DESIGN STORM TREATMENT CAPACITY, ac-ft	10.3
EWMP SUBWATERSHEDS TREATED	412673

PARCEL SCREENING AND PRIORITIZATION

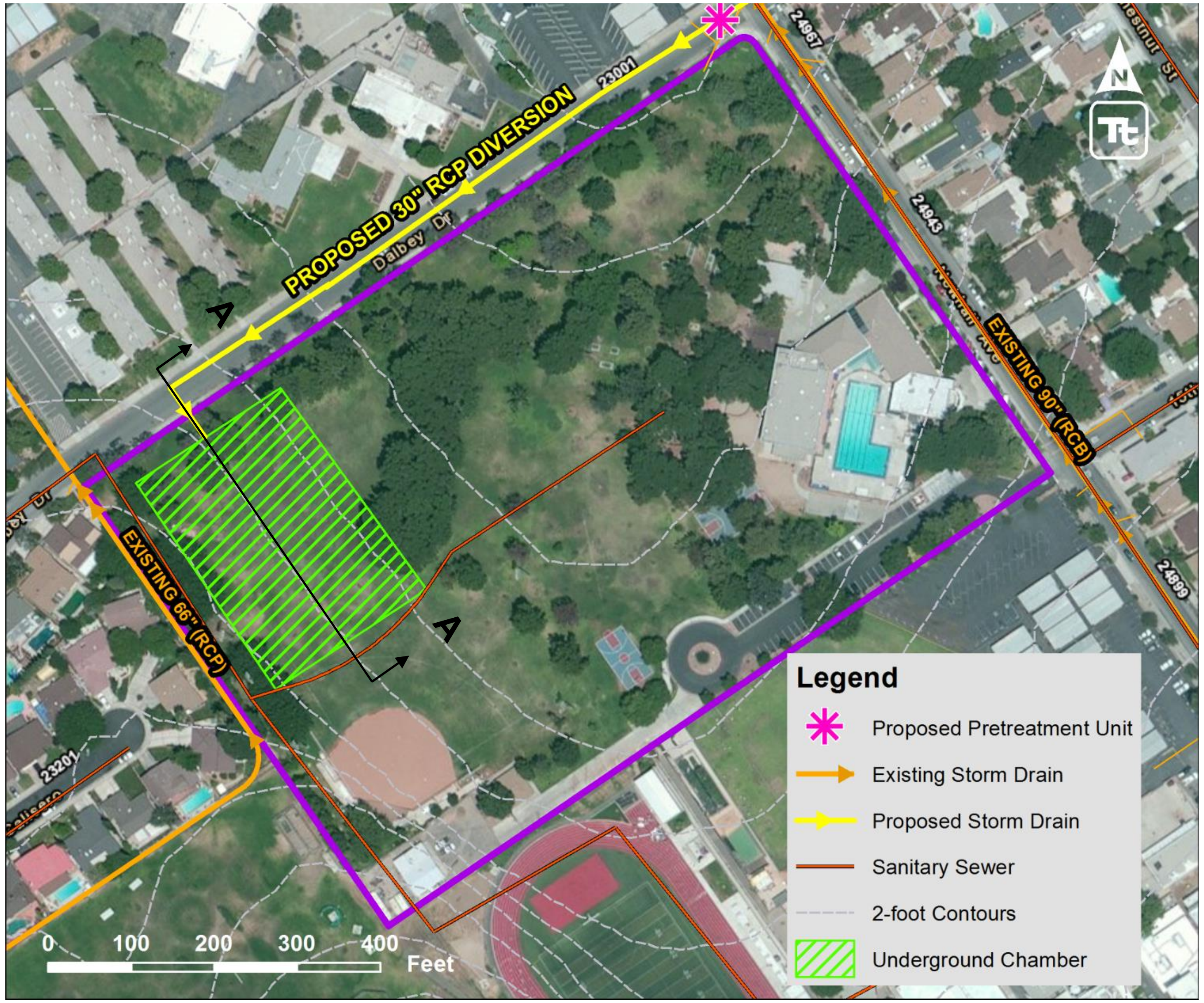
PARCEL AREA, acres	14
PARCEL AREA LESS THAN 10% SLOPE	95%
PROXIMITY TO MAJOR STORM DRAIN, ft	< 100
PROXIMITY TO SOIL CONTAMINATION, ft	>100
DEPTH TO GROUNDWATER, ft	> 20
FIELD-MEASURED COMPOSITE SOIL INFILTRATION RATE, in/hr	8.8

PRIORITIZATION SCORE:
89/100

SITE 3b – NEWHALL MEMORIAL PARK

PARCEL OWNER: CITY OF SANTA CLARITA

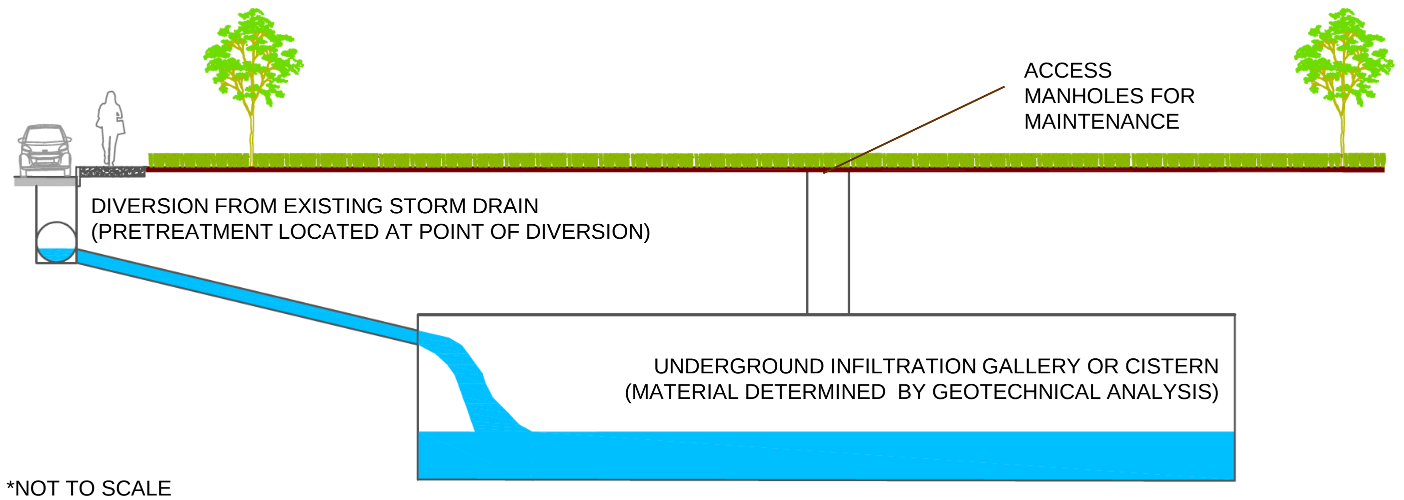
PROPOSED CONCEPTUAL SITE LAYOUT



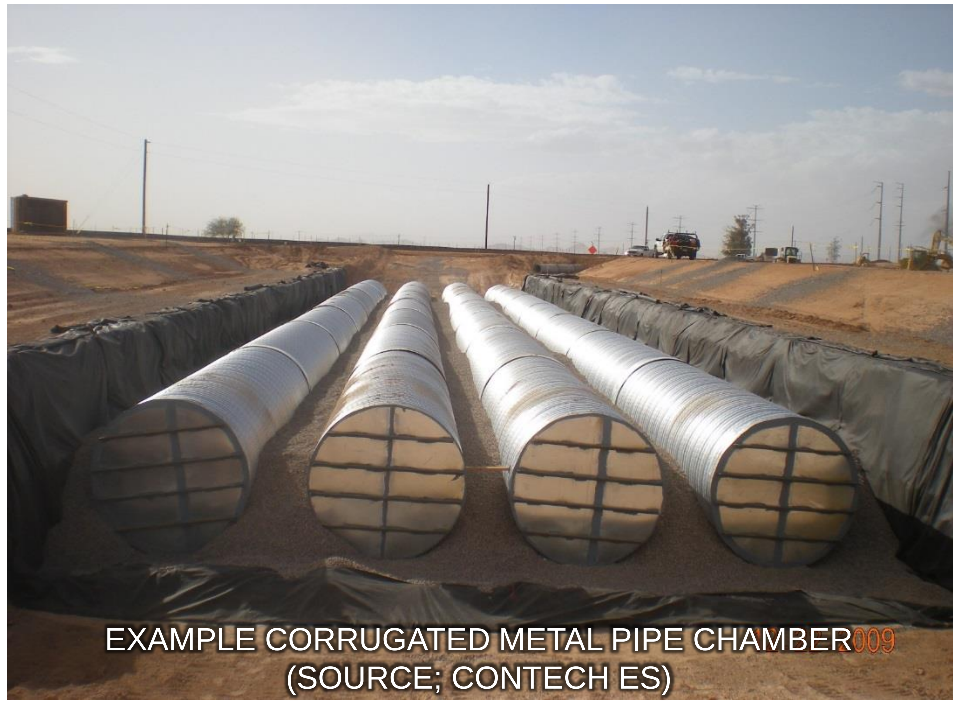
PROJECT CHARACTERISTICS

SUBSURFACE STORAGE FOOTPRINT, ft^2	60,480	**PROPOSED RETROFIT DESCRIPTION:** The proposed retrofit would divert runoff from an existing 90-inch storm drain under Newhall Ave to an offline chamber below Newhall Park. Pretreatment would be provided at the diversion to capture gross solids and reduce maintenance frequency. This conceptual design proposes a 10 acre-ft infiltration gallery or cistern to fully capture and treat the 85th percentile, 24-hour design storm event (accounting for infiltration during the storm). Under the current permit interpretation, this would attain EWMP compliance for the entire tributary subwatershed and preclude construction of other BMPs upstream.
SUBSURFACE PONDING DEPTH, ft	7.0	
STORAGE CAPACITY, ac-ft	10.0	
DIVERSION RATE (85TH PERCENTILE, 24-HR STORM PEAK DISCHARGE), cfs	21.5	
PLANNING-LEVEL ESTIMATED COST	$10,706,500	**POTENTIAL CONFLICTS:** Mature trees, existing sewer line, site irrigation and electrical, construction sequencing to minimize park disruptions, treatment infrastructure for onsite water use
COBENEFITS: Groundwater recharge, preservation of existing park functions, flood control benefits, potential source of irrigation water for park, trash capture		

TYPICAL PROFILE (A-A)*



*NOT TO SCALE


EXAMPLE CORRUGATED METAL PIPE CHAMBER
(SOURCE; CONTECH ES)


EXAMPLE PRECAST CONCRETE CHAMBER
(SOURCE; CITY OF LOS ANGELES)


EXAMPLE MODULAR PLASTIC STORAGE UNIT CHAMBER

SITE 3b – NEWHALL MEMORIAL PARK

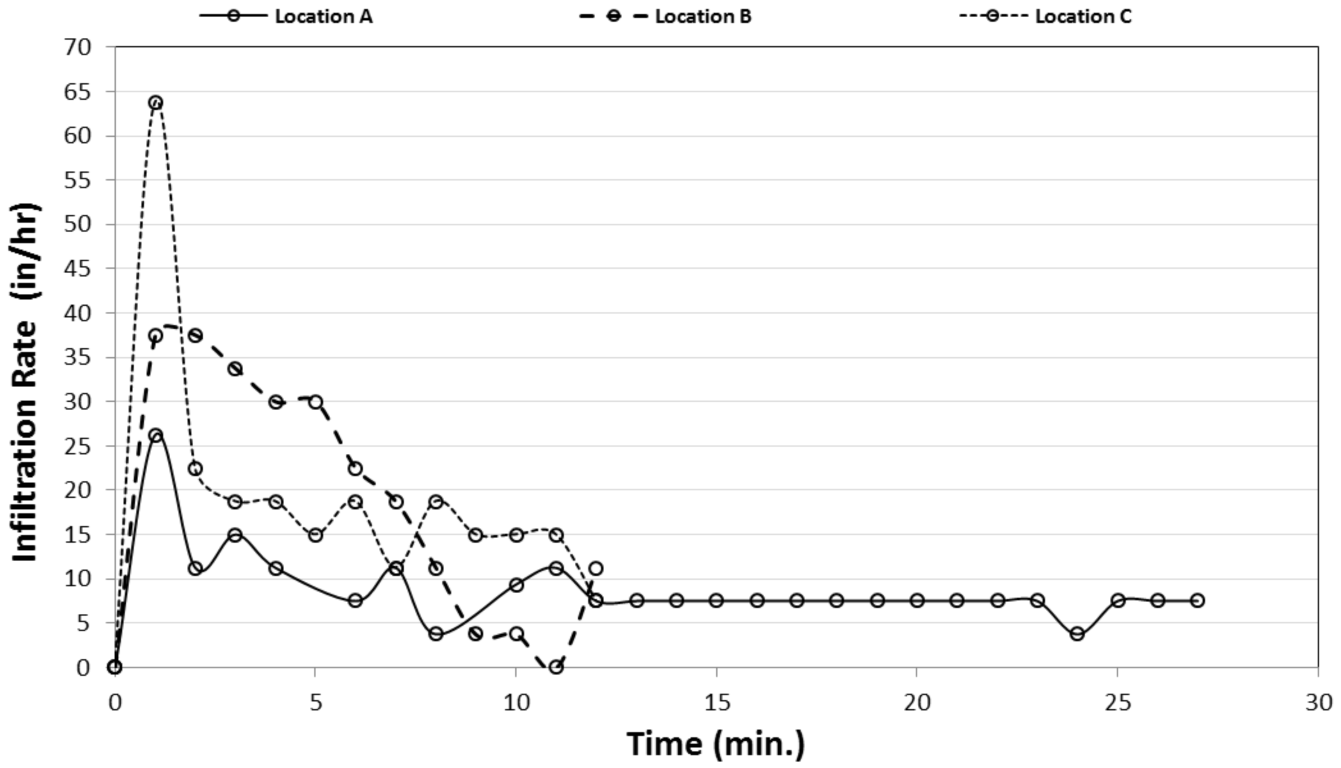
PARCEL OWNER: CITY OF SANTA CLARITA

PLANNING-LEVEL COST ESTIMATE*

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Preparation				
1	Temporary Construction Fence	1,026	LF	$2.50	$2,565.00
2	Silt Fence	1,026	LF	$3.00	$3,078.00
	Site Preparation				
3	Excavation and Removal	45,920	CY	$45.00	$2,066,400.00
	Structures				
4	Pretreatment	1	EA	$75,000.00	$75,000.00
5	Structural Layer (washed no 57 or no 2 stone)	2,240	CY	$50.00	$112,000.00
6	Utility Conflicts	1	LS	$10,000.00	$10,000.00
7	Connection to Underground Infiltration Basin	1	LS	$350.00	$350.00
8	Diversion Structure	1	EA	$8,000.00	$8,000.00
9	Gravity 30" RCP	950	LF	$140.00	$133,000.00
	Underground Storage				
10	Fine Grading	60,480	SF	$0.72	$43,546.00
11	Underground Chamber	15,680	CY	$270.00	$4,233,596.00
12	Maintenance/Observation Access to the Underground Infiltration Basin	5	EA	$5,000.00	$25,000.00
				CONSTRUCTION SUBTOTAL	$6,712,540.00
13	Bond (5% of subtotal)				$335,630.00
14	Mobilization (10% of subtotal)				$671,250.00
15	Construction Management (10% of subtotal)				$671,250.00
16	Construction contingency (20% of subtotal)				$1,342,510.00
				CONSTRUCTION TOTAL	$9,733,180.00
17	Design (10% of Construction Total)				$973,320.00
				TOTAL COST	**$10,706,500.00**

*COSTS ARE ORDER-OF-MAGNITUDE ESTIMATES BASED ON AVAILABLE DATA AND CONCEPTUAL LAYOUT. ACTUAL COSTS WILL VARY.

FIELD SOIL INFLTRATION RATE TEST RESULTS**



**PERFORMED WITH TURF TEC DOUBLE-RING INFILTROMETER AT A DEPTH OF APPROXIMATELY 1 FOOT BELOW EXISTING GROUND SURFACE

HAND AUGER SOIL INVESTIGATION LOG – TEST LOCATION A

Tetra Tech, Inc.
3475 E. Foothill Blvd.
Pasadena, CA 91107
Telephone: 626.351.4664
Fax: 626.351.5291

BORING NUMBER Testing Location 1 - Newhall Park

PAGE 1 OF 1

CLIENT County of Los Angeles

PROJECT NAME Upper Santa Clara River EWMP

PROJECT NUMBER 100-SDG-T31351

PROJECT LOCATION Santa Clarita, CA

DATE STARTED 4/1/15 **COMPLETED** 4/1/15

GROUND ELEVATION **HOLE SIZE** 2.25 inches

DRILLING CONTRACTOR

GROUND WATER LEVELS:

DRILLING METHOD

AT TIME OF DRILLING ---

LOGGED BY EN **CHECKED BY** EN

AT END OF DRILLING ---

NOTES Hand Augered to 5 ft bgs.

AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0.0					SILTY SAND (SM): 60% fine to medium grained sand, 30% silt, 10% gravel, poorly graded, non-plastic, very dense, no staining, no odor, with pieces of asphalt debris.	
2.5				2.0	LEAN CLAY WITH SAND (CL): 75% clay, 20% sand, 5% gravel, medium plasticity, medium stiff, maximum gravel grain 2.5".	
5.0				4.0	SILTY SAND (SM): 85% fine to medium grained sand, 15% silt, moist to dry, non-plastic, loose, no staining, no odor, trace fine gravel with maximum grain size 1/2".	
				5.0		

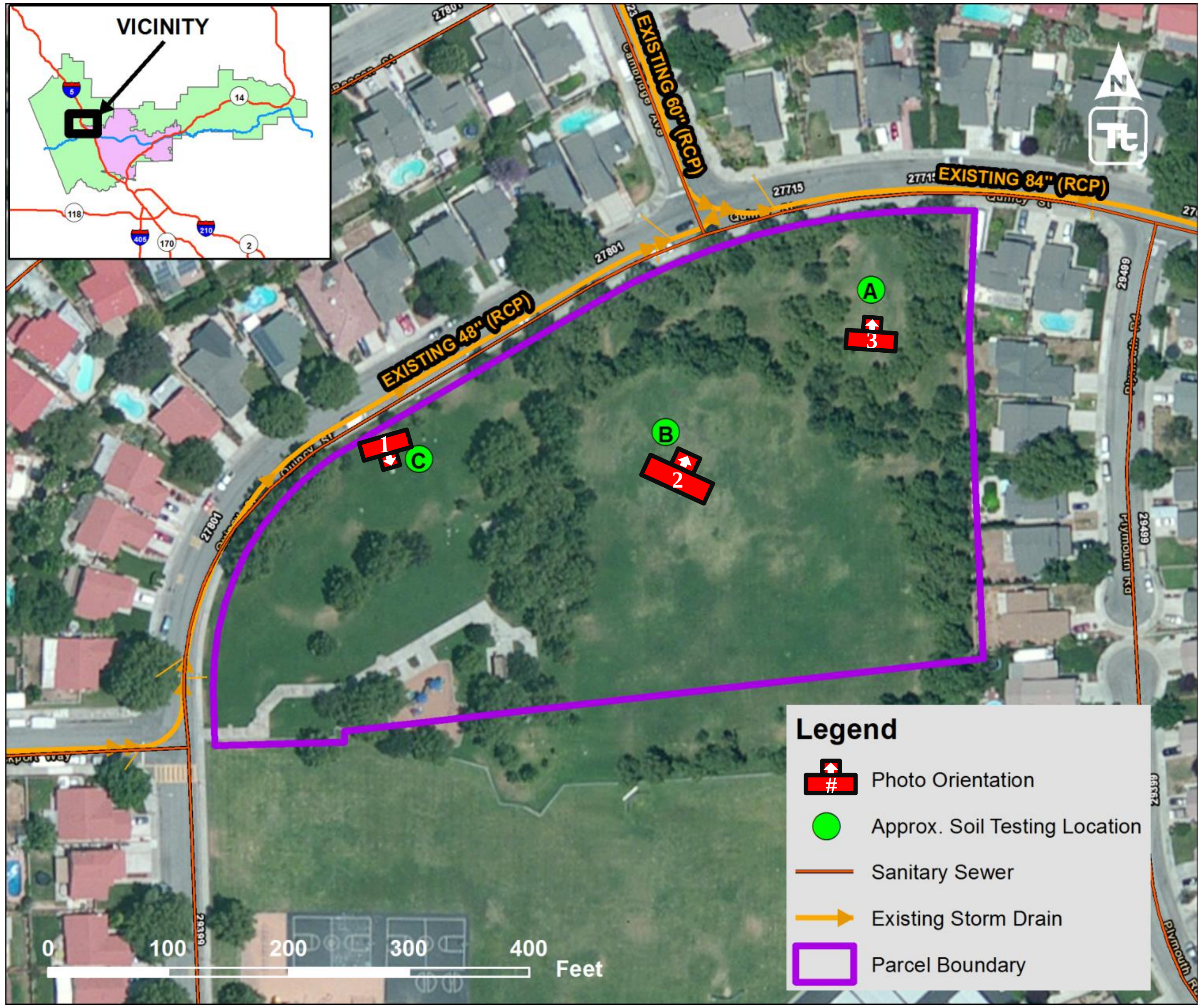
Bottom of borehole at 5.0 feet.

ENVIRONMENTAL BH - GINT STD US LAB.GDT - 6/8/15 17:21 - V:\OTHER CLIENTS\CITY OF SANTA CLARITA\BORINGS - REVISED.GPJ

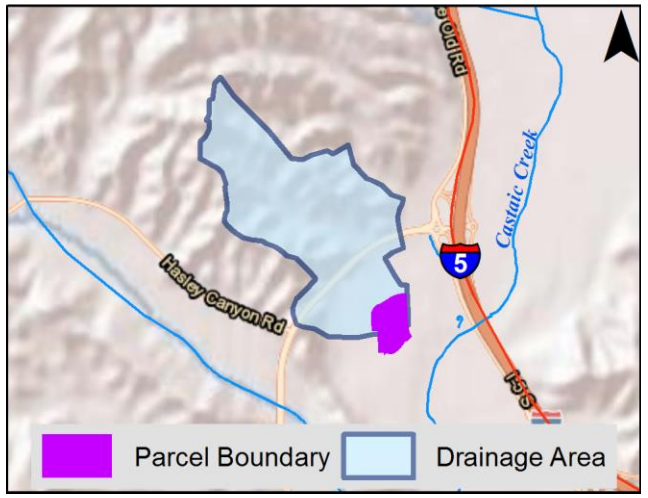
SITE 7 – HASLEY CANYON PARK

PARCEL OWNER: LOS ANGELES COUNTY

EXISTING SITE CONDITIONS AND SOIL TESTING LOCATIONS



DRAINAGE AREA



SYNOPSIS AND PARCEL DESCRIPTION

Runoff will be directed to a subsurface cistern or infiltration chamber from an existing 84-inch storm drain. Additionally, local roadway runoff will be treated by green streets along Quincy Street. This project has potential to augment local water supply both through groundwater recharge or storage and use for onsite irrigation.

LOCATION	UNINCORPORATED
ASSESSOR'S IDENTIFICATION NUMBERS	2866014934, 2866015900, 2866014900, 2866020908, 2866020910, 2866020909, 2866020907
LATITUDE, LONGITUDE	34.451415, -118.619881

DRAINAGE AREA CHARACTERIZATION		PARCEL SCREENING AND PRIORITIZATION	
DRAINAGE AREA, acres	187	PARCEL AREA, acres	12
TOTAL IMPERVIOUS, %	30	PARCEL AREA LESS THAN 10% SLOPE	95%
IMPERVIOUS DRAINAGE AREA, acres	57	PROXIMITY TO MAJOR STORM DRAIN, ft	< 100
HYDROLOGIC SOIL GROUP (SSURGO)	B	PROXIMITY TO SOIL CONTAMINATION, ft	> 500
REQUIRED DESIGN STORM TREATMENT CAPACITY, ac-ft	5.6	DEPTH TO GROUNDWATER, ft	<10
EWMP SUBWATERSHEDS TREATED	401583	FIELD-MEASURED COMPOSITE SOIL INFILTRATION RATE, in/hr	12.5

PRIORITIZATION SCORE:
83/100

SITE 7 – HASLEY CANYON PARK

PARCEL OWNER: LOS ANGELES COUNTY

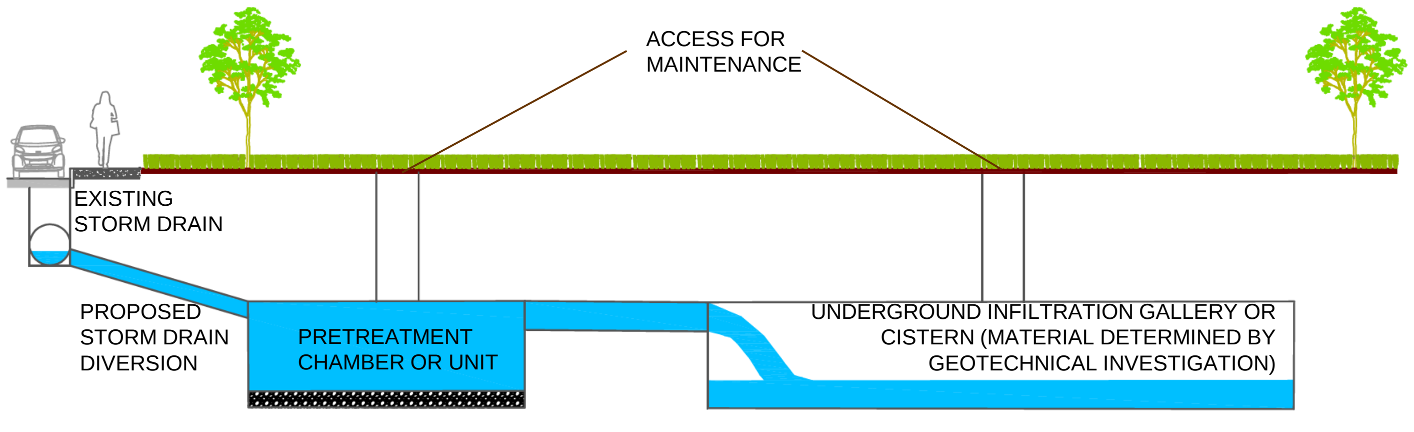
PROPOSED CONCEPTUAL SITE LAYOUT

PROJECT CHARACTERISTICS

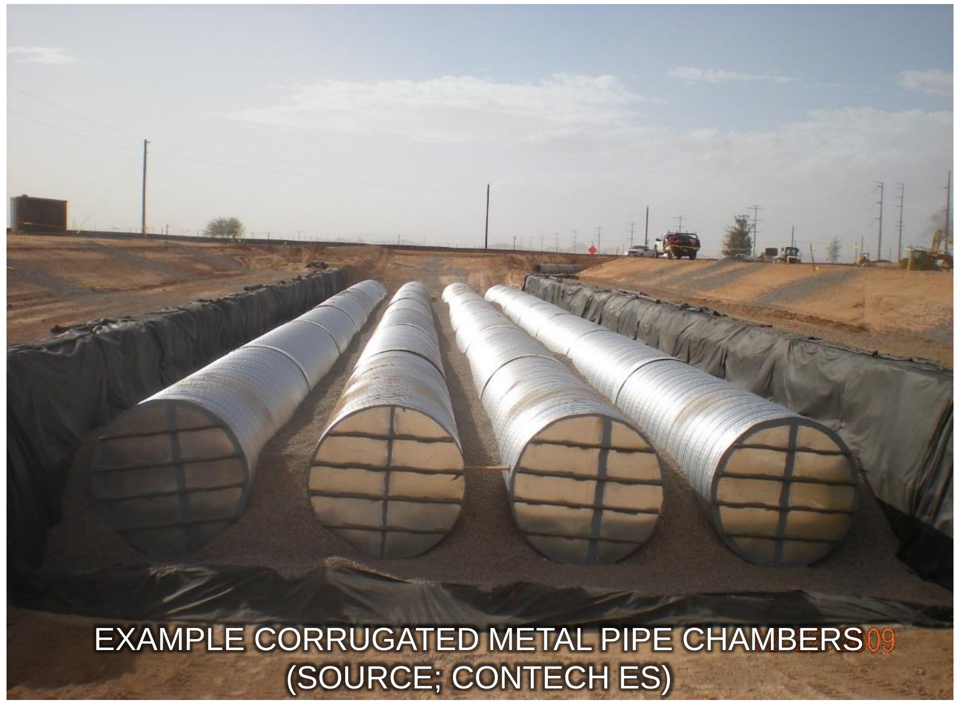
SUBSURFACE STORAGE FOOTPRINT, ft^2	53,800	**PROPOSED RETROFIT DESCRIPTION:** The proposed retrofit would divert runoff from an existing 84" storm drain under Quincy St to an offline chamber below Hasley Canyon Park. Pretreatment would be provided just downstream of the diversion (with access from the street) to capture gross solids and reduce maintenance frequency. This conceptual design proposes a 4.9 acre-ft infiltration gallery or cistern that (accounting for infiltration) will retain the 85th percentile design storm consistent with the reasonable assurance analysis in the EWMP. Street runoff not diverted to the facility will be treated by green street installed along Quincy Street.
SUBSURFACE PONDING DEPTH, ft	4.0	
STORAGE CAPACITY, ac-ft	4.9	
DIVERSION RATE (85TH PERCENTILE, 24-HR STORM PEAK DISCHARGE), cfs	10.2	
PLANNING-LEVEL ESTIMATED COST	$5,323,150	**POTENTIAL CONFLICTS:** Existing sewer line, site irrigation and electrical, construction sequencing to minimize park disruptions, treatment infrastructure for onsite water use, high groundwater.

COBENEFITS: Groundwater recharge, preservation of existing park functions, flood control benefits, potential source of irrigation water for park, trash capture

TYPICAL PROFILE (A-A)*



*NOT TO SCALE


EXAMPLE CORRUGATED METAL PIPE CHAMBERS
(SOURCE; CONTECH ES)


EXAMPLE PRECAST CONCRETE CHAMBERS
(SOURCE; CITY OF LOS ANGELES)


EXAMPLE MODULAR PLASTIC STORAGE UNIT CHAMBER

SITE 7 – HASLEY CANYON PARK

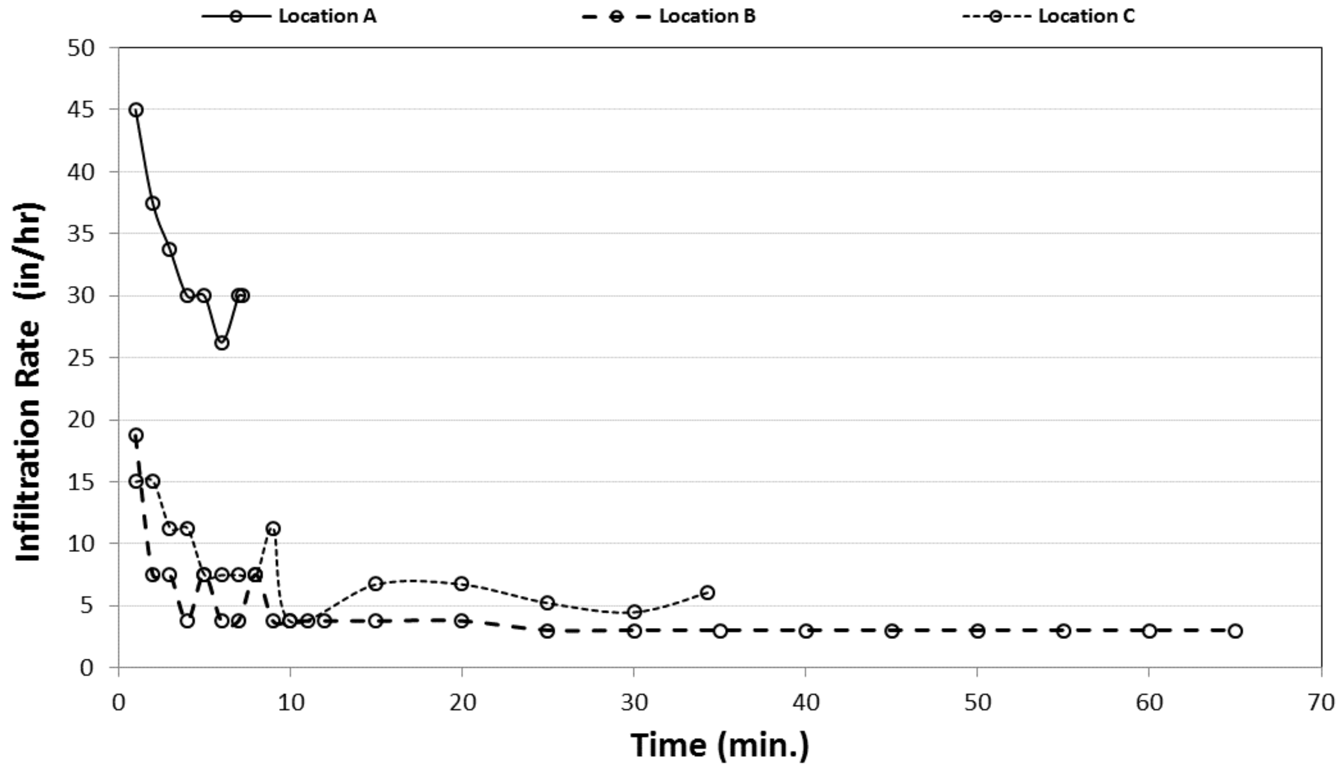
PARCEL OWNER: LOS ANGELES COUNTY

PLANNING-LEVEL COST ESTIMATE*

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Preparation				
1	Temporary Construction Fence	1,000	LF	$2.50	$2,500.00
2	Silt Fence	1,000	LF	$3.00	$3,000.00
	Site Preparation				
3	Excavation and Removal	13,948	CY	$45.00	$627,666.67
	Structures				
4	Pretreatment	1	EA	$70,000.00	$70,000.00
5	Structural Layer (washed no 57 or no 2 stone)	1,993	CY	$50.00	$99,629.63
6	Utility Conflicts	1	LS	$10,000.00	$10,000.00
7	Connection to Underground Infiltration Basin	1	LS	$350.00	$350.00
8	Diversion Structure	1	EA	$8,000.00	$8,000.00
9	Gravity 24" RCP	160	LF	$140.00	$22,400.00
	Underground Storage				
10	Fine Grading	53,800	SF	$0.72	$38,736.00
11	Underground Chamber	7,970	CY	$270.00	$2,152,000.00
12	Maintenance/Observation Access to the Underground Infiltration Basin	5	EA	$5,000.00	$25,000.00
				CONSTRUCTION SUBTOTAL	$3,059,280.00
13	Bond (5% of subtotal)				$152,960.00
14	Mobilization (10% of subtotal)				$305,930.00
15	Construction Management (10% of subtotal)				$305,930.00
16	Construction contingency (20% of subtotal)				$611,860.00
				CONSTRUCTION TOTAL	$4,435,960.00
17	Design (20% of Construction Total)				$887,190.00
				TOTAL COST	**$5,323,150.00**

*COSTS ARE ORDER-OF-MAGNITUDE ESTIMATES BASED ON AVAILABLE DATA AND CONCEPTUAL LAYOUT. ACTUAL COSTS WILL VARY.

FIELD SOIL INFLTRATION RATE TEST RESULTS**



**PERFORMED WITH TURF TEC DOUBLE-RING INFILTROMETER AT A DEPTH OF APPROXIMATELY 1 FOOT BELOW EXISTING GROUND SURFACE

HAND AUGER SOIL INVESTIGATION LOG – TEST LOCATION B

Tetra Tech, Inc.
3475 E. Foothill Blvd.
Pasadena, CA 91107
Telephone: 626.351.4664
Fax: 626.351.5291

BORING NUMBER Testing Location 2 - Hasley Canyon

PAGE 1 OF 1

CLIENT County of Los Angeles
PROJECT NAME Upper Santa Clara River EWMP
PROJECT NUMBER 100-SDG-T31351
PROJECT LOCATION Santa Clarita, CA
DATE STARTED 5/27/15 **COMPLETED** 5/27/15
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY EN **CHECKED BY** EN
AT END OF DRILLING ---
NOTES Hand Augered to 5 ft bgs.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0.0				▨	POORLY GRADED SAND (SP): moist to dry, 90% sand, 10% silt, medium density, non-plastic, no odor, no staining, with some roots.	
2.5				▨		
5.0				▨	5.0	

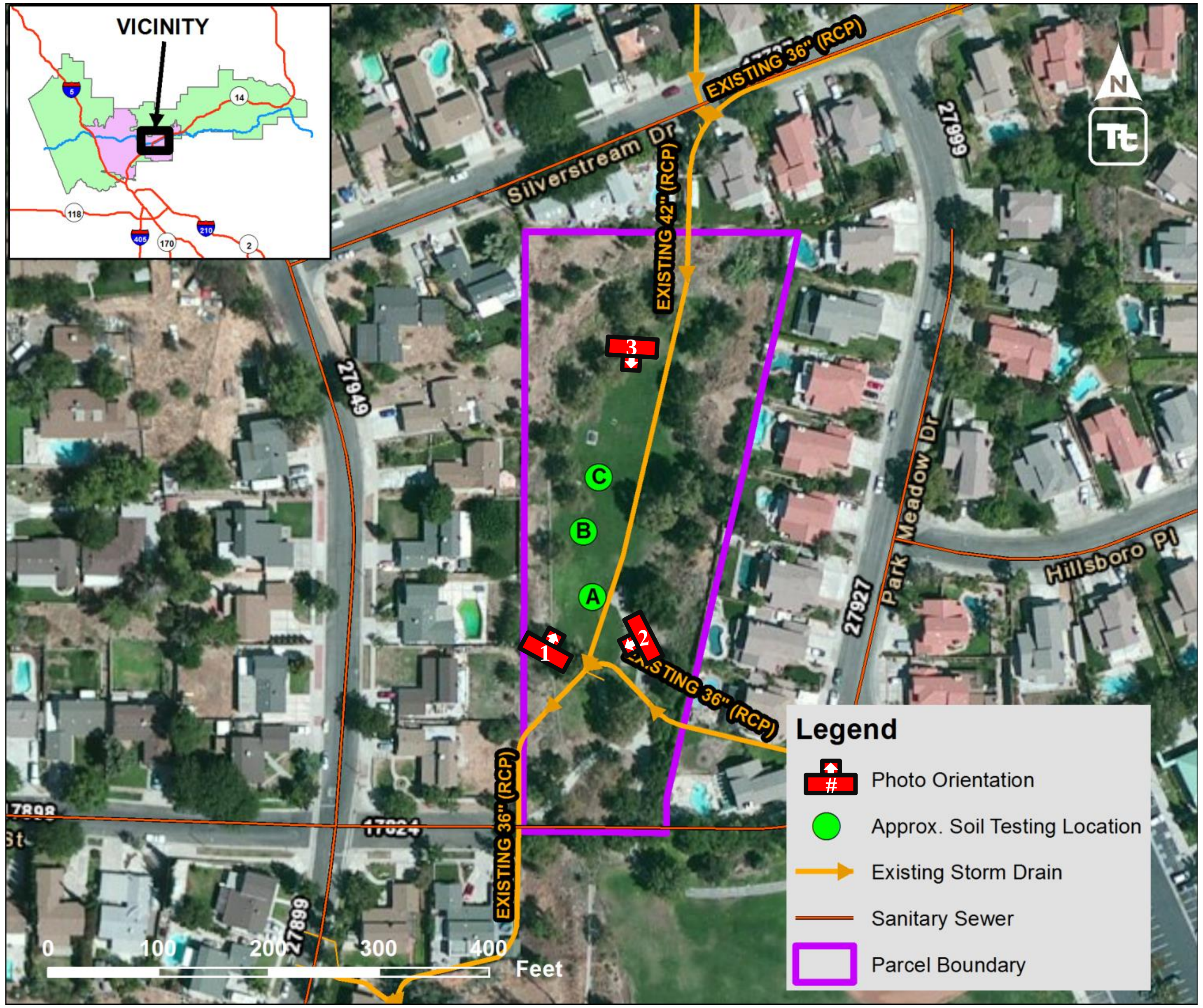
Bottom of borehole at 5.0 feet.

ENVIRONMENTAL BH - GINT STD US LAB.GDT - 6/8/15 17:21 - V:\OTHER CLIENTS\CITY OF SANTA CLARITA\BORINGS - REVISED.GPJ

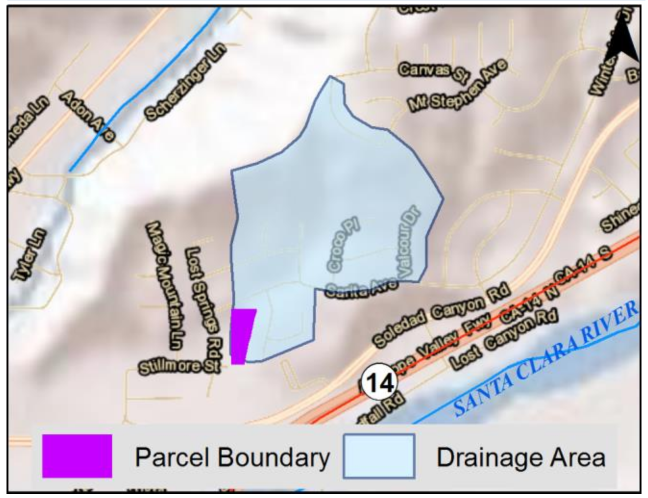
SITE 25 – CANYON COUNTRY PARK

PARCEL OWNER: CITY OF SANTA CLARITA

EXISTING SITE CONDITIONS AND SOIL TESTING LOCATIONS



DRAINAGE AREA



SYNOPSIS AND PARCEL DESCRIPTION

Runoff will be captured in a subsurface cistern or infiltration chamber from two storm drains that currently traverse the parcel. This project has potential to augment local water supply both through groundwater recharge or storage and use for onsite irrigation.

LOCATION	CITY OF SANTA CLARITA
ASSESSOR'S IDENTIFICATION NUMBERS	2844013901, 2844013900
LATITUDE, LONGITUDE	34.419385, -118.443521

DRAINAGE AREA CHARACTERIZATION		PARCEL SCREENING AND PRIORITIZATION	
DRAINAGE AREA, acres	77	PARCEL AREA, acres	2
TOTAL IMPERVIOUS, %	26	PARCEL AREA LESS THAN 10% SLOPE	95%
IMPERVIOUS DRAINAGE AREA, acres	20	PROXIMITY TO MAJOR STORM DRAIN, ft	< 100
HYDROLOGIC SOIL GROUP (SSURGO)	B	PROXIMITY TO SOIL CONTAMINATION, ft	> 500
REQUIRED DESIGN STORM TREATMENT CAPACITY, ac-ft	3.3	DEPTH TO GROUNDWATER, ft	10-20
EWMP SUBWATERSHEDS TREATED	421373	FIELD-MEASURED COMPOSITE SOIL INFILTRATION RATE, in/hr	3.5

PRIORITIZATION SCORE:
91/100

SITE 25 – CANYON COUNTRY PARK

PARCEL OWNER: CITY OF SANTA CLARITA

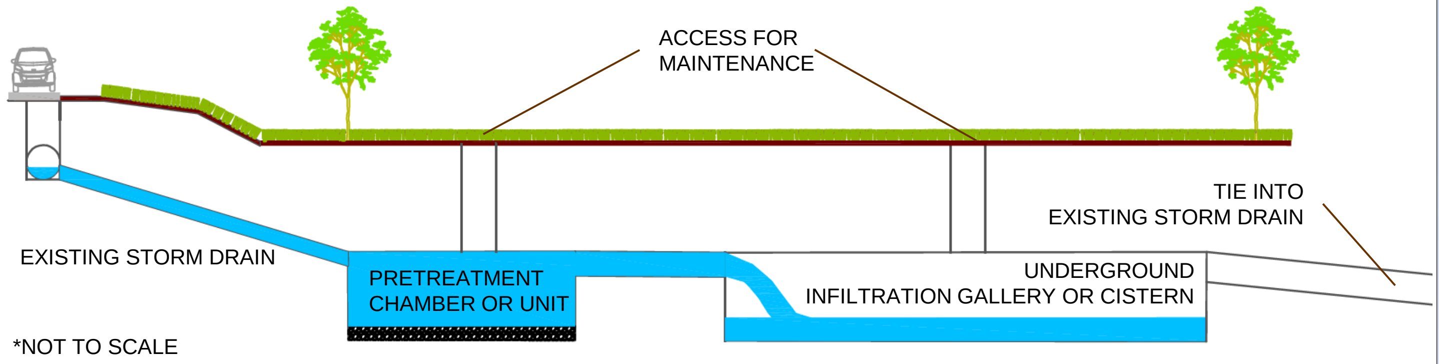
PROPOSED CONCEPTUAL SITE LAYOUT

PROJECT CHARACTERISTICS

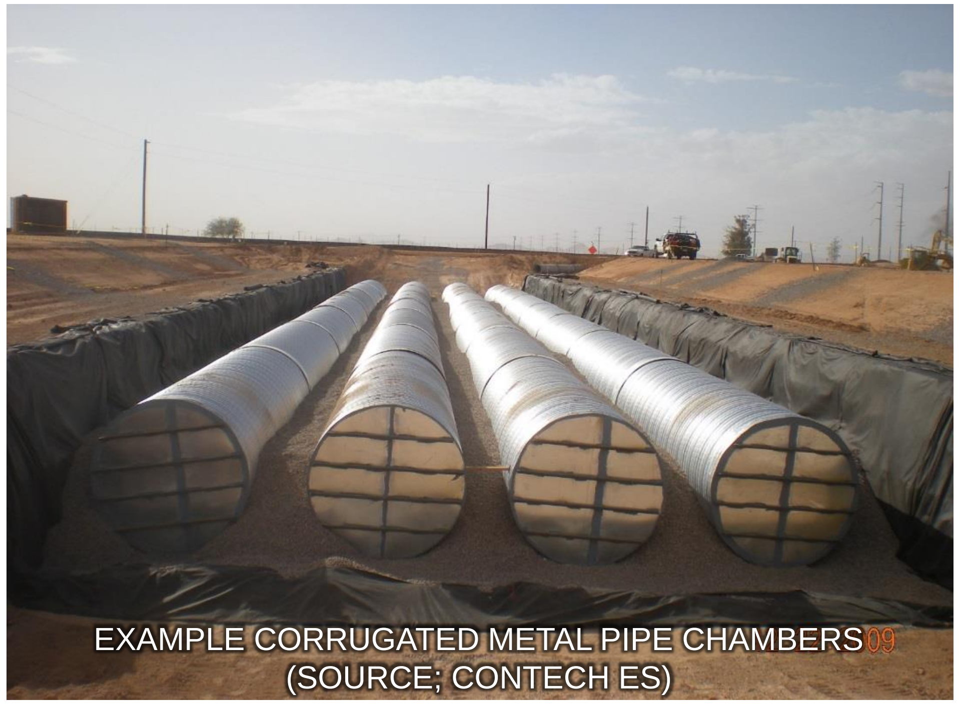
SUBSURFACE STORAGE FOOTPRINT, ft^2	30,780	**PROPOSED RETROFIT DESCRIPTION:** The proposed retrofit would divert runoff from existing 42-inch and 36-inch storm drains to an online chamber below Canyon Country Park. Pretreatment would be provided at each incoming storm drain to capture gross solids and reduce maintenance frequency. This conceptual design proposes a 2.8 acre-ft infiltration gallery or cistern to fully capture and treat the 85th percentile, 24-hour design storm event (accounting for infiltration during the storm event). Under the current permit interpretation, this would attain EWMP compliance for the entire tributary subwatershed and preclude construction of other BMPs upstream. Alternatively, the pipes could be daylighted and the existing park storm drain infrastructure could be retrofitted to create a surface infiltration basin during wet weather events.
SUBSURFACE PONDING DEPTH, ft	4.0	
STORAGE CAPACITY, ac-ft	2.8	
DIVERSION RATE (85TH PERCENTILE, 24-HR STORM PEAK DISCHARGE), cfs	8.0	
PLANNING-LEVEL ESTIMATED COST	$3,116,700	**POTENTIAL CONFLICTS:** Adjacent steep slopes, equipment ingress/egress, onsite electrical and irrigation lines, construction sequencing to minimize park disruptions, treatment infrastructure for onsite water use

COBENEFITS: Groundwater recharge, preservation of existing park functions, flood control benefits, potential source of irrigation water for park, trash capture

TYPICAL PROFILE (A-A)*



*NOT TO SCALE


EXAMPLE CORRUGATED METAL PIPE CHAMBERS (SOURCE; CONTECH ES)


EXAMPLE PRECAST CONCRETE CHAMBERS (SOURCE; CITY OF LOS ANGELES)

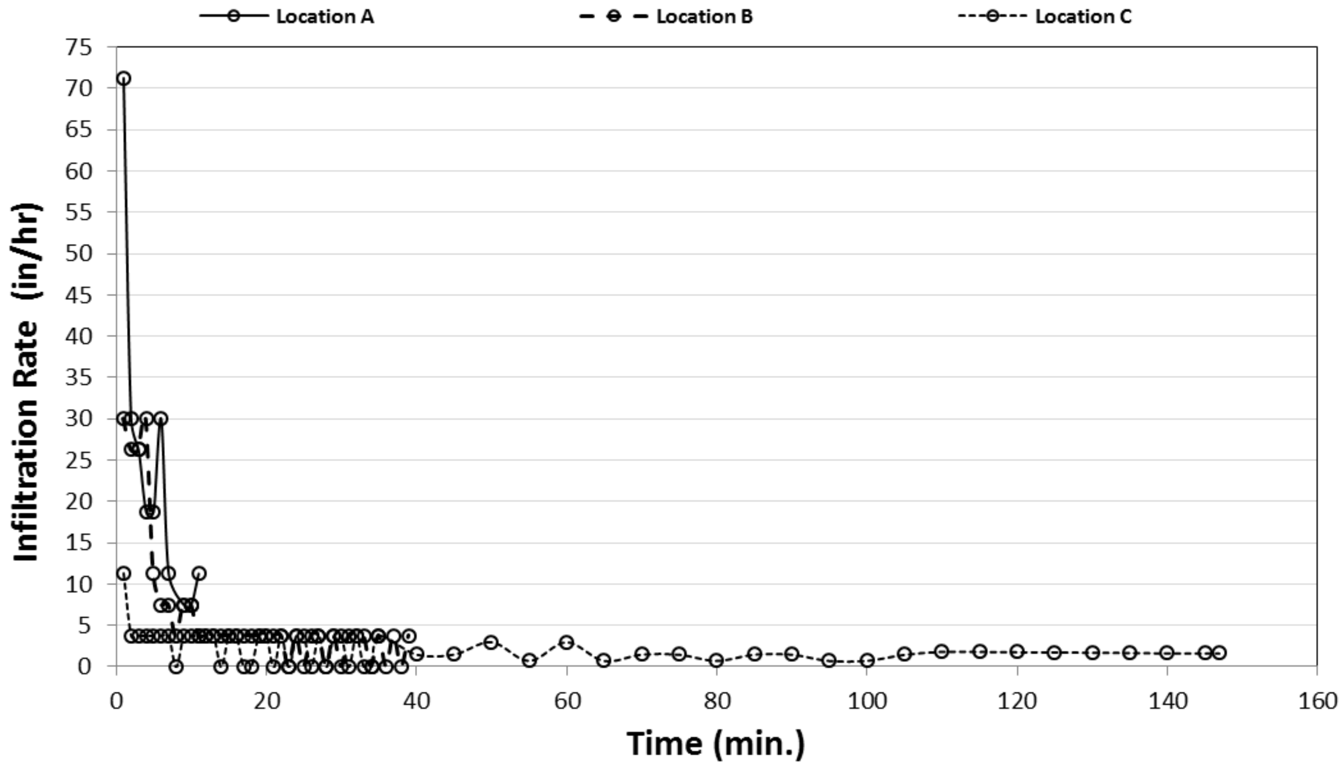

EXAMPLE MODULAR PLASTIC STORAGE UNIT CHAMBER

PLANNING-LEVEL COST ESTIMATE*

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Preparation				
1	Temporary Construction Fence	1,000	LF	$2.50	$2,500.00
2	Silt Fence	1,000	LF	$3.00	$3,000.00
	Site Preparation				
3	Excavation and Removal	6,840	CY	$45.00	$307,800.00
	Structures				
4	Pretreatment	2	EA	$46,000.00	$92,000.00
5	Structural Layer (washed no 57 or no 2 stone)	1,140	CY	$50.00	$57,000.00
6	Utility Conflicts	1	LS	$10,000.00	$10,000.00
7	Connection to Underground Infiltration Basin	1	LS	$350.00	$350.00
8	Diversion Structure	1	EA	$8,000.00	$8,000.00
9	Gravity 30" RCP	230	LF	$140.00	$32,200.00
	Underground Storage				
10	Fine Grading	30,780	SF	$0.72	$22,162.00
11	Underground Chamber	4,560	CY	$270.00	$1,231,200.00
12	Maintenance/Observation Access to the Underground Infiltration Basin	5	EA	$5,000.00	$25,000.00
				CONSTRUCTION SUBTOTAL	$1,791,210.00
13	Bond (5% of subtotal)				$89,560.00
14	Mobilization (10% of subtotal)				$179,120.00
15	Construction Management (10% of subtotal)				$179,120.00
16	Construction contingency (20% of subtotal)				$358,240.00
				CONSTRUCTION TOTAL	$2,597,250.00
17	Design (10% of Construction Total)				$519,450.00
				TOTAL COST	**$3,116,700.00**

*COSTS ARE ORDER-OF-MAGNITUDE ESTIMATES BASED ON AVAILABLE DATA AND CONCEPTUAL LAYOUT. ACTUAL COSTS WILL VARY.

FIELD SOIL INFLTRATION RATE TEST RESULTS**



**PERFORMED WITH TURF TEC DOUBLE-RING INFILTROMETER AT A DEPTH OF APPROXIMATELY 1 FOOT BELOW EXISTING GROUND SURFACE

HAND AUGER SOIL INVESTIGATION LOG – TEST LOCATION B

Tetra Tech, Inc.
3475 E. Foothill Blvd.
Pasadena, CA 91107
Telephone: 626.351.4664
Fax: 626.351.5291

BORING NUMBER Testing Location 2 - Canyon Country Park

PAGE 1 OF 1

CLIENT County of Los Angeles
PROJECT NAME Upper Santa Clara River EWMP
PROJECT NUMBER 100-SDG-T31351
PROJECT LOCATION Santa Clarita, CA
DATE STARTED 4/1/15 **COMPLETED** 4/1/15
GROUND ELEVATION
HOLE SIZE 2.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY EN **CHECKED BY** EN
AT END OF DRILLING ---
NOTES Hand Augered to 2 ft bgs.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0.0				▨	LEAN CLAY WITH SAND (CL): 75% CLAY, 15% sand, 10% gravel, moist to dry, medium dense, low plasticity, maximum gravel size 1.5". Hit refusal (boulders) at first location at 1.5 ft bgs. Hit refusal (boulders) at second location at 2 ft bgs.	
				2.0	Bottom of borehole at 2.0 feet.	

ENVIRONMENTAL BH - GINT STD US LAB.GDT - 6/8/15 17:21 - V:\OTHER CLIENTS\CITY OF SANTA CLARITA\BORINGS - REVISED.GPJ

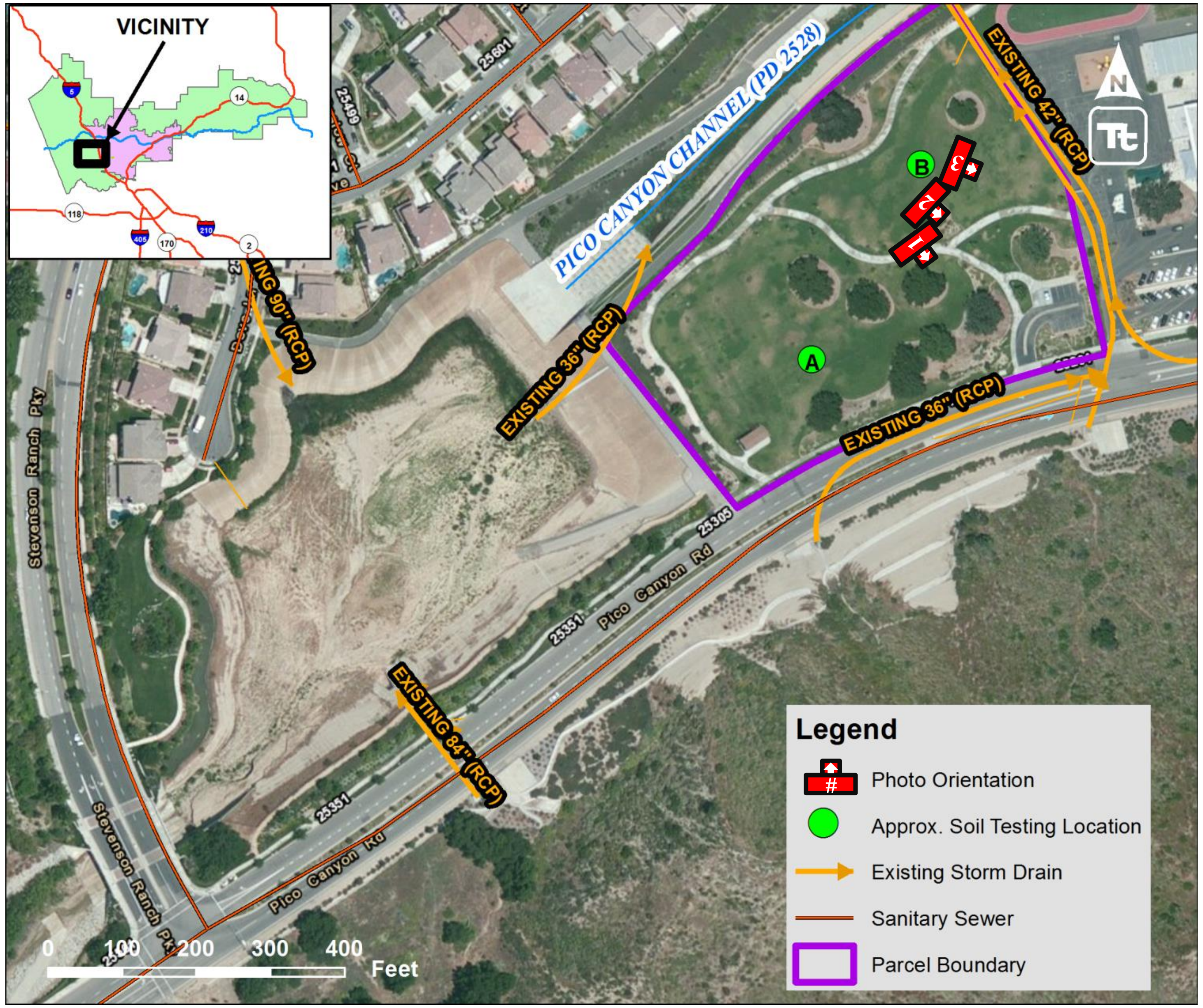
SITE 25 – CANYON COUNTRY PARK

PARCEL OWNER: CITY OF SANTA CLARITA

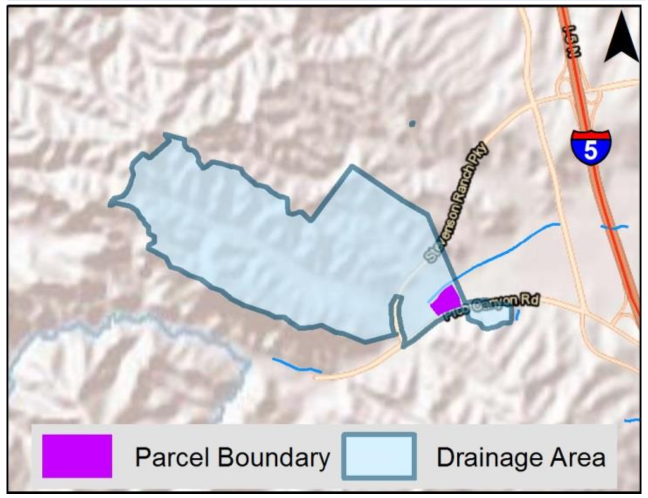
SITE 26 – JAKE KUREDJIAN PARK

PARCEL OWNER: LOS ANGELES COUNTY

EXISTING SITE CONDITIONS AND SOIL TESTING LOCATIONS



DRAINAGE AREA



SYNOPSIS AND PARCEL DESCRIPTION

Runoff will be directed to a subsurface cistern or infiltration chamber from multiple existing storm drains. This project has potential to augment local water supply both through groundwater recharge or storage and use for onsite irrigation.

LOCATION	UNINCORPORATED
ASSESSOR'S IDENTIFICATION NUMBERS	2826160901
LATITUDE, LONGITUDE	34.3814, -118.5808

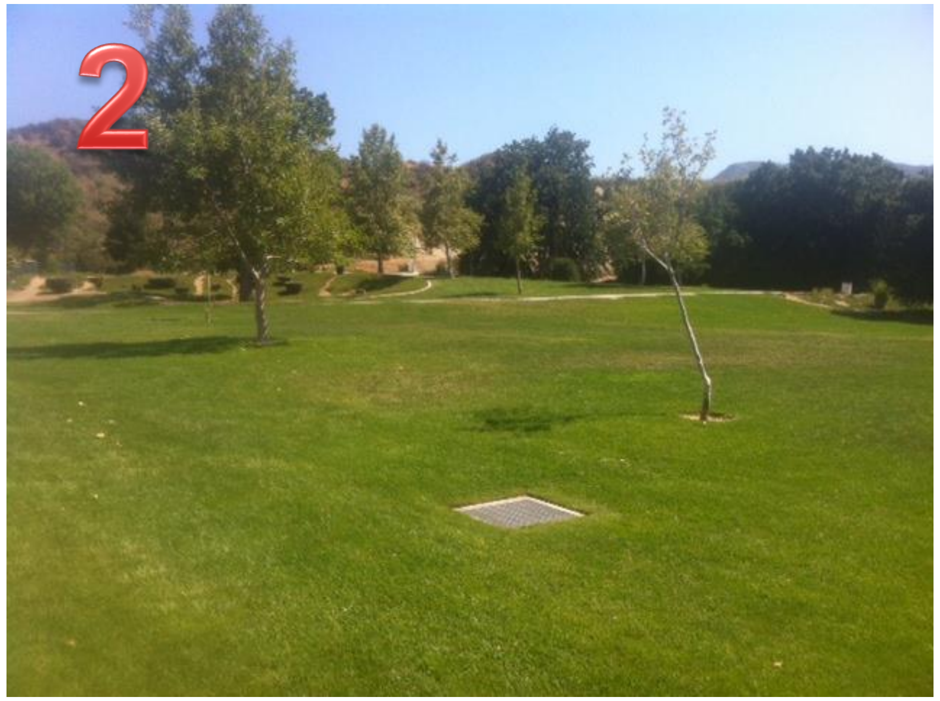
DRAINAGE AREA CHARACTERIZATION

DRAINAGE AREA, acres	438
TOTAL IMPERVIOUS, %	30
IMPERVIOUS DRAINAGE AREA, acres	131
HYDROLOGIC SOIL GROUP (SSURGO)	B
REQUIRED REGIONAL BACTERIA TREATMENT CAPACITY, ac-ft	8
EWMP SUBWATERSHEDS TREATED	414183 414283

PARCEL SCREENING AND PRIORITIZATION

PARCEL AREA, acres	6
PARCEL AREA LESS THAN 10% SLOPE	<95%
PROXIMITY TO MAJOR STORM DRAIN, ft	100 >, <250
PROXIMITY TO SOIL CONTAMINATION, ft	> 500
DEPTH TO GROUNDWATER, ft	>20
FIELD-MEASURED COMPOSITE SOIL INFILTRATION RATE, in/hr	1.1

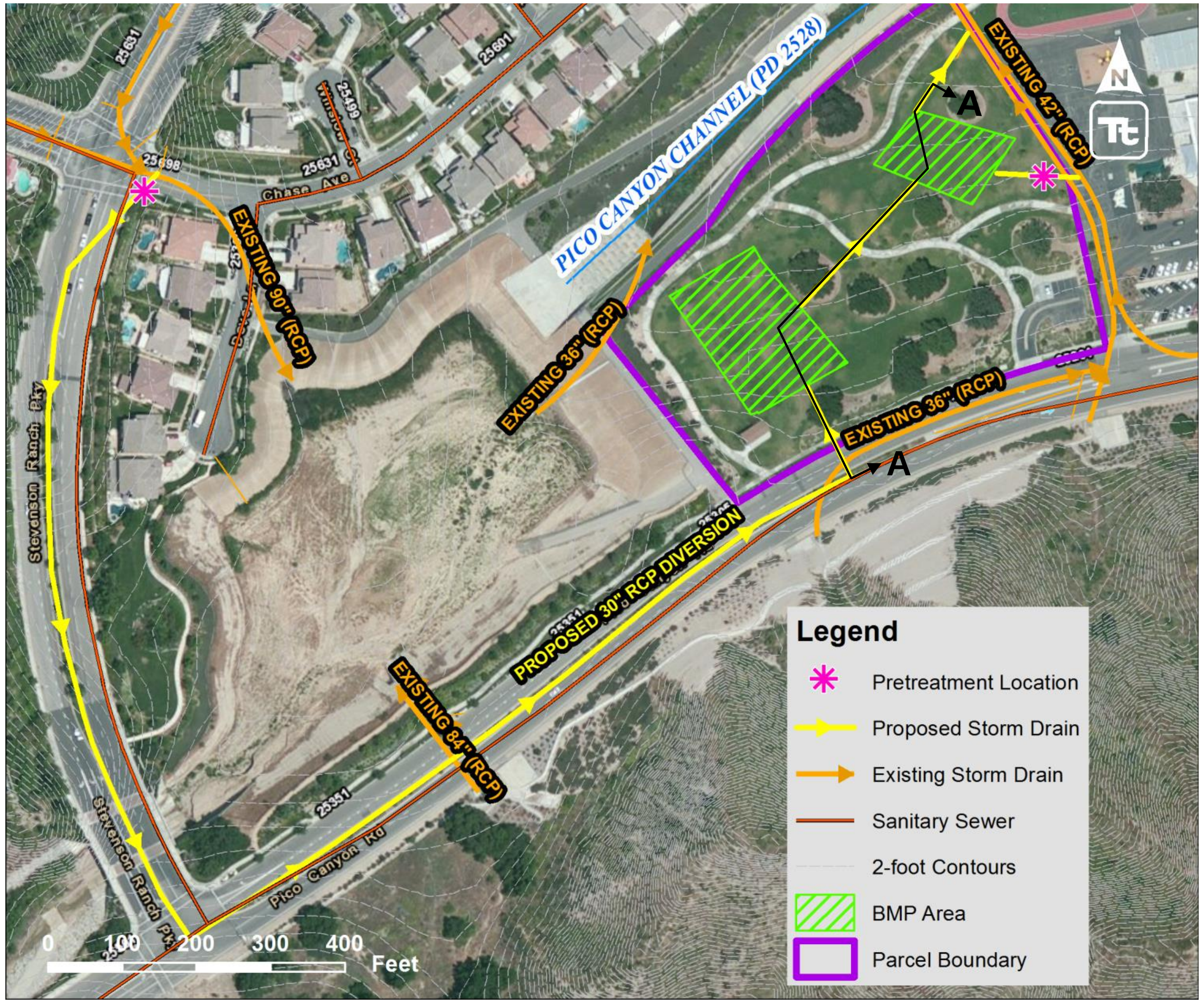
PRIORITIZATION SCORE:
92/100



SITE 26 – JAKE KUREDJIAN PARK

PARCEL OWNER: LOS ANGELES COUNTY

PROPOSED CONCEPTUAL SITE LAYOUT



PROJECT CHARACTERISTICS

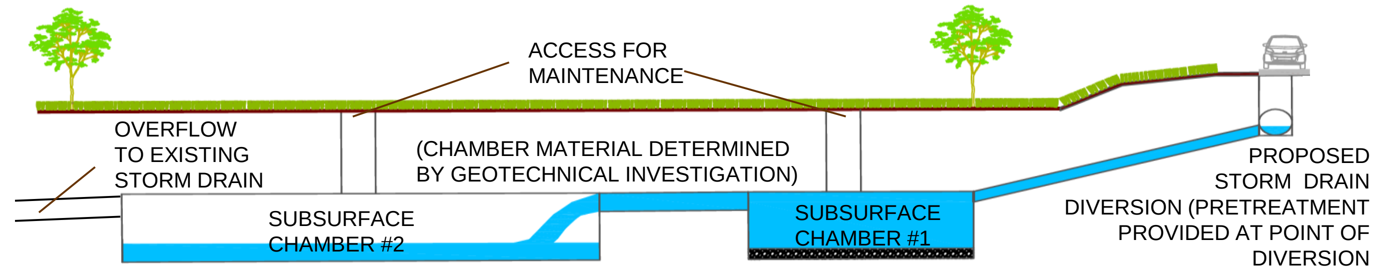
SUBSURFACE STORAGE FOOTPRINT, ft^2	38,720
SUBSURFACE PONDING DEPTH, ft	9.0
STORAGE CAPACITY, ac-ft	8.0
DIVERSION RATE (85TH PERCENTILE, 24-HR STORM PEAK DISCHARGE), cfs	31.0
PLANNING-LEVEL ESTIMATED COST	$8,640,650

PROPOSED RETROFIT DESCRIPTION: The proposed project would involve installation of a subsurface cistern or infiltration gallery below Jake Kuredjian County Park. Runoff from developed land is diverted before encountering the existing flood control/debris basin such that it is not mixed with runoff from undeveloped land; alternatively, the existing basin could be retrofitted to retain comparable runoff volume. Pretreatment would be provided downstream from the points of diversion in locations accessible for maintenance. In addition, roadway runoff will be treated by green streets installed along Pico Canyon Road. This conceptual design proposes an 8 acre-ft infiltration gallery or cistern, which provides all required public and private regional BMP capacity specified in the EWMP for bacteria treatment in the contributing subwatersheds. Construction will be coordinated with planned playground improvements.

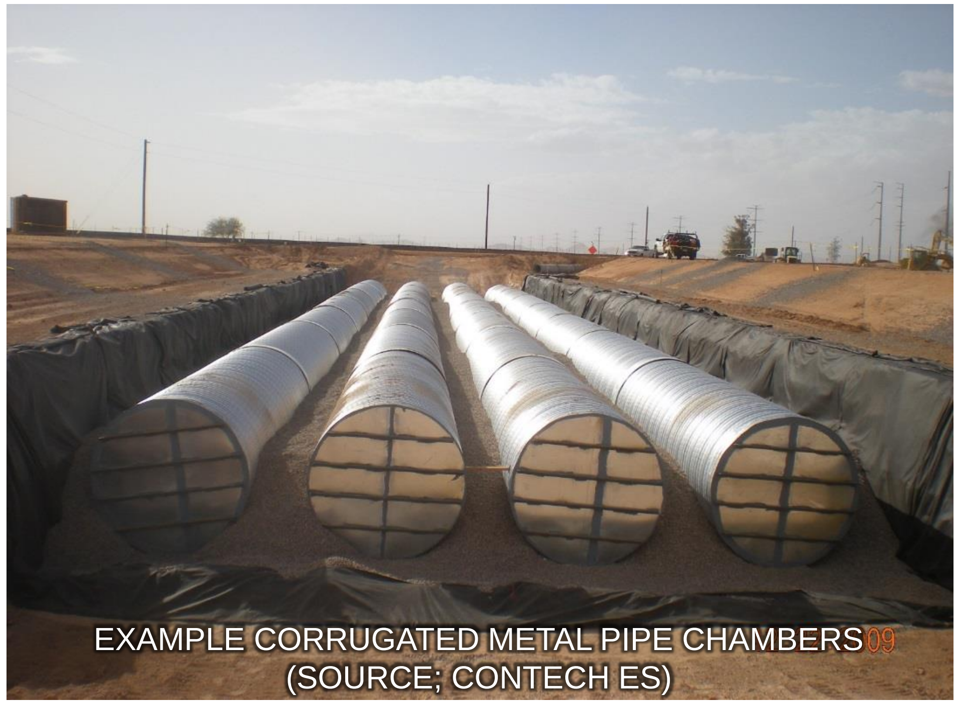
POTENTIAL CONFLICTS: Long diversion distance, existing sewer line, site irrigation and electrical, construction sequencing to minimize park disruptions, treatment infrastructure for onsite water use.

COBENEFITS: Groundwater recharge, preservation of existing park functions, flood control benefits, potential source of irrigation water for park, trash capture

TYPICAL PROFILE (A-A)*



*NOT TO SCALE



EXAMPLE CORRUGATED METAL PIPE CHAMBERS09
(SOURCE; CONTECH ES)

EXAMPLE PRECAST CONCRETE CHAMBERS
(SOURCE; CITY OF LOS ANGELES)

EXAMPLE MODULAR PLASTIC STORAGE UNIT CHAMBER

SITE 26 – JAKE KUREDJIAN PARK

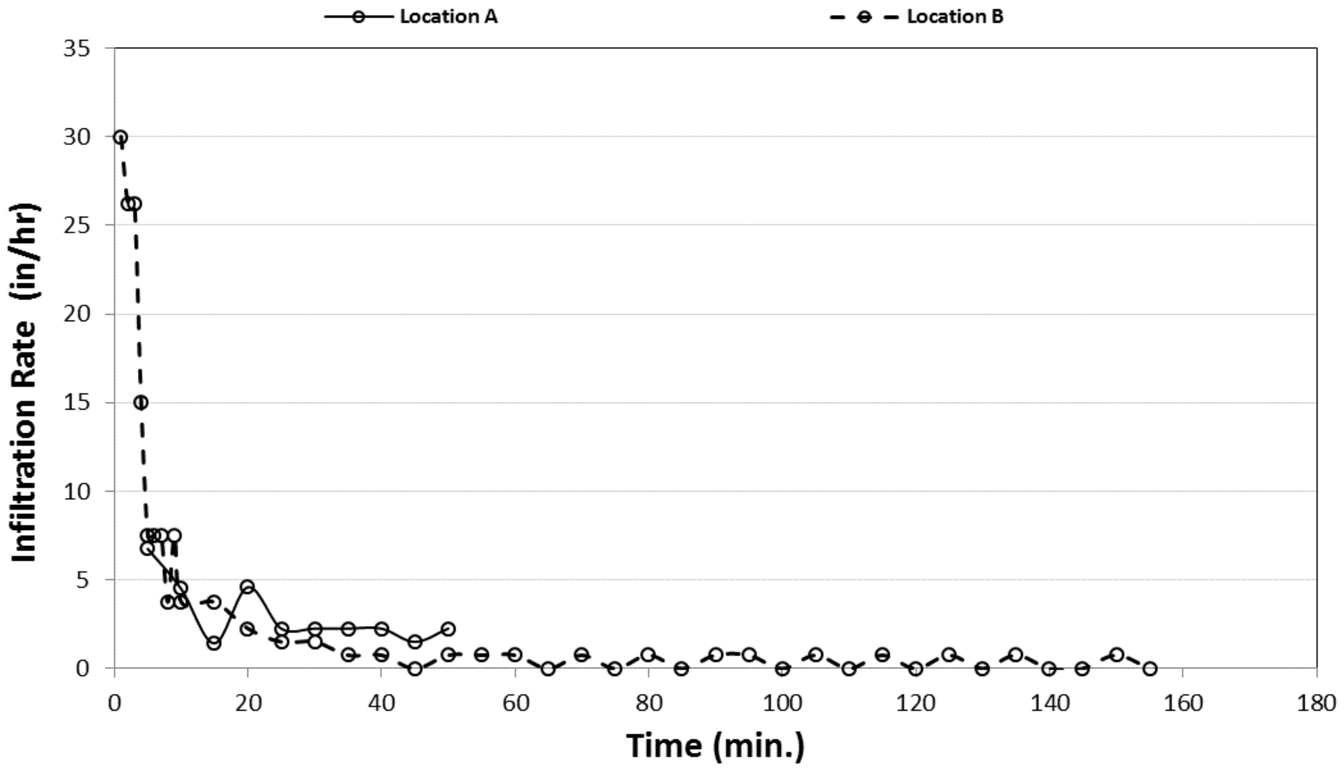
PARCEL OWNER: LOS ANGELES COUNTY

PLANNING-LEVEL COST ESTIMATE*

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Preparation				
1	Temporary Construction Fence	1,150	LF	$2.50	$2,875.00
2	Silt Fence	1,150	LF	$3.00	$3,450.00
	Site Preparation				
3	Excavation and Removal	16,492	CY	$45.00	$742,140.00
	Structures				
4	Pretreatment	2	EA	$105,000	$210,000.00
5	Structural Layer (washed no 57 or no 2 stone)	1,434	CY	$50.00	$71,700.00
6	Utility Conflicts	1	LS	$10,000.00	$10,000.00
7	Connection to Underground Infiltration Basin	1	LS	$350.00	$350.00
8	Diversion Structure	1	EA	$8,000.00	$8,000.00
9	Gravity 30" RCP	2,350	LF	$140.00	$329,000.00
	Underground Storage				
10	Fine Grading	38,720	SF	$0.72	$27,878.00
11	Underground Chamber	12,907	CY	$270.00	$3,484,797.00
12	Maintenance/Observation Access to the Underground Infiltration Basin	5	EA	$5,000.00	$25,000.00
				CONSTRUCTION SUBTOTAL	$4,965,890.00
13	Bond (5% of subtotal)				$248,290.00
14	Mobilization (10% of subtotal)				$496,590.00
15	Construction Management (10% of subtotal)				$496,590.00
16	Construction contingency (20% of subtotal)				$993,180.00
				CONSTRUCTION TOTAL	$7,200,540.00
17	Design (20% of Construction Total)				$1,440,110.00
				TOTAL COST	**$8,640,650.00**

*COSTS ARE ORDER-OF-MAGNITUDE ESTIMATES BASED ON AVAILABLE DATA AND CONCEPTUAL LAYOUT. ACTUAL COSTS WILL VARY.

FIELD SOIL INFLTRATION RATE TEST RESULTS**



**PERFORMED WITH TURF TEC DOUBLE-RING INFILTROMETER AT A DEPTH OF APPROXIMATELY 1 FOOT BELOW EXISTING GROUND SURFACE

HAND AUGER SOIL INVESTIGATION LOG – TEST LOCATION B

Tetra Tech, Inc.
3475 E. Foothill Blvd.
Pasadena, CA 91107
Telephone: 626.351.4664
Fax: 626.351.5291

BORING NUMBER Testing Location 2 - Jake Kuredjian Park

PAGE 1 OF 1

CLIENT County of Los Angeles
PROJECT NAME Upper Santa Clara River EWMP
PROJECT NUMBER 100-SDG-T31351
PROJECT LOCATION Santa Clarita, CA
DATE STARTED 5/27/15 **COMPLETED** 5/27/15
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY EN **CHECKED BY** EN
AT END OF DRILLING ---
NOTES Hand Augered to 3.5 ft bgs.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0.0					WELL-GRADED SAND WITH GRAVEL (SW): 60% fine to coarse grained sand, 40% fine to coarse grained gravel, moist to dry, very dense, no odor, no staining, trace silt, yellowish brown.	
2.5						
				3.5		

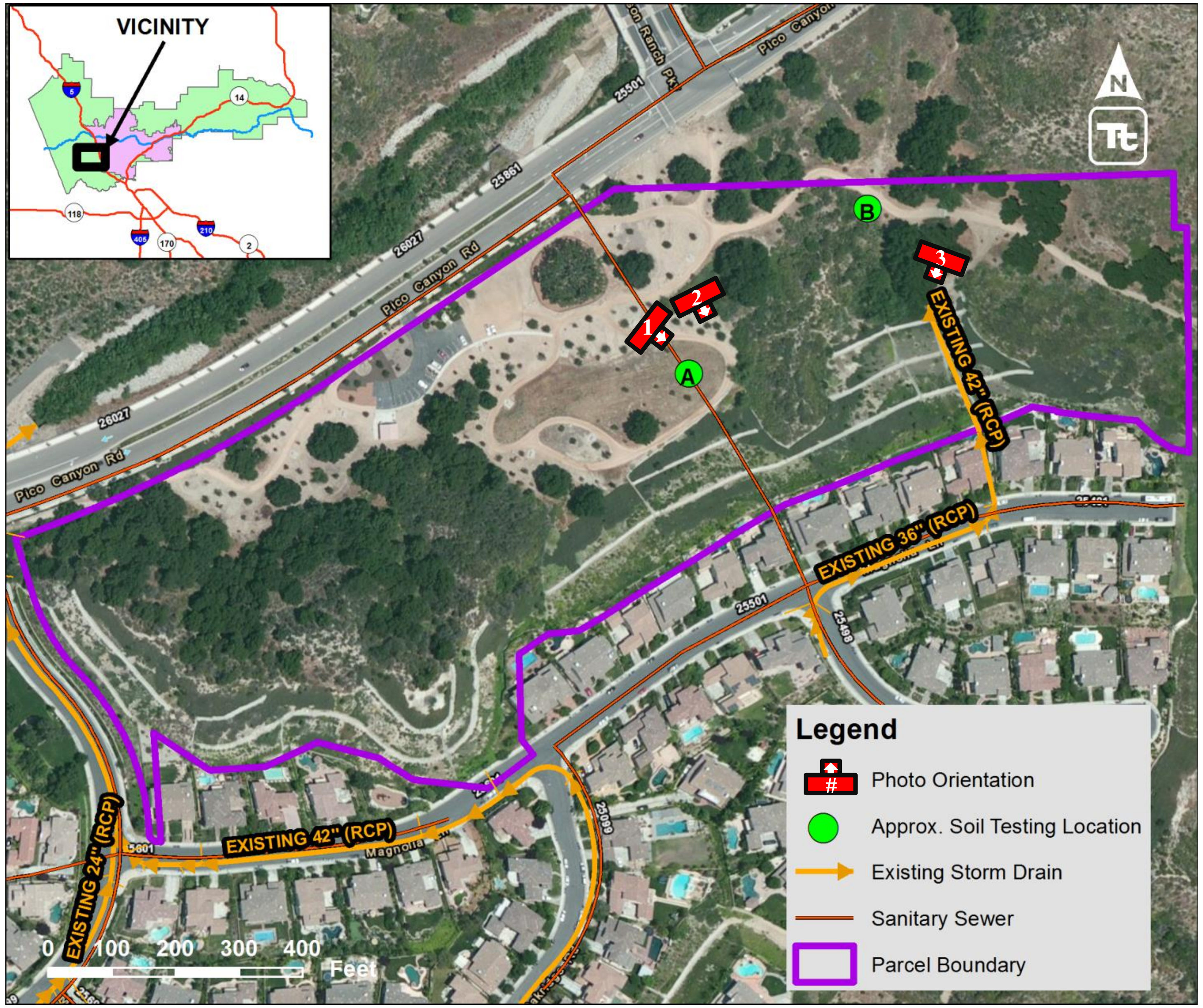
Boulders at 3.5' ft bgs
Bottom of borehole at 3.5 feet.

ENVIRONMENTAL BH - GINT STD US LAB.GDT - 6/8/15 17:21 - V:\OTHER CLIENTS\CITY OF SANTA CLARITA\BORINGS - REVISED.GPJ

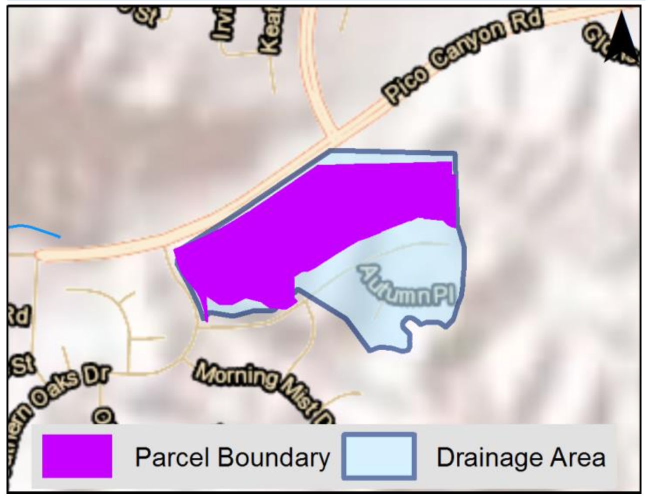
SITE 26 – PICO CANYON PARK

PARCEL OWNER: LOS ANGELES COUNTY

EXISTING SITE CONDITIONS AND SOIL TESTING LOCATIONS



DRAINAGE AREA



SYNOPSIS AND PARCEL DESCRIPTION

Runoff will be treated by “naturalized” bioretention areas incorporated into the existing park. In addition to water quality benefits, this retrofit could provide public outreach benefits and would be an ideal volunteer project.

LOCATION	UNINCORPORATED
ASSESSOR’S IDENTIFICATION NUMBERS	2826119900
LATITUDE, LONGITUDE	34.377543, -118.584186

DRAINAGE AREA CHARACTERIZATION

DRAINAGE AREA, acres	38
TOTAL IMPERVIOUS, %	15
IMPERVIOUS DRAINAGE AREA, acres	5.7
HYDROLOGIC SOIL GROUP (SSURGO)	C
REQUIRED DESIGN STORM TREATMENT CAPACITY, ac-ft	0.64
EWMP SUBWATERSHEDS TREATED	414283

PARCEL SCREENING AND PRIORITIZATION

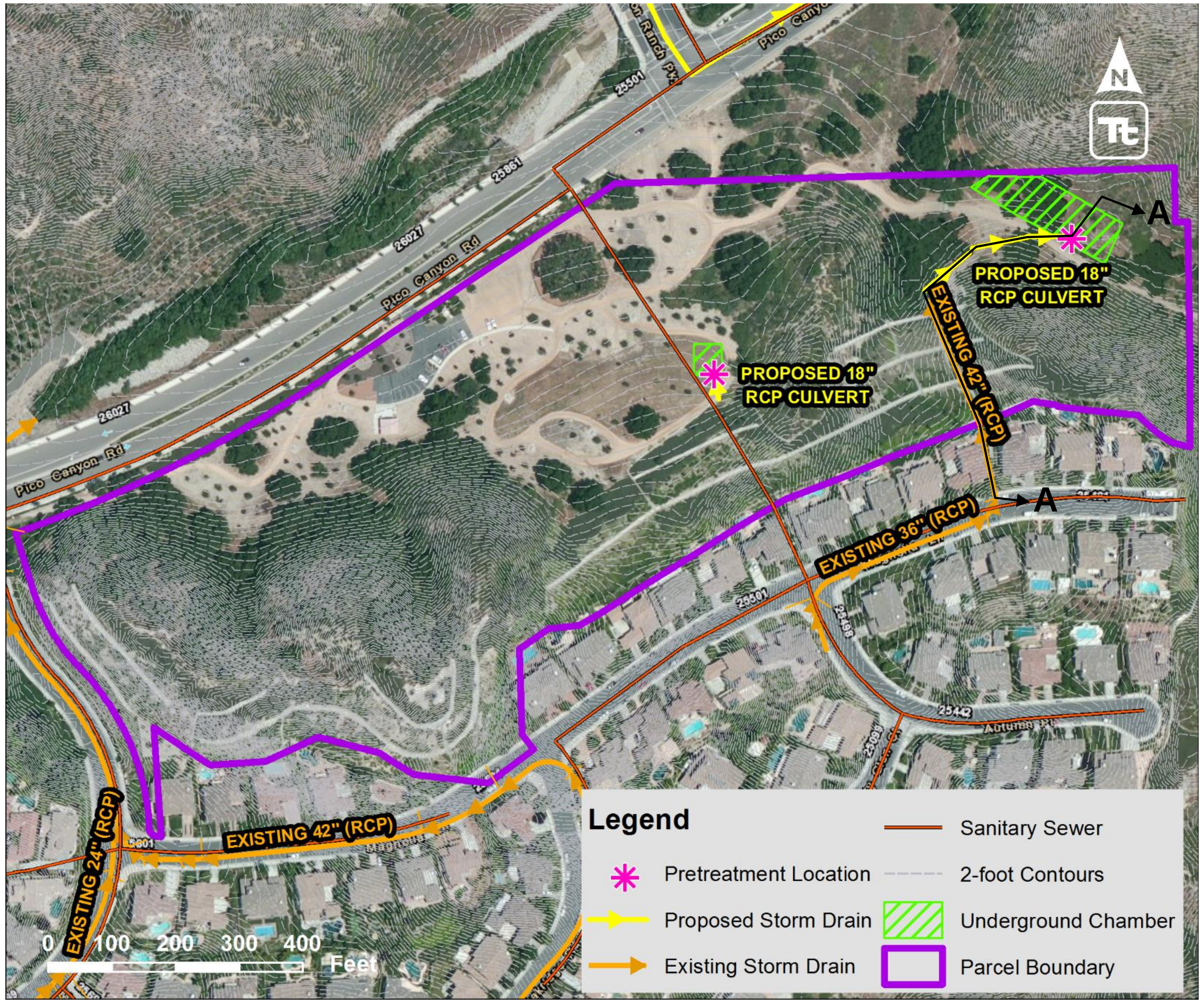
PARCEL AREA, acres	21
PARCEL AREA LESS THAN 10% SLOPE	<65%
PROXIMITY TO MAJOR STORM DRAIN, ft	< 100
PROXIMITY TO SOIL CONTAMINATION, ft	> 500
DEPTH TO GROUNDWATER, ft	>20
FIELD-MEASURED COMPOSITE SOIL INFILTRATION RATE, in/hr	28

PRIORITIZATION SCORE:
83/100

SITE 26 – PICO CANYON PARK

PARCEL OWNER: LOS ANGELES COUNTY

PROPOSED CONCEPTUAL SITE LAYOUT



PROJECT CHARACTERISTICS

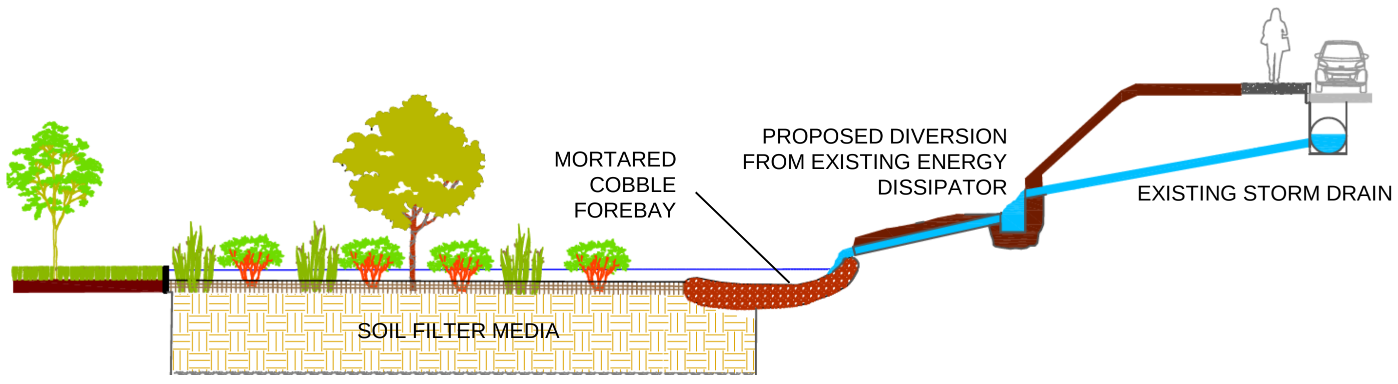
BIORETENTION FOOTPRINT, ft^2	12,000
SURFACE PONDING DEPTH ,ft	1.5
SOIL MEDIA DEPTH, ft	2.0
STORAGE CAPACITY (SURFACE PONDING + SOIL PORE SPACE), ac-ft	0.6
DIVERSION RATE (85TH PERCENTILE, 24-HR STORM PEAK DISCHARGE), cfs	1.3
PLANNING-LEVEL ESTIMATED COST	$930,330

PROPOSED RETROFIT DESCRIPTION: The proposed retrofit would install 0.6 ac-ft of bioretention to fully capture and treat the 85th percentile, 24-hour design storm event (accounting for infiltration). One bioretention area would be sited in the existing meadow and treat runoff from adjacent slope drains. A second bioretention area would treat runoff from the upslope development by diverting flow from an existing energy dissipation structure. Pretreatment for sediment is provided by cobbled forebays. BMP locations were selected to minimize disturbance to existing habitat and would be planted with native species to mimic the surrounding oak savannah. This design would attain EWMP compliance for the tributary drain area and preclude construction of other BMPs upstream.

POTENTIAL CONFLICTS: Existing sewer line, site irrigation lines, construction sequencing to minimize park disruptions, offsite flow

COBENEFITS: Public education, groundwater recharge, enhancement of existing park functions, trash capture

TYPICAL PROFILE (A-A)*



*NOT TO SCALE

EXAMPLE BIORETENTION AREA WITH DROUGHT-TOLERANT PLANTINGS

EXAMPLE “SAVANNAH-LIKE” BIORETENTION AREA

EXAMPLE MORTARED COBBLE BIORETENTION INLET FOR ENERGY DISSIPATION AND PRETREATMENT

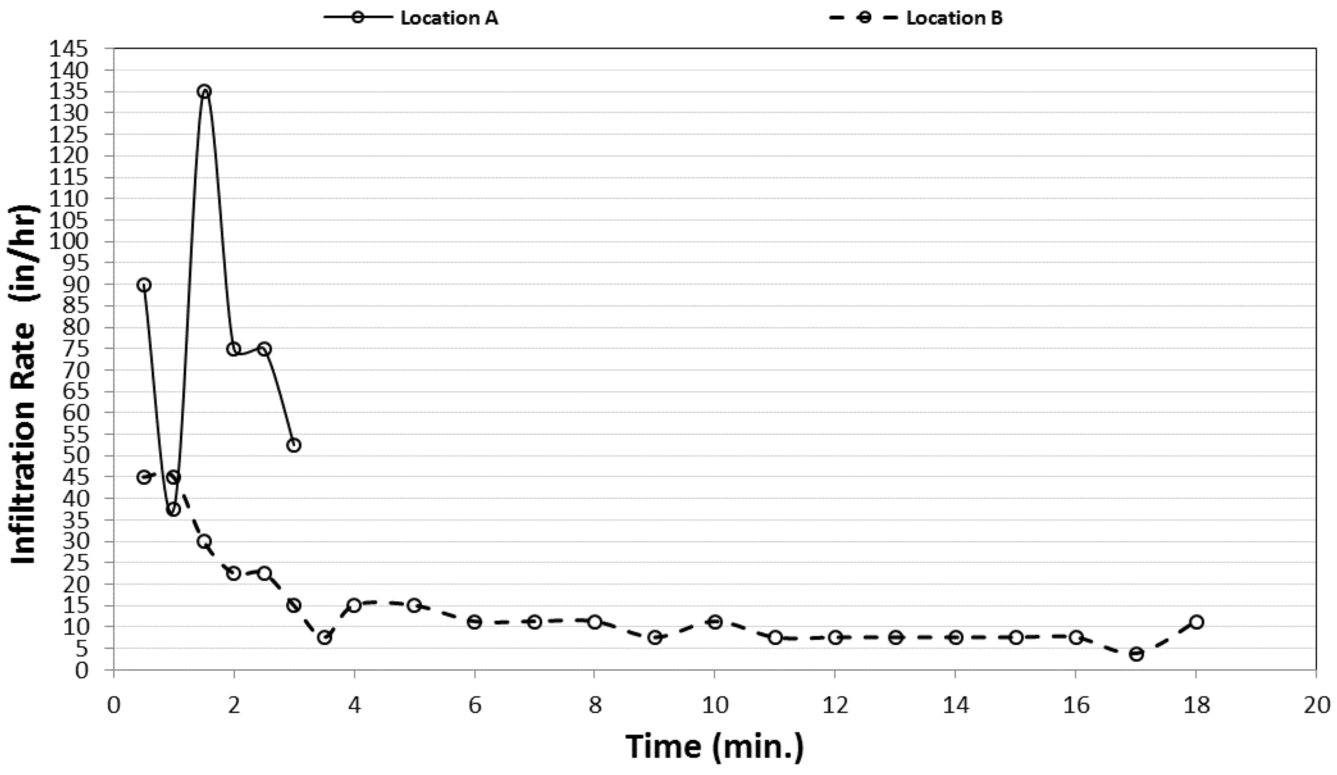
SITE 26 – PICO CANYON PARK
PARCEL OWNER: LOS ANGELES COUNTY

PLANNING-LEVEL COST ESTIMATE*

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Preparation				
1	Temporary Construction Fence	1,300	LF	$2.50	$3,250.00
2	Silt Fence	1,300	LF	$3.00	$3,900.00
	Site Preparation				
3	Clearing and Grubbing	12,000	SF	$0.46	$5,520.00
4	Excavation and Removal	2,222	CY	$45.00	$99,990.00
5	Remove and Replace Sidewalk	200	SF	$7.20	$1,440.00
	Structures				
6	Fine Grading	12,000	SF	$0.72	$8,640.00
7	Mortared Cobble Energy Dissipater	40	SF	$2.25	$90.00
8	Soil Media	889	CY	$45.00	$40,000.00
9	Vegetation	12,000	SF	$4.00	$48,000.00
10	Mulch	111	CY	$55.00	$6,111.00
11	18" RCP Culvert	270	LF	$130.00	$35,100.00
12	Retrofit Existing Energy Dissipation Structure	1	LS	$350.00	$350.00
13	Diversion Structure	1	LS	$8,000.00	$8,000.00
14	2-Year Plant Establishment and Maintenance Program	1	LS	$172,900.00	$172,900.00
15	Educational Signage	1	LS	$25,000.00	$25,000.00
		CONSTRUCTION SUBTOTAL			$458,290.00
16	Bond (5% of subtotal)				$22,910.00
17	Mobilization (10% of subtotal)				$45,830.00
18	Construction Management (10% of subtotal)				$45,830.00
19	Construction contingency (20% of subtotal)				$91,660.00
		CONSTRUCTION TOTAL			$664,520.00
20	Design (40% of Construction Total)				$265,810.00
		TOTAL COST			**$930,330.00**

*COSTS ARE ORDER-OF-MAGNITUDE ESTIMATES BASED ON AVAILABLE DATA AND CONCEPTUAL LAYOUT. ACTUAL COSTS WILL VARY.

FIELD SOIL INFLTRATION RATE TEST RESULTS**



**PERFORMED WITH TURF TEC DOUBLE-RING INFILTROMETER AT A DEPTH OF APPROXIMATELY 1 FOOT BELOW EXISTING GROUND SURFACE

HAND AUGER SOIL INVESTIGATION LOG – TEST LOCATION B

Tetra Tech, Inc.
3475 E. Foothill Blvd.
Pasadena, CA 91107
Telephone: 626.351.4664
Fax: 626.351.5291

BORING NUMBER Testing Location 2 - Pico Canyon Park

PAGE 1 OF 1

CLIENT County of Los Angeles

PROJECT NAME Upper Santa Clara River EWMP

PROJECT NUMBER 100-SDG-T31351

PROJECT LOCATION Santa Clarita, CA

DATE STARTED 5/28/15 **COMPLETED** 5/28/15

GROUND ELEVATION **HOLE SIZE** 2.25 inches

DRILLING CONTRACTOR

GROUND WATER LEVELS:

DRILLING METHOD

AT TIME OF DRILLING ---

LOGGED BY EN **CHECKED BY** EN

AT END OF DRILLING ---

NOTES Hand Augered to 5 ft bgs.

AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0.0					SILT WITH SAND (ML): 70% silt, 25% fine to coarse sand, 5% fine grain gravel, moist to dry, non-plastic, medium dense, no odor, no staining.	
2.5						
5.0					5.0	

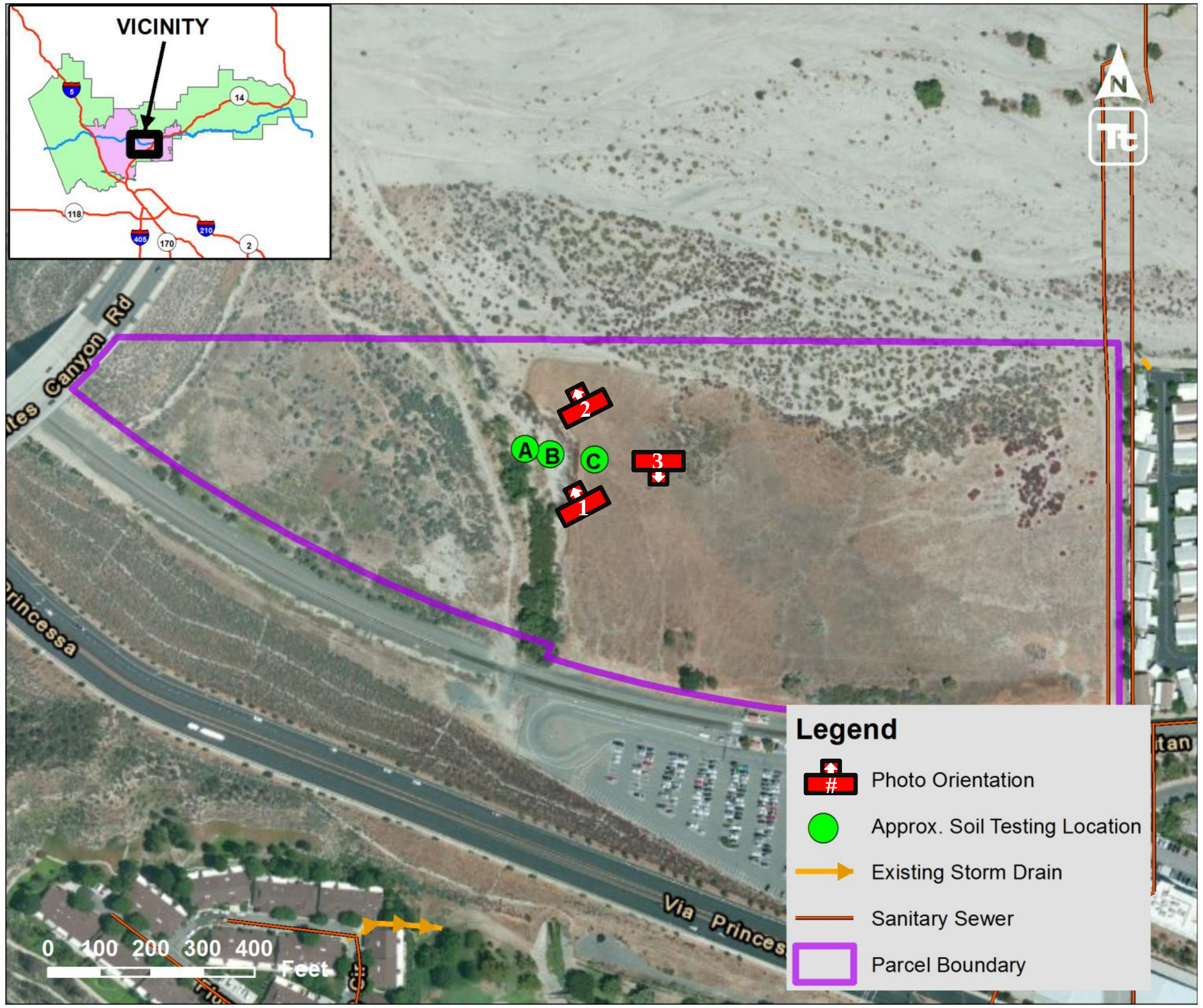
Bottom of borehole at 5.0 feet.

ENVIRONMENTAL BH - GINT STD US LAB.GDT - 6/8/15 17:21 - V:\OTHER CLIENTS\CITY OF SANTA CLARITA\BORINGS - REVISED.GPJ

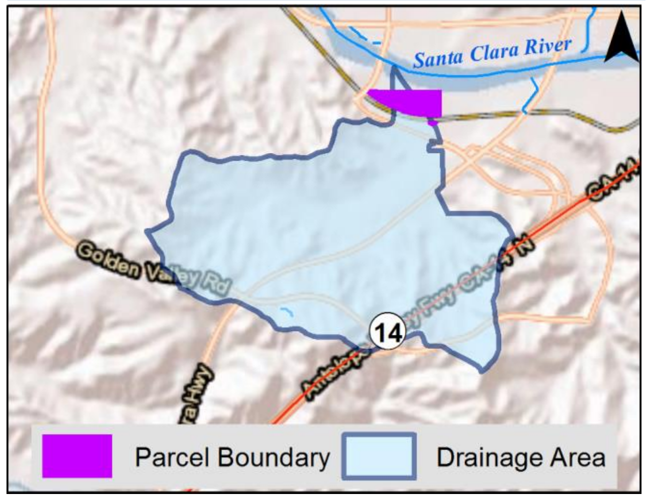
SITE X – SANTA CLARA RIVER FLOODPLAIN

PARCEL OWNER: LOS ANGELES COUNTY

EXISTING SITE CONDITIONS AND SOIL TESTING LOCATIONS



DRAINAGE AREA



SYNOPSIS AND PARCEL DESCRIPTION

Runoff from an existing concrete channel will be diverted to an infiltrating wetland basin along the bank of the Santa Clara River. This project was the potential to augment local water supply and provide opportunities for public education and recreation.

LOCATION	CITY OF SANTA CLARITA
ASSESSOR'S IDENTIFICATION NUMBERS	2836002922, 2836002907, 2864003919
LATITUDE, LONGITUDE	34.4097, -118.4708

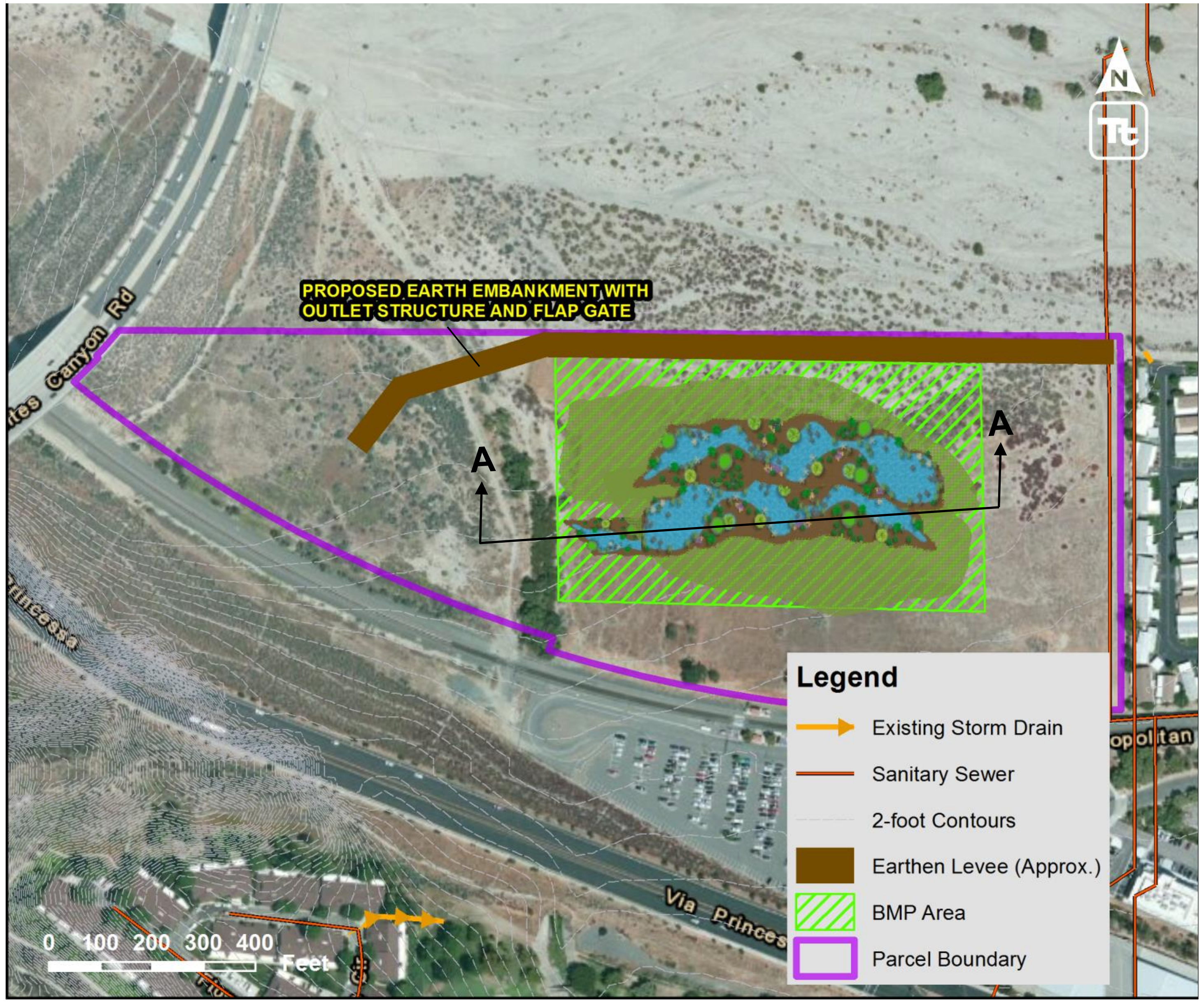
DRAINAGE AREA CHARACTERIZATION		PARCEL SCREENING AND PRIORITIZATION	
DRAINAGE AREA, acres	982	PARCEL AREA, acres	27
TOTAL IMPERVIOUS, %	20	PARCEL AREA LESS THAN 10% SLOPE	100%
IMPERVIOUS DRAINAGE AREA, acres	196	PROXIMITY TO MAJOR STORM DRAIN, ft	<100
HYDROLOGIC SOIL GROUP (SSURGO)	B	PROXIMITY TO SOIL CONTAMINATION, ft	>500
REQUIRED DESIGN STORM TREATMENT CAPACITY, ac-ft	22.8	DEPTH TO GROUNDWATER, ft	10-20
EWMP SUBWATERSHEDS TREATED	419973	FIELD-MEASURED COMPOSITE SOIL INFILTRATION RATE, in/hr	260

PRIORITIZATION SCORE:
92/100

SITE X – SANTA CLARA RIVER FLOODPLAIN

PARCEL OWNER: LOS ANGELES COUNTY

PROPOSED CONCEPTUAL SITE LAYOUT

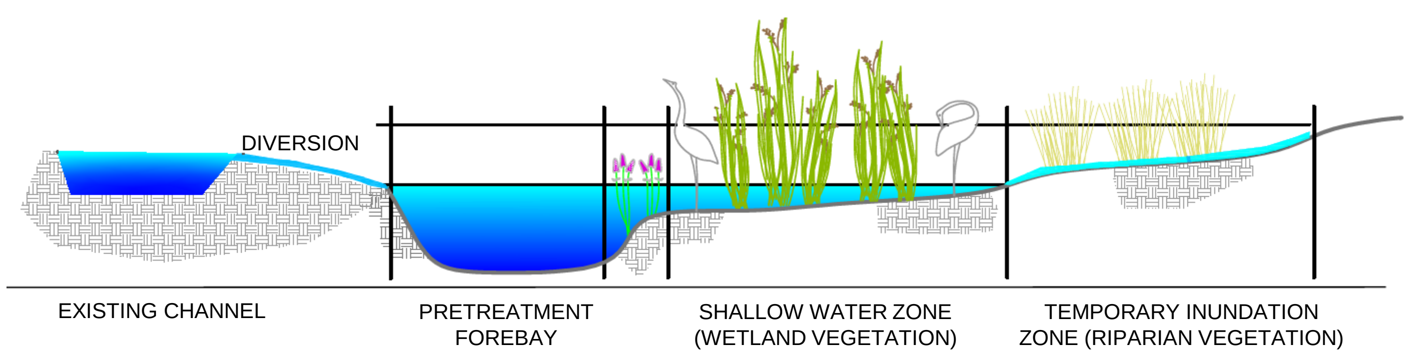


PROJECT CHARACTERISTICS

BASIN FOOTPRINT, ft^2	390,600	**PROPOSED RETROFIT DESCRIPTION:** The proposed retrofit would install an infiltration basin with wetland features in an undeveloped parcel adjacent to the Santa Clara River. This conceptual design proposes an 18 acre-ft basin to fully capture and treat the 85th percentile, 24-hour design storm event from an existing concrete channel (accounting for infiltration). A pretreatment forebay would capture gross solids and reduce maintenance frequency. The meandering pattern of deep pools and shallow water zones creates habitat and allows infiltration between wet weather events. This design would attain EWMP compliance for the entire tributary subwatershed and preclude construction of other BMPs upstream. Alternatively, runoff could be diverted into subsurface infiltration galleries installed below the existing ground surface. **NOTE: Detailed geotechnical and flood analyses are required to confirm the suitability of a project adjacent to the floodplain.**
MAXIMUM SURFACE PONDING DEPTH ,ft	2.0	
STORAGE CAPACITY, ac-ft	18.0	
85TH PERCENTILE, 24-HR STORM PEAK DISCHARGE, cfs	47.1	
PLANNING-LEVEL ESTIMATED COST	$10,265,510	**POTENTIAL CONFLICTS:** Geotechnical and flood study constraints, equipment access, existing natural resources and receiving water protection during construction, permitting

COBENEFITS: Groundwater recharge, plant and wildlife habitat, public education and recreation opportunities (if greenway trails can be extended to site), trash capture

TYPICAL PROFILE (A-A)*



*NOT TO SCALE

EXAMPLE STORMWATER WETLAND WITH MEANDERING FLOW PATH

EXAMPLE LINEAR STORMWATER WETLAND WITH INFILTRATION CAPACITY

EXAMPLE FLAP GATES TO PREVENT BACKWATER FROM A RIVER

SITE X – SANTA CLARA RIVER FLOODPLAIN

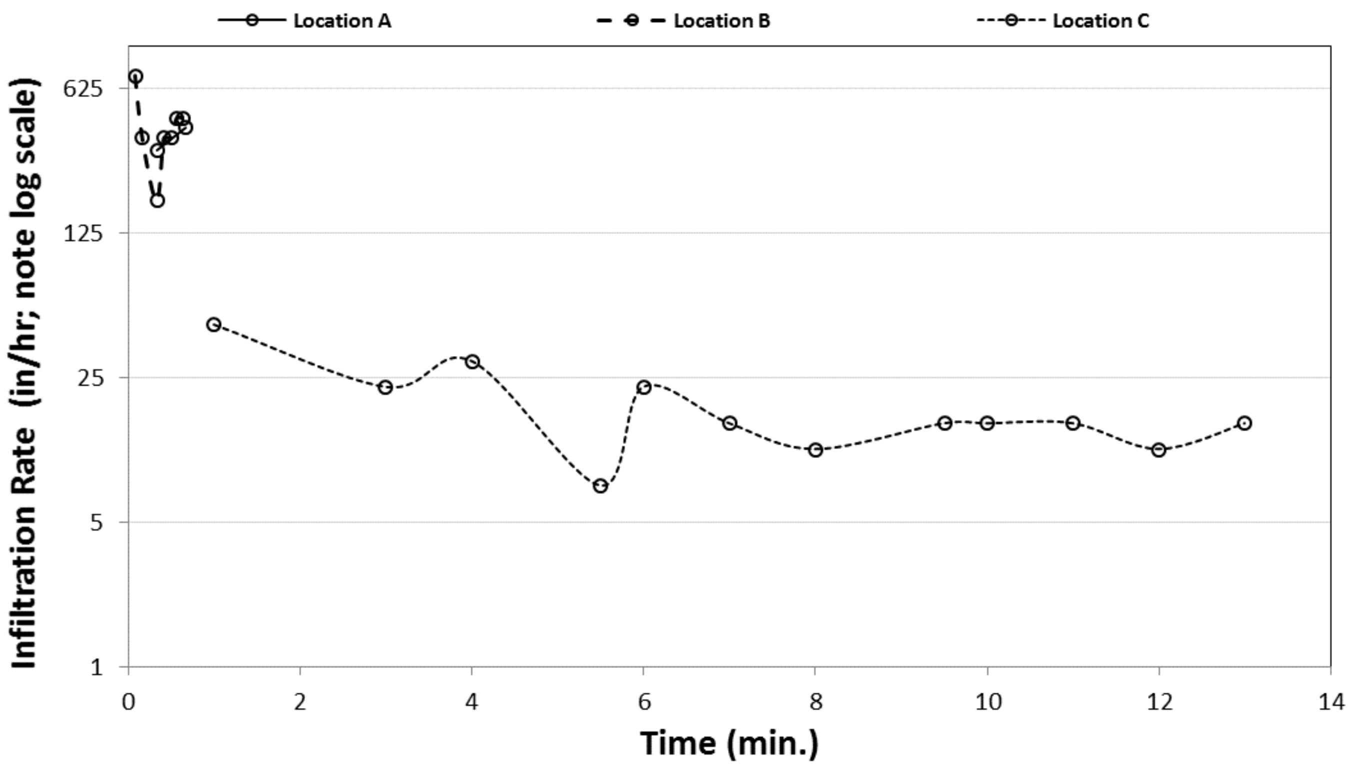
PARCEL OWNER: LOS ANGELES COUNTY

PLANNING-LEVEL COST ESTIMATE*

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Preparation				
1	Temporary Construction Fence	2,600	LF	$2.50	$6,500.00
2	Silt Fence	2,600	LF	$3.00	$7,800.00
	Site Preparation				
3	Excavation and Removal	101,267	CY	$45.00	$4,557,015.00
	Basin				
4	Utility Conflicts	1	LS	$10,000.00	$10,000.00
5	Earth Levee	1	LS	$900,000.00	$900,000.00
6	Wing Wall	1	EA	$8,000.00	$8,000.00
7	Culvert to Channel Connection Head Wall	1	EA	$10,000.00	$10,000.00
8	Box Culvert	180	CY	$1,760.00	$316,800.00
9	Flap Gate	4	EA	$2,500.00	$10,000.00
10	AC Spillway	1	EA	$500.00	$500.00
11	Fine Grading	390,600	SF	$0.72	$281,232.00
12	Riprap Forebay	1	EA	$4,000.00	$4,000.00
13	Vegetation	390,600	SF	$0.33	$128,898.00
14	Soil Amendment (Compost)	390,600	SF	$0.50	$195,300.00
	CONSTRUCTION SUBTOTAL				$6,436,050.00
15	Bond (5% of subtotal)				$321,800.00
16	Mobilization (10% of subtotal)				$643,610.00
17	Construction Management (10% of subtotal)				$643,610.00
18	Construction contingency (20% of subtotal)				$1,287,210.00
	CONSTRUCTION TOTAL				$9,332,280.00
19	Design (10% of Construction Total)				$933,230.00
	TOTAL COST				**$10,265,510.00**

*COSTS ARE ORDER-OF-MAGNITUDE ESTIMATES BASED ON AVAILABLE DATA AND CONCEPTUAL LAYOUT. ACTUAL COSTS WILL VARY.

FIELD SOIL INFLTRATION RATE TEST RESULTS**



**PERFORMED WITH TURF TEC DOUBLE-RING INFILTROMETER AT A DEPTH OF APPROXIMATELY 1 FOOT BELOW EXISTING GROUND SURFACE

HAND AUGER SOIL INVESTIGATION LOG – TEST LOCATION A

Tetra Tech, Inc.
3475 E. Foothill Blvd.
Pasadena, CA 91107
Telephone: 626.351.4664
Fax: 626.351.5291

BORING NUMBER Testing Location 1 - SCR Floodplain

PAGE 1 OF 1

CLIENT County of Los Angeles
PROJECT NAME Upper Santa Clara River EWMP
PROJECT NUMBER 100-SDG-T31351
PROJECT LOCATION Santa Clarita, CA
DATE STARTED 5/27/15 **COMPLETED** 5/27/15
GROUND ELEVATION **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY EN **CHECKED BY** EN
AT END OF DRILLING ---
NOTES Hand Augered to 3 ft bgs.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0.0					WELL GRADED SAND: moist to dry, 70% fine-to coarse-grained sand, 30% gravel, very loose, no odor, no staining. Clay lense (1 inch thick) @1 ft bgs, trash/debris intermixed, no odor, no staining	
2.5				3.0		

Stopped hand augering, encountered water, heaving sands
Bottom of borehole at 3.0 feet.

ENVIRONMENTAL BH - GINT STD US LAB.GDT - 6/8/15 17:21 - V:\OTHER CLIENTS\CITY OF SANTA CLARITA\BORINGS - REVISED.GPJ

APPENDIX C10

Additional RAA Information & Regional Validation

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1 Introduction

As a component of the Regional Board's review of the EWMP, additional information from the Reasonable Assurance Analysis (RAA) was requested regarding baseline calculations and predicted BMP performance. In response, this appendix contains additional information and RAA outputs, as follows:

Section 2: Additional outputs regarding baseline condition and critical condition calculations

Section 3: Additional outputs regarding predicted end-of-pipe best management practice (BMP) performance

Section 4: Additional outputs through a regional validation example demonstrating attainment of instream receiving water limits (RWLs) by BMPs

2 Baseline Condition: Additional Outputs

Comment #1 of the Regional Board's Enclosure 2, *Summary of Comments and Necessary Revisions for the RAA* (RAA Comment Enclosure), requested a comparison be provided for the exceedance volume (EV) by subbasin the 90th percentile of pollutant (zinc) load to account for conditions in which flow may be high but concentration may not exceed the RWL. In addition, clarification of the calculation of the EV approach was requested by the RWQCB in a subsequent email. This section provides clarification on the calculation of the EV and **Figure 2-1** presents a comparison of the total zinc load for three 24-hour 90th percentile critical conditions:

1. 90th percentile 24-hour Exceedance Volume
2. 90th percentile modeled daily flow times 90th percentile modeled concentration, and
3. 90th percentile modeled daily load.

The results show that zinc loading during the Exceedance Volume critical condition (#1, above) is higher than the other 90th percentile metrics (#2 and #3) and thus it is a conservative critical condition that is consistent with RAA Guidelines.

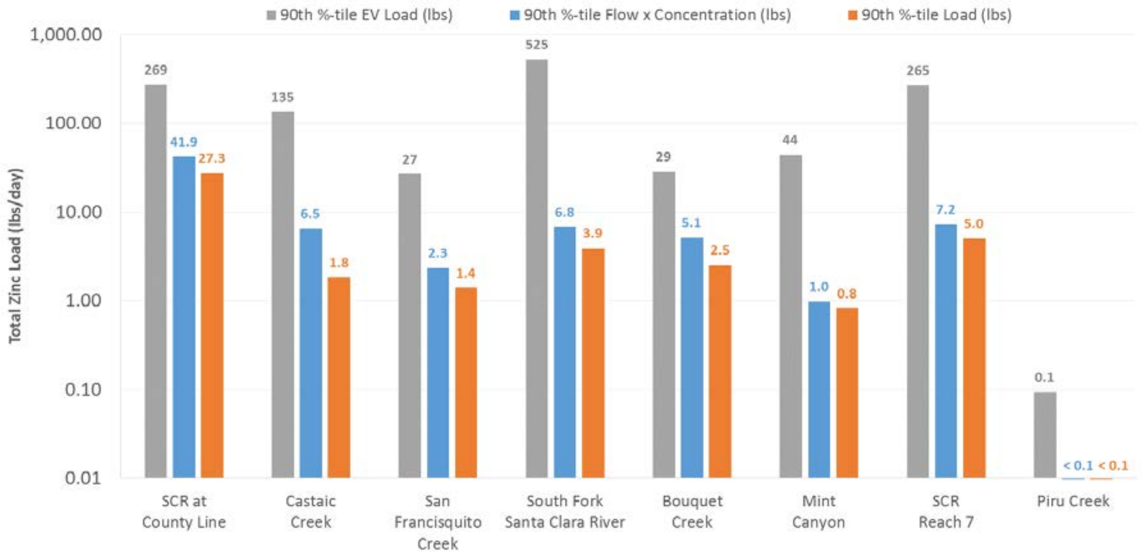


Figure 2-1. Demonstration of exceedance volume approach comparing the 90th percentile condition zinc loads by assessment area.

2.1 Exceedance Volume Calculation Clarification

For the Santa Clara watershed, the bacteria TMDL wasteload allocations for the MS4 includes 16 allowable bacteria exceedances per year. The RAA for USCR EWMP is based on retaining the stormwater runoff from the 17th wettest wet day in 90% of calendar years. In this manner, the EWMP assures that runoff from the MS4 area does not contribute to bacteria exceedances during the 90th percentile critical condition.

Because rainfall conditions vary by subwatershed, the critical condition for each subwatershed was derived individually according to the nearby precipitation gage associated with the subwatershed. The steps for deriving the precipitation event are outlined below. For each year among the most recent 10 years modeled:

1. Rank daily rainfall from highest to lowest
2. Flag the 16 wettest days as “Allowable Exceedance Days”
3. Flag the 17th wettest day as “Annual 17th Wettest Day”
4. Flag all other daily rainfall totals as “Exceedances not allowed”

Figure 2-2 ranks the annual 17th wettest days over the ten year period between 10/1/2001 and 9/30/2011 for an example rainfall gage in the Santa Clara River watershed (rain gage D1012 at Castaic Junction which is used for Subwatershed 4009). The critical condition event at this gage is highlighted as the 2nd highest event in the 10-year record – which is the 90th percentile condition.

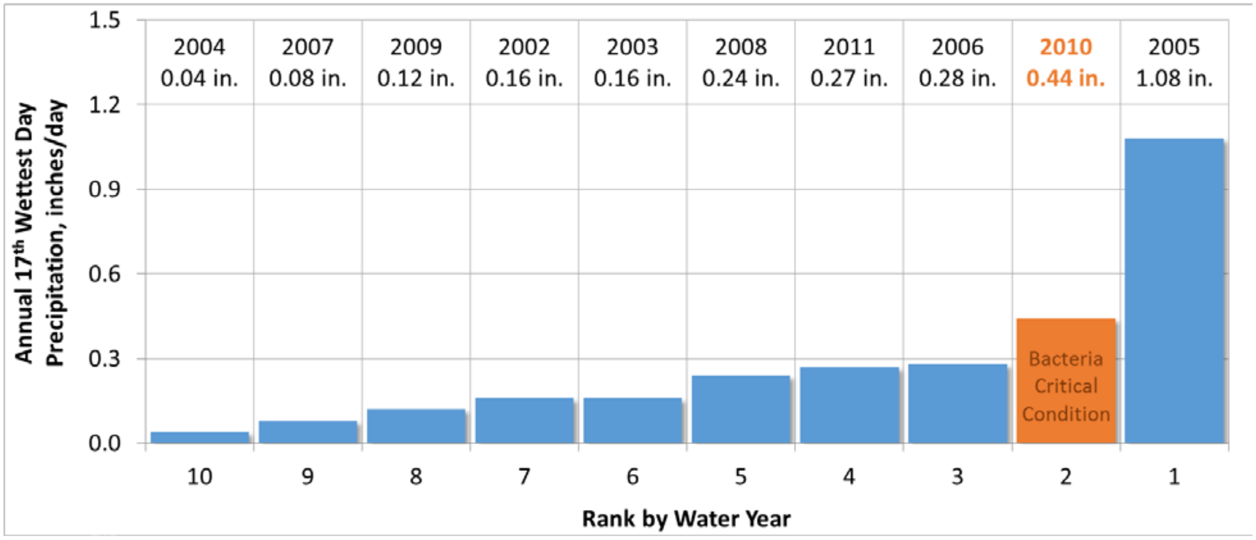


Figure 2-2. Annual 17th wettest days over the ten year period between 10/1/2001 and 9/30/2011 (and critical condition) for an example rainfall gage in the Santa Clara River watershed.

Figure 2-3 is a percentile plot of 10 years of daily precipitation for the same representative rainfall gage in the Santa Clara River watershed. At this gage, the 90th percentile 17th wettest day was 0.44 inches of rainfall that occurred in 2010. The inset graph is a histogram of wet days (24-hour precipitation) for the portion of the percentile plot greater than or equal to the 90th percentile 17th wettest day critical condition. The figure illustrates that only 2005 exhibits "exceedances not allowed" days above the 90th percentile 17th wettest day. The Year 2005 was the wettest water year (2005) in the record — a statistical extreme condition. By retaining runoff from the 90th percentile 17th wettest day, nine out of 10 years in the record were fully compliant. This demonstrates that the selected critical condition aligns with the critical condition of the SCR Bacteria TMDL and the RAA Guidelines. By design, the same assurance is provided for all rain gages and subwatersheds in the USCR EWMP area.

Another consideration for the selected critical condition is the concept of "limiting pollutant." The limiting pollutant determines the overall critical condition for the EWMP. In order to demonstrate which pollutants are limiting, the USCR EWMP introduced the concept of Exceedance Volume (EV), which is the portion of instream flow volume that exceeds the instream RWL during a selected time period. Pollutants with the most runoff volume that exceeds RWLs (largest EVs) are the limiting pollutants for stormwater management because they require the most control measure storage capacity. For the limiting pollutant analysis, EVs were computed at each instream assessment point in the Santa Clara River watershed. The steps for deriving critical condition EV are outlined below – for each year among the most recent 10 years modeled:

1. Compute Exceedance Volumes for all wet days per calendar year
2. Eliminate the 16 allowable wettest days
3. Identify EV for the 17th wettest day and extract the associated storm for the runoff event
4. Select the 90th percentile 17th wettest day as the 2nd highest 17th wettest day among the most recent 10 modeled years

Note that, for bacteria, the modeled runoff from urban areas nearly always exhibits concentrations that exceed the applicable bacteria RWLs, and thus the EV is conservatively assumed to be equal to the runoff volume (the EWMP manages 100% of the 17th day runoff from urban areas). Only runoff from open space areas exhibits concentrations below bacteria RWLs according to the RAA model.

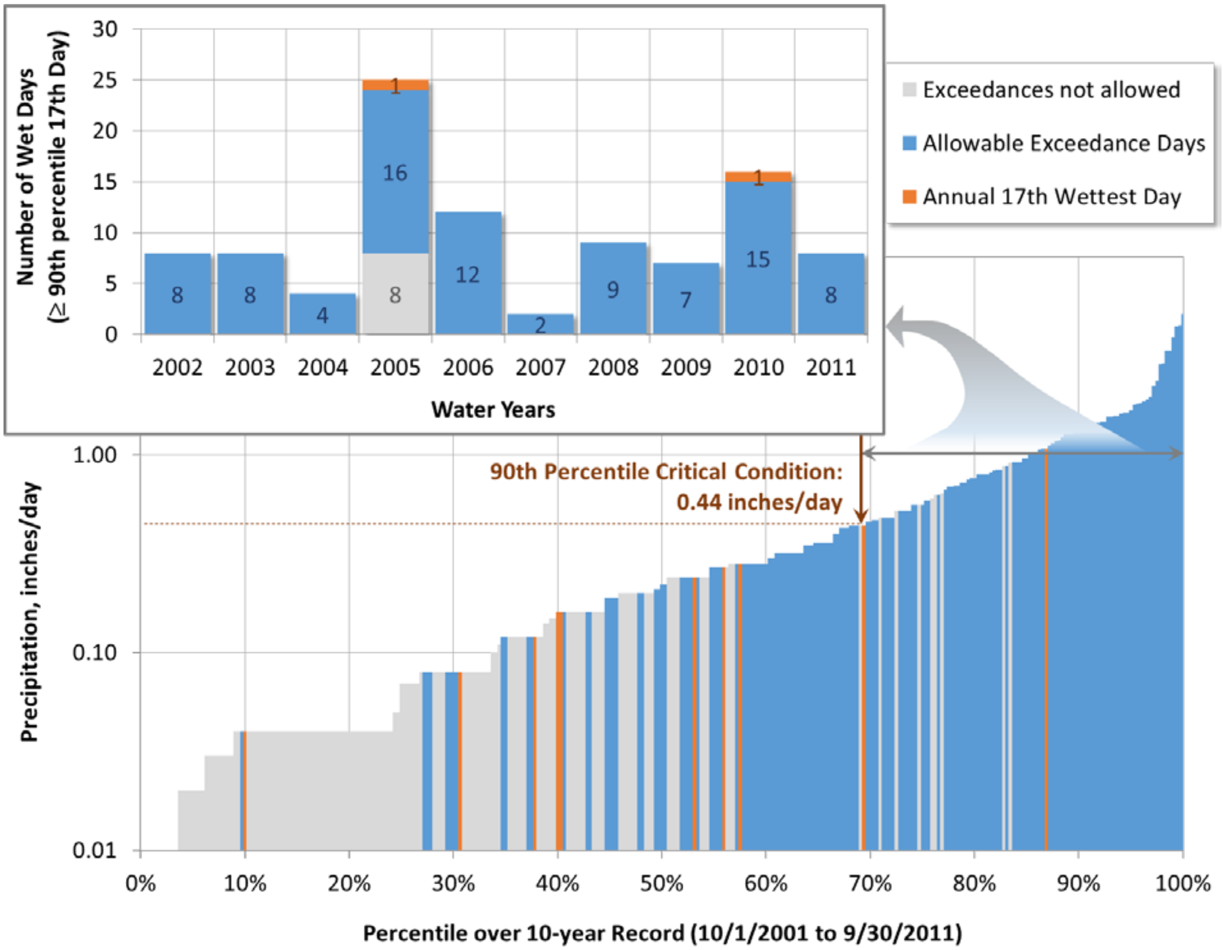


Figure 2-3. Illustration of the EWMP critical condition from among the most recent 10 years of precipitation at the representative rainfall gage in the Santa Clara River watershed

Similarly, the zinc critical condition is defined as the 90th percentile wet day. In the context of this analysis the zinc critical condition was interpreted as storm depth associated with the 90th percentile 24-hour wet-weather instream exceedance volume. The steps for deriving this value are summarized below:

1. Derive time series of EV using a rolling 24-hour time interval over the most recent 10 years modeled
2. Rank the EV time series
3. Identify the 90th percentile 24-hour EV (within the past 10-years)

The 90th percentile EVs for different pollutants can be compared to see which pollutant are limiting. **Figure 2-4** shows a comparison of the 90th percentile zinc and bacteria EVs in the Santa Clara River at the Los Angeles County boundary. This comparison demonstrates why bacteria is the limiting pollutant for this watershed – bacteria has a larger EV than zinc, meaning that more stormwater control measure capacity is needed to control bacteria than zinc. For all assessment areas in USCR EWMP area, except South Fork Santa Clara River, bacteria was determined to be the critical condition. For South Fork Santa Clara River, the EWMP includes additional control measure capacity to provide assurance that zinc RWLs are attained.

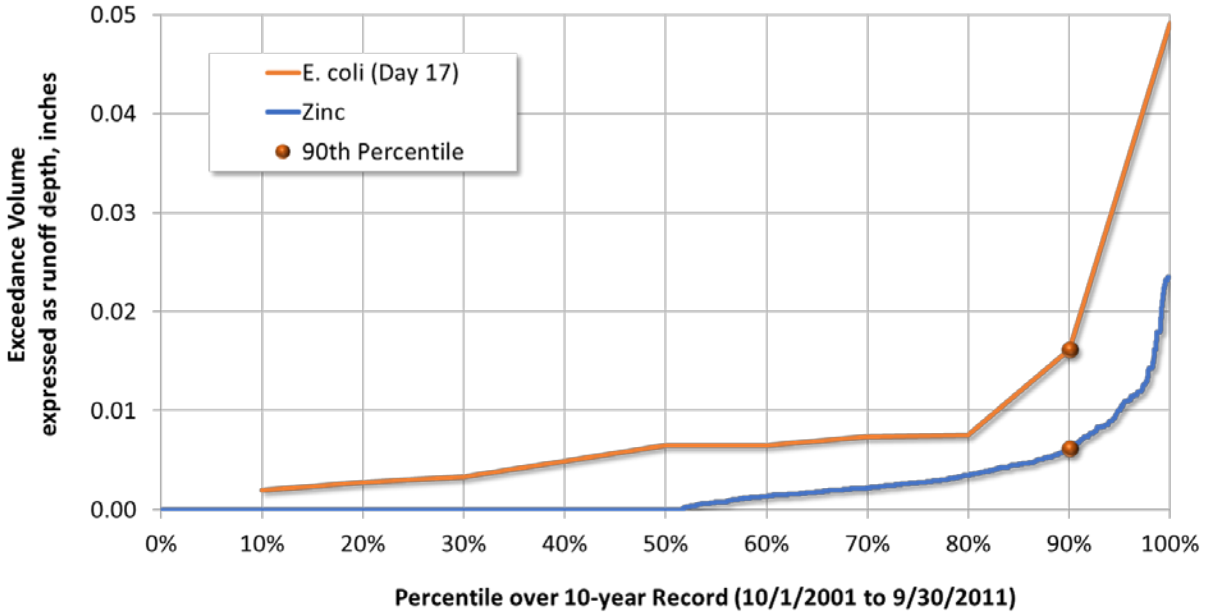


Figure 2-4. Comparison of zinc and bacteria 10-years critical condition EV in the Santa Clara River at the Los Angeles County boundary

The EV has two primary applications within the RAA analysis:

1. **Identification of the critical storm event:** by tracking the EV instream, we can identify the critical storm event for the EWMP, for each pollutant (as described in Section 6.2.3.1 of the USCR EWMP). **Figure 2-4** shows the CDF for 24-hour EV's that occur at the downstream end of the Santa Clara River, for bacteria and zinc. The storm that produces the 90th percentile EV is defined as the critical storm for EWMP / MS4 compliance, and is used in the RAA for BMP planning. Using the 90th percentile EV to define the critical storm is robust because it ensures, by definition, that BMPs have enough capacity to manage the critical storm event.
    a. As discussed above, the EV for bacteria and zinc use different calculation approaches, because they are subject to different types of RWLs (bacteria RWLs incorporate Exceedance Days by calendar year, while the zinc RWL is based on CTR and there are no allowable exceedances). For bacteria, there are 10 values in **Figure 2-4** (one 17th day per year). For zinc, there are over 6,000 values at each station (one for each wet rolling 24-hour period in 10 years). Also, essentially all

runoff from urban areas exceeds bacteria RWLs in the model, so the entire runoff volume from urban areas is the EV (as long as an Exceedance Day doesn't apply).

   b. For the critical storm, a required % reduction is calculated. The % reduction during the critical storm is the "target" for SUSTAIN during optimization. For bacteria, full retention of runoff for that storm is required, prior to discharge from each subwatershed (100% *volume* reduction, see Figure 6-8 in the EWMP). For zinc, the required reductions are calculated based on instream *loading* vs allowable loading during the critical storm according to LSPC (see Table 6-6 of the USCR EWMP for the zinc reductions).
      i. Note that volume alone is not explicitly used to by SUSTAIN to identify the control measures target for zinc – instead it's % loading reduction during the critical storm (after using the EV to define the critical storm, the EV no longer a critical component of the RAA for zinc).
      ii. Also note the BMP Performance Goal in the Appendix D1 of the EWMP (the recipes for compliance) is not the EV, but rather the amount of runoff managed by the BMPs in SUSTAIN during the critical storm event. The runoff managed by the BMPs is the "equivalency" metric that can be used when EWMP updates are made during adaptive management.

2. **Identification of limiting pollutants:** the EV is also used to determine which pollutants are limiting as shown in **Figure 2-4**. The amount of runoff that exceeds the RWL for a pollutant is primary driver of BMP capacity needed by the EWMP. The 90th percentile EV is used to compare pollutants to one another. The pollutant with the greatest 90th percentile EV is the limiting pollutant. However, both bacteria and zinc are explicitly analyzed in the RAA. The bacteria BMPs are locked in because they are scheduled firt, and then the critical zinc storm is routed through those BMPs. If the % zinc loading reduction achieved by the bacteria BMPs is insufficient, then additional BMP capacity is added to the EWMP to assure zinc compliance. In USCR, this only occurred in South Fork Santa Clara River.

3 BMP Performance: Additional Outputs

Comments #2 & #3 of the RAA Comment Enclosure requested model results be presented for both the baseline condition and the post-EMP (managed) scenario with the proposed BMPs. The model results are summarized below by assessment area, as follows:

- Runoff under baseline and BMP scenarios for the 90th percentile, 17th wettest day bacteria critical condition (**Table 3-1**)
- Runoff and pollutant load under the baseline and BMP scenarios for the 90th percentile total zinc critical condition (**Table 3-2**)

Table 3-1. Baseline Runoff and BMP Retention for Assessment Areas during Bacteria Critical Condition

Assessment Area	Baseline Runoff during 90th percentile, 17th day (acre-feet)	Runoff with BMPs during 90th percentile, 17th day (acre-feet)
Bouquet Creek	48.5	0.0
Castaic Creek	51.7	0.0
Mint Canyon	8.6	0.0
Piru Creek	0.3	0.0
San Francisquito Creek	17.2	0.0
Santa Clara River at County Line	163.4	0.0
Santa Clara River Reach 7	9.2	0.0
South Fork Santa Clara River	60.9	0.0

Table 3-2. Baseline and BMP Scenario for Runoff and Pollutant Loads during Zinc Critical Condition

Assessment Area	Scenario	Runoff Volume (ac-ft)	*E. coli* (MPN)	Total Lead (lbs)	Total Zinc (lbs)	% Total Zinc Reduction
Bouquet Creek	Baseline	163.41	1.23E+14	20.94	105.19	70%
	with BMPs	80.37	5.36E+13	5.88	31.60	
Castaic Creek	Baseline	173.16	1.26E+14	21.73	137.52	66%
	with BMPs	84.03	5.02E+13	7.71	47.16	
Mint Canyon	Baseline	37.70	6.92E+13	7.37	36.17	41%
	with BMPs	25.34	3.58E+13	4.32	21.34	
Piru Creek	Baseline	9.41	2.44E+12	0.03	0.17	45%
	with BMPs	8.87	2.16E+12	0.02	0.09	
San Francisquito Creek	Baseline	57.37	4.47E+13	7.97	38.49	71%
	with BMPs	27.58	1.91E+13	2.19	11.29	
Santa Clara River at County Line	Baseline	663.41	7.34E+14	84.36	446.98	70%
	with BMPs	383.78	3.15E+14	26.24	135.78	
Santa Clara River Reach 7	Baseline	58.25	9.43E+13	9.58	53.70	41%
	with BMPs	38.37	4.52E+13	5.38	31.86	
South Fork Santa Clara River	Baseline	401.19	4.54E+14	54.10	269.97	66%
	with BMPs	252.58	2.26E+14	20.03	91.79	

4 Regional Validation Example

Comment #4 of the RAA Comment Enclosure requested a proof/validation/demonstration that managing metals using the recommended EWMP BMPs results in instream attainment of RWLs. It is important to note that volume-and-load-reduction targets are determined at the *beginning* of the Reasonable Assurance Analysis (RAA) process (and through the limiting pollutant analysis), and thus the extra step at the end of the RAA process to show validation results is optional. However, it is understood that a clear validation may be useful for engaging the public and Regional Board during future discussion.

The RAA for the USCR EWMP employs a two-tiered optimization approach that manages stormwater runoff from EWMP areas according to critical conditions for associated water bodies (or assessment areas). For metals, the management target becomes the load reduction that achieves receiving water limitations (RWLs) during the critical storm that produces the 90th percentile Exceedance Volume. The following EWMPs used this two-tiered optimization approach for selecting Best Management Practices (BMPs) for their implementation plans:

- Upper Santa Clara River (USCR),
- Upper Los Angeles River (ULAR),
- Ballona Creek (BC),
- Upper San Gabriel River (USGR),
- Malibu Creek (MC), and
- Carson and Lawndale portions of the Dominguez Channel (DC) EWMP

In order to support future public discussions, this section provides an example regional validation for a representative example waterbody within Los Angeles County: Puente Creek, a tributary to San Jose Creek in the San Gabriel River Watershed. This regional validation example is attached to each of the six "selected EWMPs" listed above, and this sections presents several comparisons between the Puente Creek watershed and the selected EWMPs, based on averaged conditions *across all six* of those EWMP areas. The selected EWMP areas summarized in Table 4-1 represent the land use distribution within the 6 EWMP groups mapped in **Figure 4-1**. The areas in **Table 4-1** represent the total MS4 areas for which the two-tiered optimization approach was used. Average rainfall within the selected EWMP areas was calculated by area-weighting 25 years of hourly rainfall from 111 unique rainfall gages from over 1,442 WMMS subwatersheds. Average rainfall for Puente Creek was calculated by area-weighting 25 years of rainfall from 2 rainfall gages over eight WMMS subwatersheds. Area-normalized rainfall depths were then plotted and compared (**Figure 4-2** and **Figure 4-3**).

Puente Creek was selected for this demonstration because:

- Puente Creek has high required zinc reductions, providing a conservative demonstration of modeled BMP performance.
- Puente Creek is a watershed where 100% of the watershed area is contained within the EWMP boundary (**Figure 4-1**).

- The land use distribution is Puente Creek is generally more urbanized than the land use distribution in the other selected EWMP areas mentioned above (see **Table 4-1**). Compared to the average distribution in the selected EWMP areas, the Puente Creek watershed has more urban area (93% vs. 55%). The distribution of Commercial, Institutional, Industrial, and Roads is similar; however, Puente Creek has nearly twice as much residential area (expressed as pervious and impervious residential land cover).
- Average rainfall in Puente Creek is very similar to average rainfall throughout the selected EWMP areas. **Figure 4-2** shows annual average rainfall distribution for 25 years in Puente Creek watershed vs. selected EWMP areas. **Figure 4-3** also confirms that seasonal variability in Puente follows the average seasonal trend in the selected EWMP areas. The percent difference in annual average and median rainfall in Puente Creek vs. selected EWMP areas over 25 years of record is only -1.4% and -3.8%, respectively.
- The RAA for Puente Creek recommended a mix of LID, Green Streets, and Regional BMPs, which collectively treat 78% of the EWMP area.

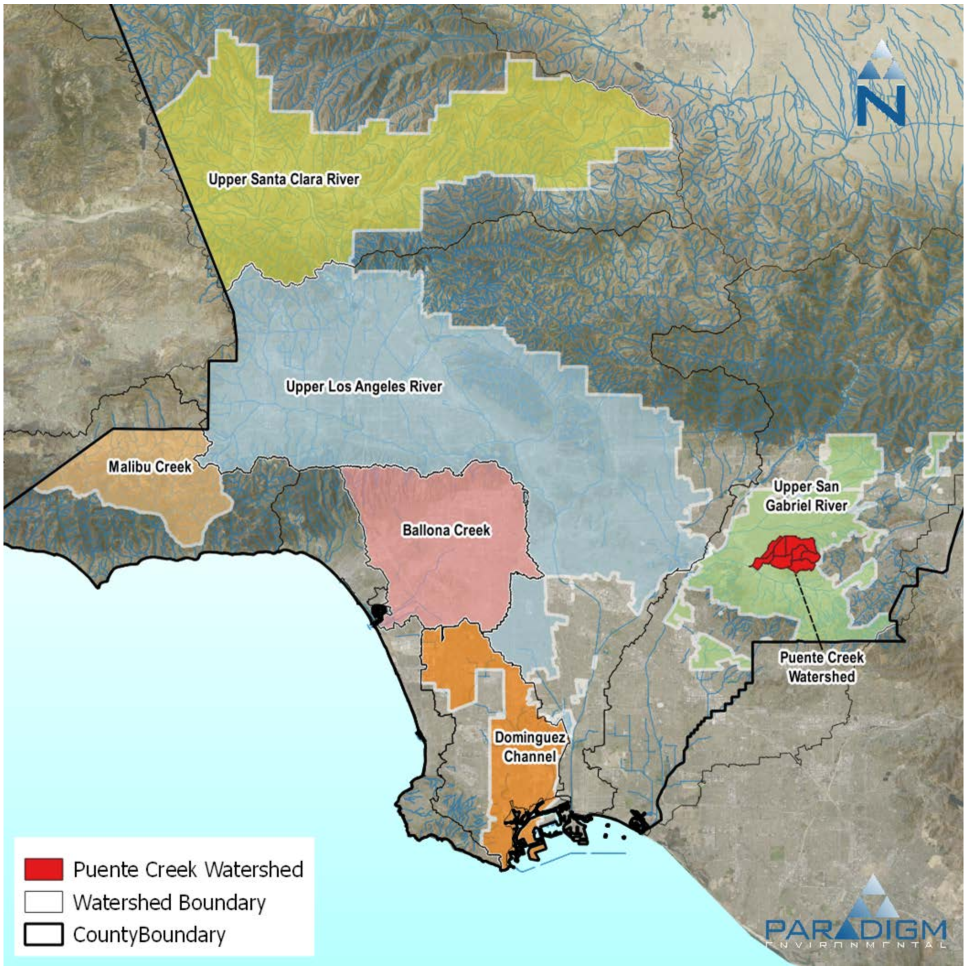


Figure 4-1. Location of Puente Creek watershed within the context of selected Los Angeles County EWMPs.

Table 4-1. Comparison of land use distribution in the Puente Creek EWMP area vs. selected EWMP areas

Land Use		Land Use Distribution[1] by Drainage Area			
		Selected EWMP Areas[2]		Puente Creek Watershed	
		Acres	Percent	Acres	Percent
Impervious	Residential	81,701	10%	1,044	19%
	Commercial	26,250	3%	226	4%
	Institutional	16,163	2%	231	4%
	Industrial	31,467	4%	277	5%
	Roads	60,793	7%	467	9%
Urban Pervious		236,137	29%	2,762	51%
Non-Urban Pervious		363,182	45%	398	7%
Total		**815,692**	**100%**	**5,405**	**100%**

1: Color gradient shows relative land use distribution from least (white) to greatest (red)

2: Selected EWMP areas include: USCR, USGR, ULAR, BC, Malibu, and portions of DC

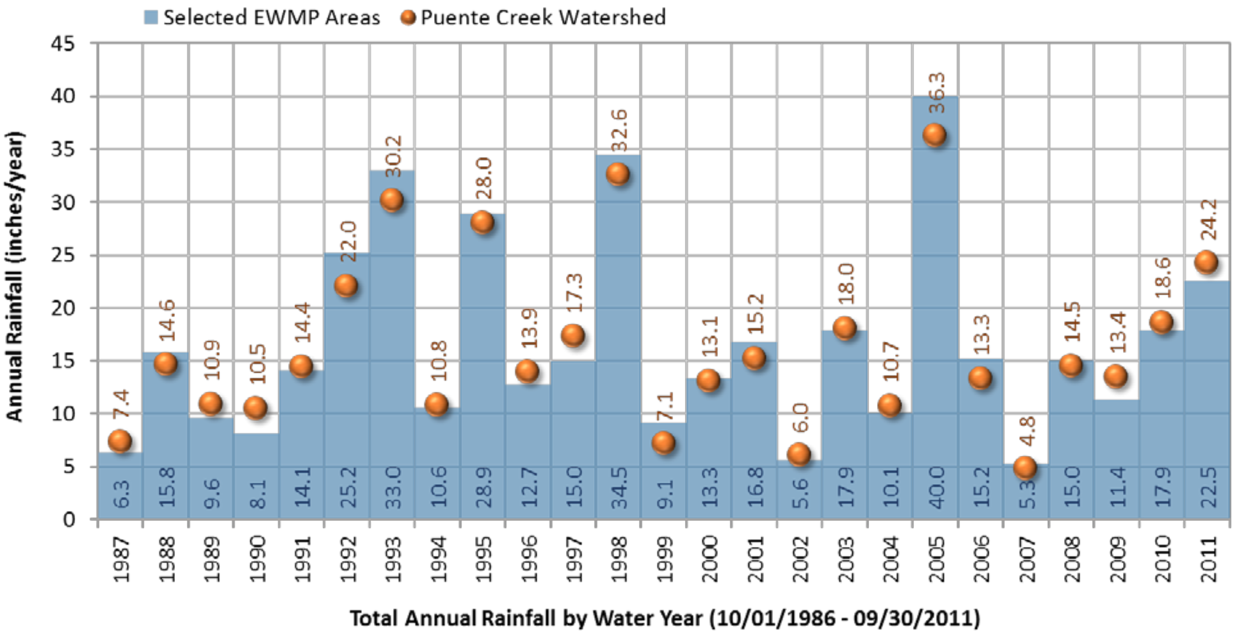


Figure 4-2. Annual rainfall distribution (25 years) in Puente Creek watershed vs. selected EWMP areas.

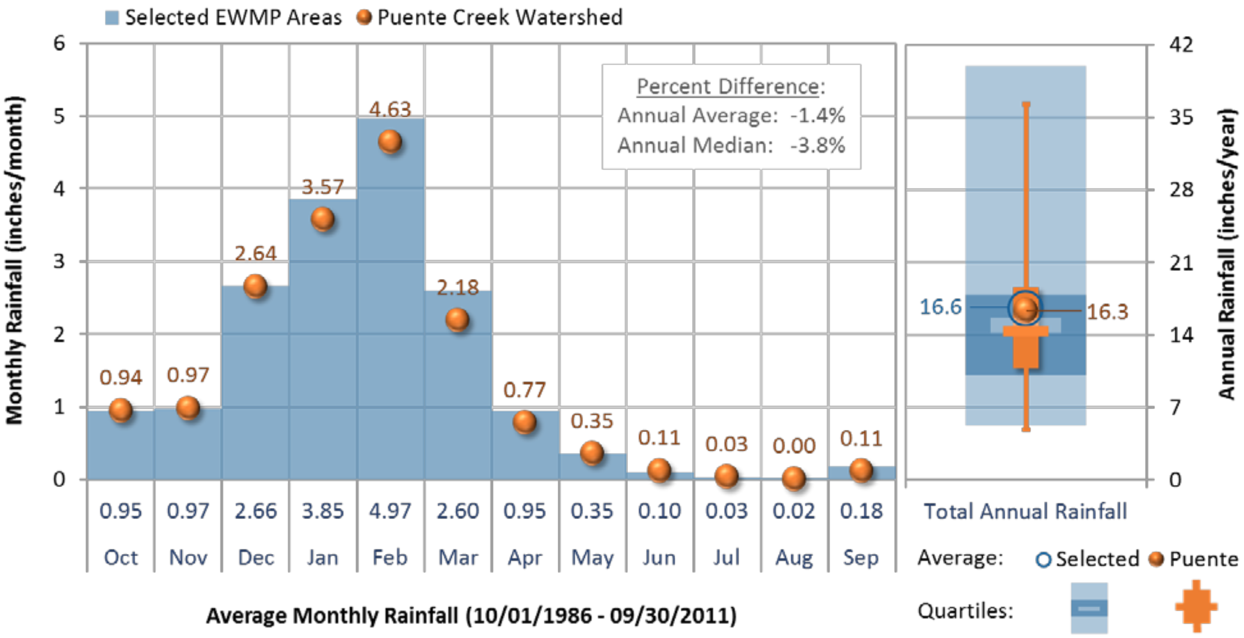


Figure 4-3. Monthly and annual rainfall variability in Puente Creek watershed vs. selected EWMP areas.

4.1 Validation Methodology

RAAs for the selected EWMPs were built on the two primary models within the Watershed Management Modeling System (WMMS) – the Loading Simulation Program in C++ (LSPC), which is used for watershed runoff and streamflow routing, and the System for Urban Stormwater Treatment and Analysis INtegration (SUSTAIN), which is used for BMP selection and placement optimization modeling. As shown in **Figure 4-4**, to conduct the RAA and complete the validation, the modeling workflow includes (1) simulating watershed rainfall-runoff and pollutant loading; (2) predicting performance of BMPs with fixed assumptions and cost-optimize the cumulative network of BMPs given available BMP opportunities; and (3) validating the selected BMP network to provide reasonable assurance of attainment of RWLs.

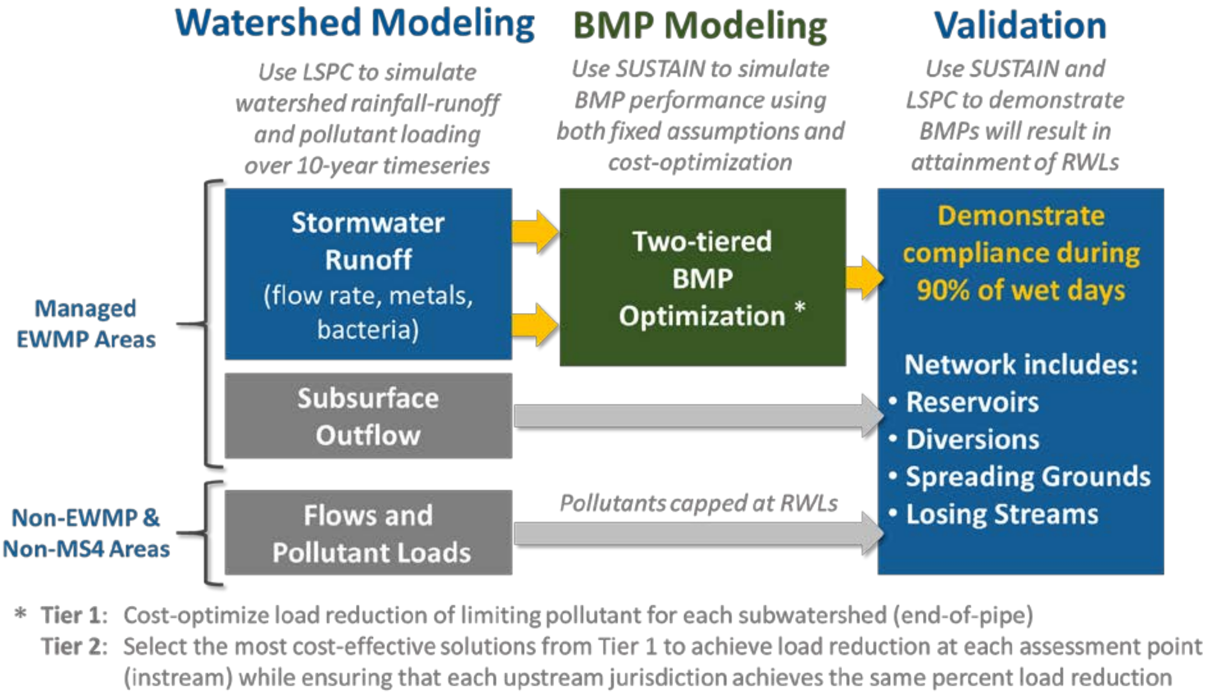
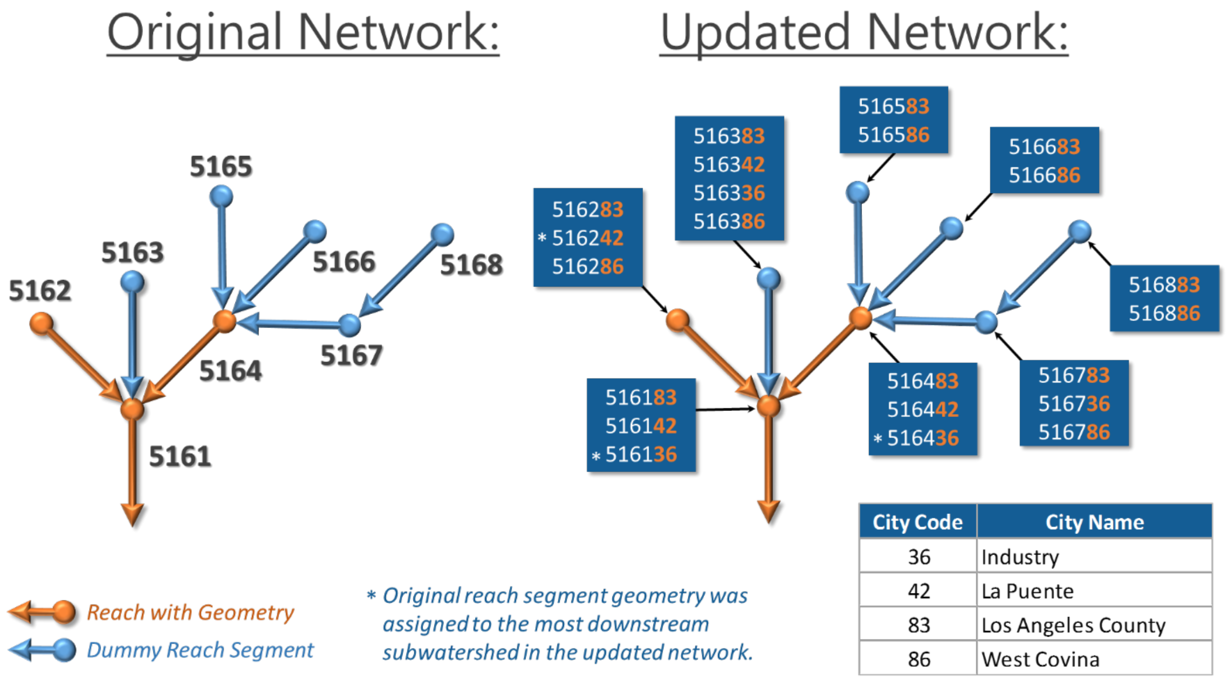


Figure 4-4. Components of the RAA Modeling Process.

4.2 Watershed Model Configuration

The watershed model simulates stormwater runoff and routing/transport for flow and pollutant loads. Subwatershed outflow includes surface and subsurface contributions. Stormwater BMPs manage the surface runoff portion of subwatershed outflow. As described in the RAA sections of the EWMPs, results from 10-years of continuous simulation were used to identify the limiting pollutant's critical condition (i.e. 90th percentile zinc Exceedance Volume) and the required load reduction associated with that critical condition. Although critical conditions are determined instream, associated runoff and loadings originate from multiple subwatersheds and jurisdictions.

An important aspect of the RAA is that load reductions within an assessment area are equitably distributed among jurisdictions contributing to the exceedance. For this reason, the original WMMS subwatersheds were further subdivided into jurisdictions. As described in the RAA sections of the selected EWMPs, all jurisdictions draining to a given assessment point were held to the same percent reduction. **Figure 4-5** shows the original WMMS and updated RAA subwatershed routing networks for Puente Creek for the four contributing jurisdictions. The zinc critical condition in Puente Creek required a 76% instream load reduction—for equitability, all jurisdictions are required to each achieve a 76% load reduction collectively within their respective areas that drain to Puente Creek.



* *Original reach segment geometry was assigned to the most downstream subwatershed in the updated network.*

City Code	City Name
36	Industry
42	La Puente
83	Los Angeles County
86	West Covina

Figure 4-5. Original WMMS vs. RAA subwatershed modeling network for Puente Creek with contributing jurisdictions.

As previously shown in **Figure 4-4**, individual subwatershed contributions are separated into surface runoff and baseflow. Surface runoff from EWMP areas within Puente Creek were exported from the watershed model and used as boundary conditions for BMP modeling. Validation is performed by replacing baseline runoff in the watershed model with BMP effluent from the EWMP implementation plan. Subsurface flows and any other contributions from non-EWMP areas were also identified in the baseline model for accounting purposes. Non-EWMP areas were not managed by EWMP BMPs but it is important to account for impact of non-EWMP areas on the validation, as further described in Section 4.4.

4.3 BMP Model Configuration

SUSTAIN was used to identify the most cost-effective combination of management practices in each subwatershed that collectively achieved a 76% zinc load reduction in each jurisdiction. **Figure 4-6** shows the most cost-effective distribution BMP capacity by BMP type (LID, green streets, and regional BMPs). **Table 4-2** summarizes the detailed recipes for compliance for the four jurisdictions within the Puente Creek assessment area. For this exercise, the validation is focused on zinc RWL attainment and thus the BMPs associated with the 2026 metals attainment milestone were included in the model to validate RWL attainment for metals.

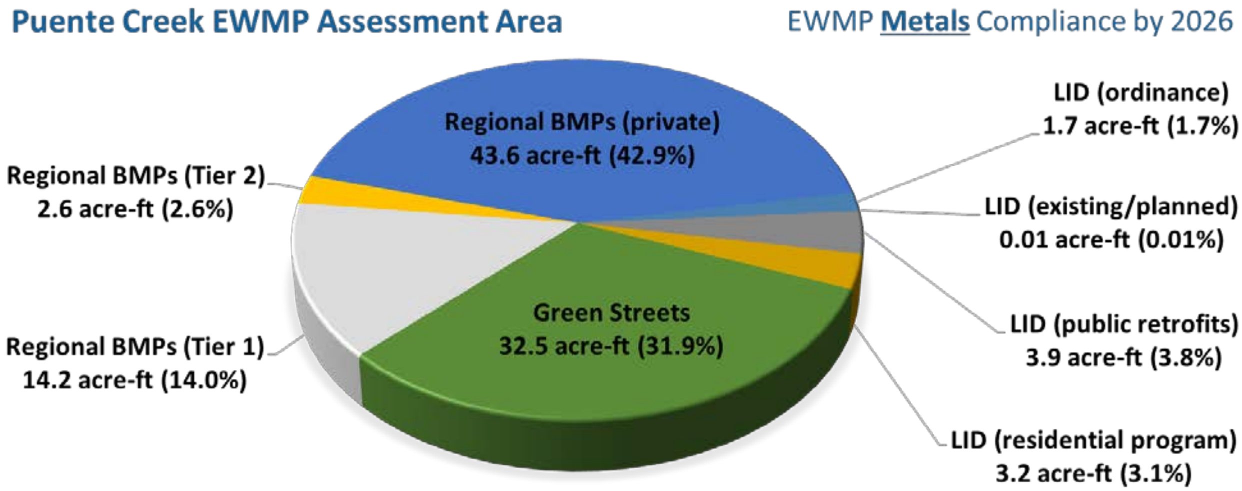


Figure 4-6. BMP capacities for metals compliance in the Puente Creek watershed.

Table 4-2. Detailed recipe for Metals TMDL compliance by jurisdiction for the Puente Creek Watershed

EWMP Implementation Plan Component			Optimized Capacity by Jurisdiction (acre-ft)			
			Industry	La Puente	Los Angeles County	West Covina
For Metals Attainment by 2026	24-hour Volume Managed		14.28	28.71	48.58	21.14
	LID	Ordinance	0.43	0.42	0.77	0.09
		Planned LID	---	---	0.01	---
		Public LID	0.14	0.42	3.27	0.05
		Residential LID	0.01	0.86	2.07	0.23
	Green Streets		0.98	9.00	17.62	4.85
	Regional	Tier 1 (public, owned)	---	10.92	3.31	---
		Tier 2 (public, owned)	0.81	0.03	---	1.78
		Tier 2 (public, non-owned)	---	---	0.00	---
		Private	6.82	10.52	15.42	10.8
	Total BMP Capacity		**9.19**	**32.18**	**42.48**	**17.8**

4.4 Routing Configuration between Watershed and BMP Models for Validation Example

The validation process involved deconstructing and reconstructing the watershed model within the Puente Creek assessment area. A step-by-step sequence of tests were performed to systematically layer the components, verifying for expected outcomes from test cases at each step in the process. The steps include:

1. **Establish baseline (original subwatershed network)**: run the baseline watershed model (with the original 8-subwatershed network), which serves as the primary reference point for validation.
2. **Confirm baseline (updated subwatershed network)**: run the updated baseline watershed (with the updated jurisdiction-based network with 22 subwatersheds) and verify that flow and water quality matches results from Step 1.
    a. **Establish EWMP baseline**: separate runoff into EWMP and non-MS4 timeseries. Non-MS4 areas are assumed to be managed by other means to achieve RWL. For the validation run, doing that ensures that non-EWMP areas do not contribute to exceedance at the assessment point. Thus, the concentrations of zinc from non-MS4 areas are "capped" at the RWL to prevent the non-MS4 areas from causing or contributing to RWL exceedances.
3. **Confirm optimized BMP solution**: combine baseline LSPC and SUSTAIN BMP model runs
    a. Route 10 years of baseline continuous simulation runoff from LSPC through the selected EWMP BMPs to generate timeseries of treated runoff.
    b. Replace baseline timeseries in the watershed with treated BMP effluent from SUSTAIN. That is, the timeseries of concentration and flow rate in the effluent from the selected BMP solution for each assessment area was inserted back into the watershed model (LSPC) and routed through the reach network.
    c. Run the updated watershed model to generate 10-years of runoff and instream pollutant concentrations at the outlet of Puente Creek with BMPs implemented.
4. **Process Validate Output**: sort and plot 10-years of zinc *wet-weather* concentrations for each of the three model runs listed below.
    a. Baseline model for Puente Creek (output from Step 1 or 2 above)
    b. EWMP baseline model with non-MS4 area capped at RWL (output from Step 3 above)
    c. BMP solution model run (output from Step 4 above)
5. **Validate Results**: Plot the three percentile plots from Step 4 on a graph, along with the RWL. Demonstrate that the BMP solution model run achieves RWL at the 90th percentile threshold for the modeled 10-year period. Attaining the RWL in the EWMP baseline model with non-MS4 areas capped at the RWL represents validation of the RAA approach.

4.5 Results and Conclusions

Per Step #4 and #5 of the validation process described above, the 10-year record was analyzed to validate that RWLs were attained on 90% of wet weather days. **Figure 4-7** presents baseline timeseries vs. EWMP-implemented time series for flow and zinc concentration in Puente Creek. The successful validation outcome (for Puente Creek) is shown in **Figure 4-8**. The 90th percentile wet weather concentration of total zinc at the mouth of Puente Creek is compared to the RWL. Three different conditions are shown in **Figure 4-8**, as follows:

1. Baseline/existing condition (“Baseline”, blue line)
2. Baseline condition, except with zinc concentrations capped at RWLs for runoff from non-MS4 and non-EWMP areas (“Baseline for EWMP MS4s”, green line)
3. Condition after BMPs specified by the RAA are implemented (“EWMP implemented”, orange line).

Validation is demonstrated by the outcome that the 90th percentile concentration at the mouth of Puente Creek is less than the zinc RWL. This validation is representative of each of the selected EWMPs including USCR.

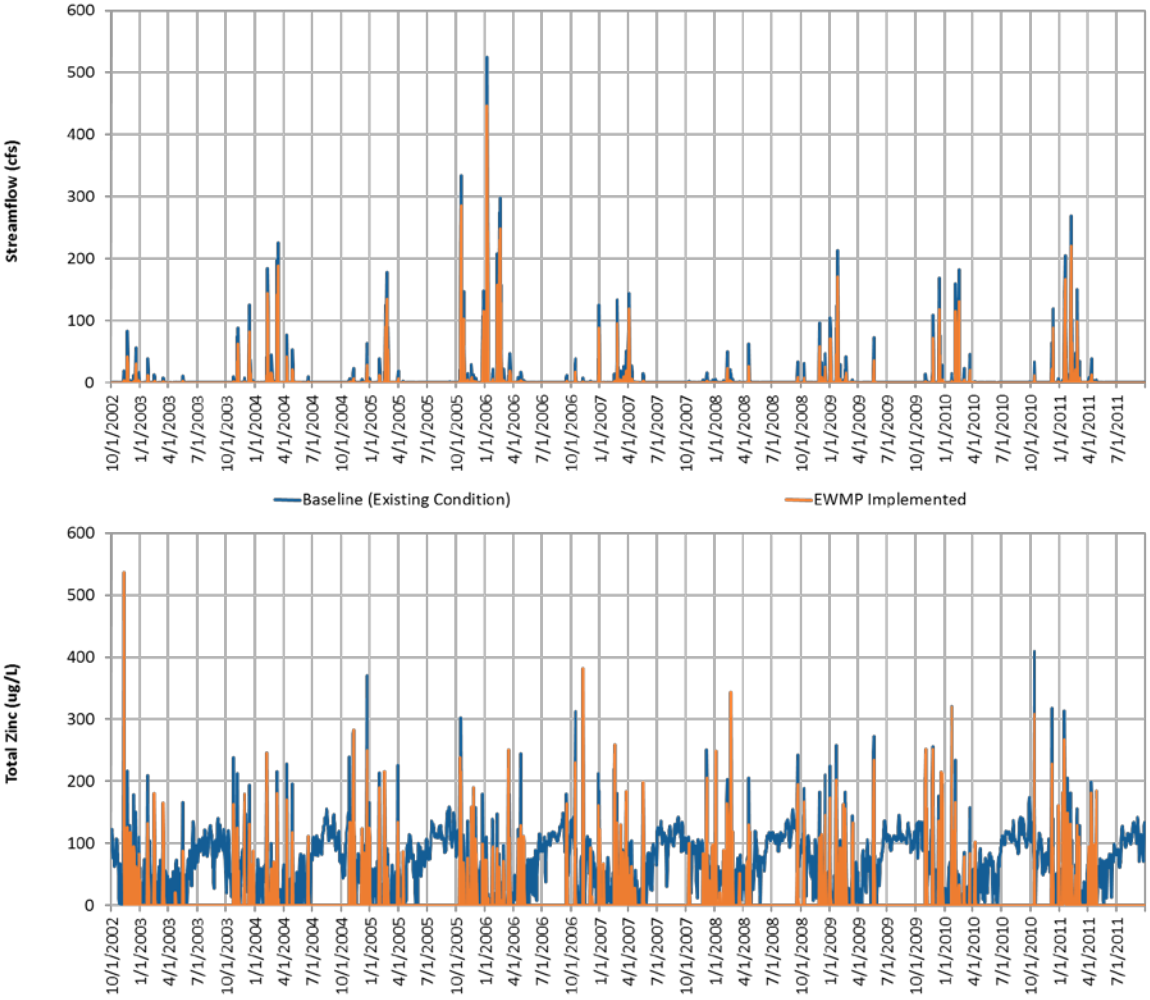


Figure 4-7. Instream validation 10-years timeseries plot demonstrating attainment of RWLs (Puente Creek).

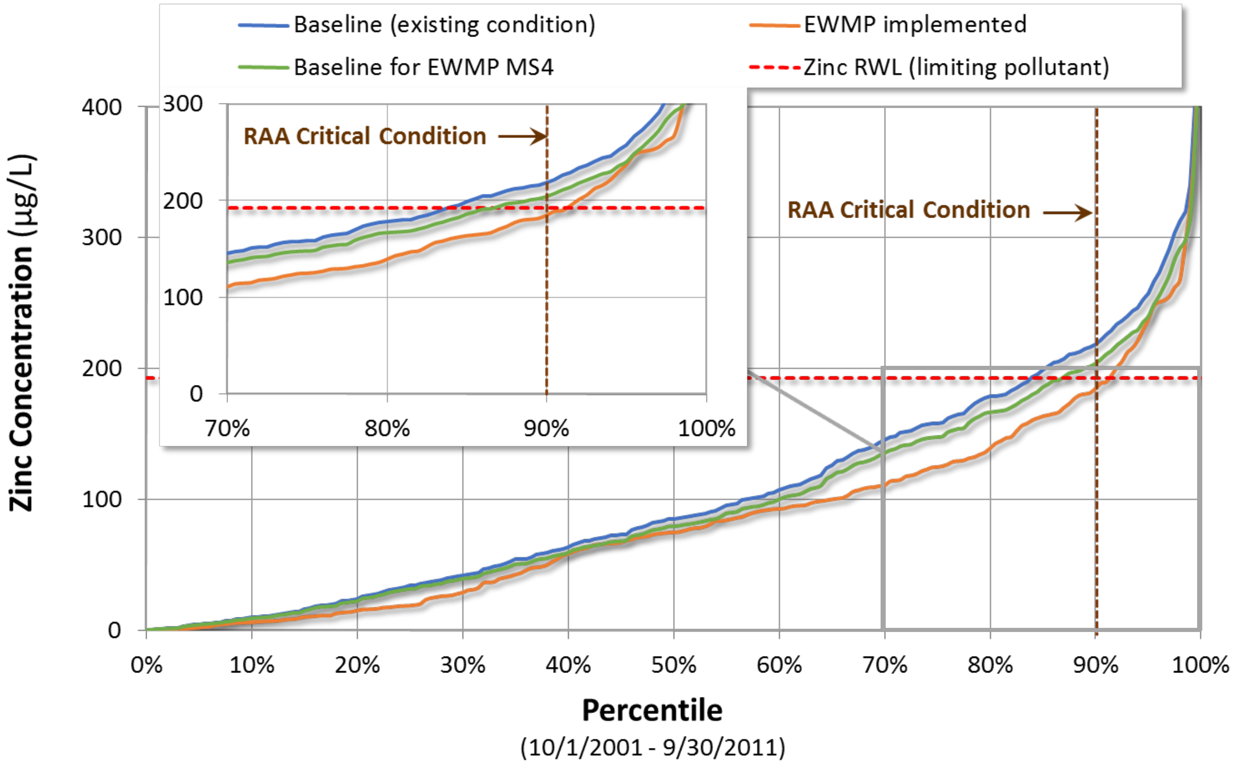


Figure 4-8. Instream validation plot demonstrating attainment of RWLs (Puente Creek).

APPENDIX D1

Detailed RAA Output and EWMP Implementation Plan

This appendix presents the detailed RAA output and EWMP implementation plan. Subwatershed index maps are also provided. A series of tables are presented below, organized first by jurisdiction and then by watershed. The detailed tables are as follows:

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The following color-gradients and symbol legend applies to all tables in Appendix D:

BLUE = Subwatersheds with highest BMP capacities within a BMP category
--- = BMP opportunity was either not available or not selected for the subwatershed (a value of 0.00 means that BMP capacity is non-zero but less than 0.004).

Table D1-1. Santa Clarita, Bouquet Creek: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
415573	0.90	---	0.62	---	0.04	0.00	---	---	---	0.57	**1.23**	---	**1.23**
415673	13.16	---	1.38	---	0.06	4.81	3.37	0.60	---	6.91	**17.13**	---	**17.13**
415773	2.55	---	0.37	---	0.06	1.02	0.97	---	---	1.28	**3.70**	---	**3.70**
416073	12.94	---	1.98	---	0.25	3.20	1.08	0.00	---	10.44	**16.95**	---	**16.95**
416173	2.49	---	0.28	---	0.00	1.10	1.01	0.00	---	1.21	**3.60**	---	**3.60**
417073	4.51	---	0.47	---	0.52	1.46	2.50	---	---	1.24	**6.19**	---	**6.19**
417173	1.00	---	0.14	---	0.03	0.50	0.56	---	0.00	0.29	**1.52**	---	**1.52**
417373	0.04	---	0.01	---	0.00	0.01	0.01	---	---	0.03	**0.06**	---	**0.06**
Total	**37.59**	**0.00**	**5.26**	**0.00**	**0.96**	**12.10**	**9.50**	**0.60**	**0.00**	**21.97**	**50.39**	**0.00**	**50.39**

Table D1-2. Santa Clarita, Castaic Creek: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
401573	0.01	---	---	---	---	---	---	---	---	0.01	**0.01**	---	**0.01**
401673	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
Total	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**

Table D1-3. Santa Clarita, Mint Canyon: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
420173	3.72	---	2.47	---	0.06	0.21	0.50	0.00	---	2.37	**5.62**	---	**5.62**
Total	**3.72**	**0.00**	**2.47**	**0.00**	**0.06**	**0.21**	**0.50**	**0.00**	**0.00**	**2.37**	**5.62**	**0.00**	**5.62**

Table D1-4. Santa Clarita, S. F. Santa Clara River: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
411773	4.16	2.04	2.45	---	0.18	---	0.72	---	---	2.36	**5.71**	2.04	**7.75**
411873	2.66	0.28	0.51	---	---	0.53	1.73	---	---	0.55	**3.32**	0.28	**3.60**
411973	7.38	0.48	1.07	---	0.29	2.25	3.33	4.82	---	1.08	**12.84**	0.48	**13.32**
412073	1.58	1.32	0.21	---	---	0.03	0.01	---	0.00	1.46	**1.72**	1.32	**3.05**
412173	1.94	0.48	0.68	0.00	0.04	0.99	0.59	0.00	0.37	0.56	**3.24**	0.48	**3.72**
412273	1.36	0.34	0.68	0.07	0.00	0.40	0.20	0.19	0.71	0.39	**2.63**	0.34	**2.97**
412373	1.19	0.55	0.43	---	0.00	0.31	0.42	---	---	0.65	**1.81**	0.55	**2.36**
412473	2.82	0.39	1.09	---	0.32	0.30	0.95	0.08	---	0.54	**3.27**	0.39	**3.65**
412573	0.40	0.31	0.37	0.00	0.00	---	---	0.01	0.00	0.35	**0.73**	0.31	**1.04**
412673	2.67	1.51	2.15	---	0.14	0.05	0.10	9.46	0.00	1.70	**13.61**	1.51	**15.13**
412773	2.25	1.40	0.73	---	0.00	0.20	0.09	---	0.14	1.55	**2.71**	1.40	**4.11**
412873	0.00	0.00	---	---	---	---	---	---	---	0.00	**0.00**	0.00	**0.00**
412973	0.05	0.04	0.01	---	---	---	---	---	---	0.05	**0.06**	0.04	**0.10**
413073	0.38	0.31	0.49	---	---	---	---	---	0.00	0.35	**0.83**	0.31	**1.15**
413173	2.88	1.32	2.56	---	0.01	0.14	1.78	---	---	1.51	**6.00**	1.32	**7.33**
413273	0.12	0.04	0.16	---	0.01	0.43	---	0.22	---	0.04	**0.85**	0.04	**0.89**
413373	0.85	---	1.04	---	0.01	0.06	0.03	0.00	---	0.77	**1.92**	---	**1.92**

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
413473	0.04	0.03	0.00	---	---	0.02	---	---	---	0.03	**0.06**	0.03	**0.09**
413673	4.71	0.97	1.48	---	0.02	2.16	4.55	---	---	1.43	**9.64**	0.97	**10.62**
413773	0.24	0.16	0.02	---	---	0.00	0.06	---	---	0.18	**0.26**	0.16	**0.43**
413873	1.76	0.19	1.45	---	0.05	0.78	0.57	0.78	0.01	0.25	**3.89**	0.19	**4.08**
413973	2.11	0.49	0.53	---	0.00	1.48	1.61	0.00	0.11	0.64	**4.37**	0.49	**4.85**
414073	2.73	0.82	1.12	0.94	---	0.80	1.72	1.61	---	1.01	**7.21**	0.82	**8.03**
414573	1.56	0.50	0.39	---	0.03	0.80	0.35	0.00	0.03	0.60	**2.21**	0.50	**2.70**
415073	0.00	0.00	---	---	---	---	---	---	0.00	0.00	**0.00**	0.00	**0.00**
415173	0.00	---	---	---	---	---	---	0.00	---	0.00	**0.00**	---	**0.00**
Total	**45.83**	**13.99**	**19.63**	**1.01**	**1.13**	**11.72**	**18.81**	**17.16**	**1.37**	**18.07**	**88.89**	**13.99**	**102.88**

Table D1-5. Santa Clarita, San Francisquito Creek: RAA Output and EWMP Implementation Plan

Subwatershed ID	COMPLIANCE TARGETS: **BMP PERFORMANCE GOAL**		EWMP IMPLEMENTATION PLAN: **APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
409773	6.22	---	0.90	---	0.01	1.41	1.78	0.11	---	3.31	**7.53**	---	**7.53**
409873	4.30	---	0.67	---	0.01	1.66	0.54	0.15	0.00	2.95	**5.98**	---	**5.98**
409973	0.01	---	0.00	---	---	0.00	---	---	---	0.01	**0.01**	---	**0.01**
Total	**10.53**	**0.00**	**1.57**	**0.00**	**0.03**	**3.07**	**2.32**	**0.26**	**0.00**	**6.26**	**13.51**	**0.00**	**13.51**

Table D1-6. Santa Clarita, SCR at County Line: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
409173	0.26	---	0.11	---	---	---	0.01	---	---	0.24	**0.36**	---	**0.36**
409273	30.79	---	5.62	0.14	0.03	0.39	4.40	---	0.66	21.32	**32.57**	---	**32.57**
409573	0.49	---	0.48	---	---	---	0.01	---	---	0.32	**0.81**	---	**0.81**
409673	14.21	---	5.44	0.76	0.53	2.18	5.09	---	---	7.66	**21.65**	---	**21.65**
411673	6.02	---	3.21	---	0.34	0.31	1.05	0.39	---	2.06	**7.37**	---	**7.37**
419373	9.39	---	4.16	0.37	0.09	0.00	0.30	---	0.00	6.97	**11.89**	---	**11.89**
419473	5.26	---	1.26	---	0.02	0.29	0.29	0.30	0.01	3.27	**5.44**	---	**5.44**
419573	13.58	---	2.11	0.05	0.20	1.83	3.55	---	0.55	6.60	**14.89**	---	**14.89**
419673	4.25	---	0.45	---	0.01	1.48	1.14	0.08	0.03	2.11	**5.29**	---	**5.29**
419773	8.16	---	1.26	---	0.02	2.37	4.88	0.00	---	2.17	**10.71**	---	**10.71**
419873	3.24	---	1.27	---	0.02	1.36	0.70	---	0.00	1.96	**5.31**	---	**5.31**
419973	3.28	---	1.16	---	0.30	1.60	0.47	0.03	0.00	2.43	**5.98**	---	**5.98**
420073	5.49	---	1.99	---	0.04	0.15	0.69	---	---	3.94	**6.81**	---	**6.81**
421373	8.70	---	1.61	0.51	0.02	1.80	1.73	2.80	0.00	4.66	**13.13**	---	**13.13**
421473	0.55	---	1.18	---	0.01	0.35	0.06	---	---	0.45	**2.05**	---	**2.05**
421573	1.47	---	2.46	---	0.00	0.04	0.15	---	---	1.28	**3.93**	---	**3.93**
421673	0.32	---	1.02	---	---	---	---	---	---	0.30	**1.32**	---	**1.32**

Subwatershed ID	**COMPLIANCE TARGETS: BMP PERFORMANCE GOAL**		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
421773	0.15	---	0.35	---	---	---	0.00	---	---	0.14	**0.50**	---	**0.50**
421873	0.09	---	0.30	---	---	---	---	---	---	0.08	**0.38**	---	**0.38**
421973	0.21	---	0.43	---	---	---	0.01	---	---	0.19	**0.63**	---	**0.63**
422173	0.02	---	0.07	---	---	---	0.00	---	---	0.02	**0.09**	---	**0.09**
422573	3.15	---	0.33	---	0.00	1.17	0.81	---	0.00	1.99	**4.30**	---	**4.30**
422673	2.58	---	0.38	---	0.08	1.75	1.16	---	0.03	0.80	**4.20**	---	**4.20**
422973	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
Total	**121.64**	**0.00**	**36.63**	**1.82**	**1.73**	**17.08**	**26.51**	**3.59**	**1.29**	**70.97**	**159.61**	**0.00**	**159.61**

Table D1-7. Uninc. LA County, Bouquet Creek: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
415783	2.56	---	0.30	---	0.01	1.05	0.08	---	---	2.24	**3.68**	---	**3.68**
415883	0.00	---	0.00	---	---	0.00	---	---	---	0.00	**0.00**	---	**0.00**
416083	0.00	---	0.00	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
416283	0.10	---	0.26	---	---	0.09	0.00	---	---	0.09	**0.44**	---	**0.44**
416483	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
417083	0.91	---	0.20	---	---	0.40	0.10	---	---	0.72	**1.42**	---	**1.42**
417183	5.15	---	0.69	---	0.00	2.11	0.92	0.00	0.17	3.39	**7.29**	---	**7.29**
417283	0.07	---	0.04	---	---	0.00	0.01	0.00	---	0.06	**0.11**	---	**0.11**
417383	1.44	---	1.62	---	0.58	0.42	0.20	---	---	0.98	**3.80**	---	**3.80**
417483	0.05	---	0.30	---	---	---	---	---	---	0.05	**0.36**	---	**0.36**
417583	0.00	---	0.03	---	---	---	---	---	---	0.00	**0.03**	---	**0.03**
417683	0.55	---	0.34	---	---	---	---	---	---	0.52	**0.86**	---	**0.86**
417783	0.00	---	0.03	---	---	---	---	---	---	0.00	**0.03**	---	**0.03**
417883	0.03	---	0.24	---	---	---	---	---	---	0.03	**0.26**	---	**0.26**
417983	0.00	---	0.07	---	---	---	---	---	---	0.00	**0.07**	---	**0.07**
418583	0.03	---	0.14	---	---	---	---	---	---	0.02	**0.16**	---	**0.16**
Total	**10.91**	**0.00**	**4.25**	**0.00**	**0.59**	**4.08**	**1.32**	**0.00**	**0.17**	**8.10**	**18.51**	**0.00**	**18.51**

Table D1-8. Uninc. LA County, Castaic Creek: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: **BMP PERFORMANCE GOAL**		EWMP IMPLEMENTATION PLAN: **APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
400983	8.87	---	1.27	---	---	---	0.14	---	---	8.12	**9.53**	---	**9.53**
401083	6.84	---	0.69	---	---	0.31	0.12	0.00	---	6.31	**7.44**	---	**7.44**
401183	1.03	---	0.59	---	---	0.74	0.25	---	0.00	0.70	**2.28**	---	**2.28**
401283	0.55	---	0.14	---	---	---	0.12	---	---	0.40	**0.66**	---	**0.66**
401383	0.09	---	0.38	---	---	---	0.00	---	---	0.08	**0.46**	---	**0.46**
401483	0.21	---	1.25	---	---	---	0.06	---	---	0.14	**1.45**	---	**1.45**
401583	11.07	---	1.50	---	1.13	1.92	2.06	1.34	---	4.87	**12.82**	---	**12.82**
401683	3.37	---	0.34	---	0.12	---	---	---	0.00	3.23	**3.68**	---	**3.68**
401783	2.29	---	0.45	---	---	1.14	0.94	---	0.00	1.25	**3.78**	---	**3.78**
401883	1.61	---	0.61	---	0.02	0.34	0.10	---	0.00	1.36	**2.43**	---	**2.43**
401983	0.39	---	0.25	---	0.02	---	---	---	---	0.13	**0.40**	---	**0.40**
402083	2.79	---	1.05	---	0.31	1.03	0.06	---	0.88	0.75	**4.08**	---	**4.08**
402183	0.52	---	0.25	---	0.09	---	0.01	---	---	0.45	**0.81**	---	**0.81**
402283	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
402383	0.00	---	0.03	---	---	---	---	---	---	0.00	**0.03**	---	**0.03**
402583	4.16	---	2.19	---	0.17	0.74	2.40	---	0.00	1.55	**7.06**	---	**7.06**
402683	0.72	---	0.43	---	---	0.30	0.00	---	---	0.67	**1.40**	---	**1.40**

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
402783	0.44	---	0.09	---	---	0.17	0.29	---	---	0.22	**0.78**	---	**0.78**
402883	0.01	---	---	---	---	---	---	---	---	0.01	**0.01**	---	**0.01**
402983	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
403083	4.49	---	3.04	---	---	0.98	0.48	---	---	3.78	**8.28**	---	**8.28**
403183	0.48	---	2.90	---	---	0.04	---	---	---	0.44	**3.39**	---	**3.39**
403283	0.04	---	0.51	---	---	---	---	---	---	0.04	**0.54**	---	**0.54**
403383	0.07	---	2.00	---	---	---	---	---	---	0.06	**2.06**	---	**2.06**
406083	0.49	---	10.29	---	---	---	---	---	---	0.44	**10.73**	---	**10.73**
406183	0.08	---	2.27	---	---	---	---	---	---	0.07	**2.34**	---	**2.34**
406283	0.86	---	5.19	---	---	---	0.00	---	---	0.81	**6.00**	---	**6.00**
406383	0.02	---	0.73	---	---	---	---	---	---	0.02	**0.75**	---	**0.75**
406483	0.21	---	0.02	---	---	---	---	---	---	0.20	**0.22**	---	**0.22**
Total	**51.68**	**0.00**	**38.44**	**0.00**	**1.87**	**7.70**	**7.04**	**1.34**	**0.88**	**36.13**	**93.40**	**0.00**	**93.40**

Table D1-9. Uninc. LA County, Mint Canyon: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
420183	2.14	---	1.81	---	---	0.36	0.40	0.00	---	1.37	**3.93**	---	**3.93**
420283	0.11	---	0.38	---	---	---	---	---	---	0.10	**0.48**	---	**0.48**
420383	1.12	---	2.22	---	0.00	---	---	---	---	0.92	**3.14**	---	**3.14**
420483	0.46	---	0.97	---	---	---	0.05	---	---	0.40	**1.43**	---	**1.43**
420583	0.08	---	0.23	---	---	---	0.01	---	---	0.07	**0.31**	---	**0.31**
420783	0.51	---	0.45	---	---	0.24	0.05	---	---	0.39	**1.13**	---	**1.13**
420883	0.32	---	0.99	---	---	---	0.02	---	---	0.23	**1.25**	---	**1.25**
420983	0.10	---	0.48	---	---	---	---	---	---	0.09	**0.57**	---	**0.57**
421083	0.00	---	0.02	---	---	---	---	---	---	0.00	**0.03**	---	**0.03**
421283	0.00	---	0.00	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
Total	**4.84**	**0.00**	**7.55**	**0.00**	**0.00**	**0.59**	**0.53**	**0.00**	**0.00**	**3.59**	**12.27**	**0.00**	**12.27**

Table D1-10. Uninc. LA County, Piru Creek: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
442183	0.08	---	0.01	---	---	---	---	---	---	0.08	**0.09**	---	**0.09**
442283	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
442383	0.12	---	0.11	---	---	---	---	---	---	0.12	**0.23**	---	**0.23**
442483	0.02	---	---	---	---	---	---	---	---	0.02	**0.02**	---	**0.02**
442583	0.01	---	---	---	---	---	---	---	---	0.01	**0.01**	---	**0.01**
442783	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
442883	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
442983	0.03	---	0.01	---	---	---	---	---	---	0.03	**0.03**	---	**0.03**
443083	0.04	---	0.01	---	---	---	---	---	---	0.04	**0.05**	---	**0.05**
443183	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
443283	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
443383	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
443483	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
Total	**0.30**	**0.00**	**0.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.30**	**0.44**	**0.00**	**0.44**

Table D1-11. Uninc. LA County, S. F. Santa Clara River: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
412583	0.00	0.00	---	---	---	---	---	0.00	---	0.00	**0.00**	0.00	**0.00**
412783	0.13	0.11	0.20	---	---	---	---	---	---	0.12	**0.32**	0.11	**0.43**
412883	0.02	0.02	0.14	---	---	---	---	---	---	0.02	**0.16**	0.02	**0.18**
412983	0.03	0.03	0.27	---	---	---	---	---	---	0.03	**0.30**	0.03	**0.32**
413083	0.02	0.01	0.03	---	---	---	0.00	---	---	0.02	**0.05**	0.01	**0.06**
413183	0.43	0.37	0.15	---	---	---	---	---	---	0.41	**0.56**	0.37	**0.93**
413483	0.80	0.67	0.10	---	---	0.08	0.01	---	---	0.75	**0.93**	0.67	**1.60**
413683	0.73	0.43	0.53	---	---	0.26	0.07	---	---	0.49	**1.34**	0.43	**1.77**
413783	0.20	0.15	0.06	---	---	0.12	0.01	---	0.00	0.17	**0.36**	0.15	**0.51**
413883	0.00	0.00	0.05	---	---	---	---	0.10	---	0.00	**0.15**	0.00	**0.15**
414083	2.58	1.24	2.49	---	0.01	0.18	0.62	---	0.00	1.43	**4.73**	1.24	**5.97**
414183	8.24	1.82	1.24	---	0.78	1.71	1.23	---	0.09	2.11	**7.16**	1.82	**8.98**
414283	0.68	0.04	0.62	---	0.15	1.54	0.00	2.40	1.50	0.04	**6.26**	0.04	**6.30**
414383	0.00	0.00	0.00	---	---	0.00	---	---	0.25	0.00	**0.25**	0.00	**0.25**
414483	0.17	---	0.09	---	---	0.46	0.17	---	0.35	0.01	**1.08**	---	**1.08**
414583	0.00	---	---	---	0.00	---	---	---	0.01	0.00	**0.01**	---	**0.01**
414683	0.01	---	0.03	---	0.00	---	0.01	---	---	0.01	**0.04**	---	**0.04**

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
414783	0.00	0.00	---	---	---	---	---	---	---	0.00	**0.00**	0.00	**0.00**
414883	0.00	0.00	---	---	---	---	---	---	0.00	0.00	**0.00**	0.00	**0.00**
414983	0.09	0.08	0.04	---	0.00	---	---	---	---	0.09	**0.13**	0.08	**0.21**
415083	0.32	0.14	0.17	---	0.00	---	0.17	---	0.00	0.17	**0.51**	0.14	**0.65**
415183	0.44	0.28	0.55	---	---	---	0.02	0.00	0.00	0.31	**0.88**	0.28	**1.16**
415283	0.06	0.05	0.01	---	---	---	---	---	---	0.06	**0.07**	0.05	**0.12**
415383	0.06	0.05	0.03	---	---	---	---	---	---	0.06	**0.09**	0.05	**0.14**
415483	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
Total	**15.03**	**5.49**	**6.79**	**0.00**	**0.95**	**4.35**	**2.30**	**2.50**	**2.20**	**6.29**	**25.36**	**5.49**	**30.86**

Table D1-12. Uninc. LA County, San Francisquito Creek: RAA Output and EWMP Implementation Plan

Subwatershed ID	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
409883	5.84	---	1.05	---	0.00	2.15	0.72	---	0.28	3.32	**7.53**	---	**7.53**
409983	0.66	---	0.27	---	---	0.46	0.07	---	---	0.49	**1.29**	---	**1.29**
410083	0.15	---	0.44	---	---	0.00	0.00	---	---	0.14	**0.58**	---	**0.58**
Total	**6.64**	**0.00**	**1.75**	**0.00**	**0.00**	**2.62**	**0.79**	**0.00**	**0.28**	**3.95**	**9.40**	**0.00**	**9.40**

Table D1-13. Uninc. LA County, SCR at County Line: RAA Output and EWMP Implementation Plan

Subwatershed ID	**COMPLIANCE TARGETS: BMP PERFORMANCE GOAL**		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
400183	0.01	---	---	---	---	---	---	---	---	0.01	**0.01**	---	**0.01**
400283	0.14	---	0.08	---	---	---	---	---	---	0.13	**0.22**	---	**0.22**
400383	1.62	---	1.08	---	---	---	---	---	---	1.54	**2.63**	---	**2.63**
400483	1.88	---	1.80	---	---	0.08	0.00	---	0.00	1.77	**3.65**	---	**3.65**
400583	0.59	---	0.18	---	---	---	---	---	---	0.57	**0.74**	---	**0.74**
400683	1.90	---	0.67	---	0.03	1.11	1.20	---	0.08	0.43	**3.52**	---	**3.52**
400783	0.19	---	0.11	---	---	0.02	0.11	---	0.00	0.11	**0.36**	---	**0.36**
400883	2.32	---	1.46	---	---	0.04	0.00	---	---	2.20	**3.70**	---	**3.70**
409183	7.34	---	4.53	---	---	---	0.14	---	---	6.02	**10.68**	---	**10.68**
409283	0.46	---	0.20	---	---	0.11	---	---	0.09	0.42	**0.82**	---	**0.82**
409383	4.07	---	4.39	---	---	0.17	0.20	---	---	2.50	**7.26**	---	**7.26**
409483	4.23	---	3.70	---	---	0.69	0.15	---	0.00	2.85	**7.40**	---	**7.40**
409583	5.11	---	2.32	---	---	1.66	0.94	---	---	3.57	**8.49**	---	**8.49**
419483	0.01	---	0.05	---	---	---	---	---	---	0.01	**0.06**	---	**0.06**
419583	0.01	---	0.00	---	---	---	---	---	---	0.01	**0.01**	---	**0.01**
419683	0.01	---	0.00	---	---	0.02	---	0.72	0.00	0.00	**0.75**	---	**0.75**
419983	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
420083	4.86	---	0.34	---	0.00	1.01	1.64	---	---	3.46	**6.45**	---	**6.45**
421383	3.73	---	0.28	---	0.01	0.53	1.93	---	---	2.24	**4.99**	---	**4.99**
421483	0.00	---	0.01	---	---	---	0.00	---	---	0.00	**0.02**	---	**0.02**
421583	0.34	---	0.84	---	---	0.43	0.04	---	---	0.30	**1.61**	---	**1.61**
421683	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
422183	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
422283	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
422383	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
422483	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
422583	0.02	---	0.01	---	---	---	---	---	---	0.02	**0.03**	---	**0.03**
422683	0.56	---	0.12	---	---	0.56	0.07	---	---	0.43	**1.18**	---	**1.18**
422783	0.01	---	0.13	---	---	0.01	---	---	---	0.01	**0.15**	---	**0.15**
422883	0.21	---	0.95	---	---	---	0.01	---	---	0.19	**1.15**	---	**1.15**
422983	1.22	---	0.26	---	---	0.84	0.18	---	---	1.00	**2.27**	---	**2.27**
423083	0.28	---	0.17	---	0.00	0.09	0.01	---	---	0.25	**0.52**	---	**0.52**
423183	0.09	---	0.15	---	---	0.13	0.00	---	---	0.07	**0.35**	---	**0.35**
423283	0.42	---	0.22	---	---	---	0.00	---	---	0.39	**0.61**	---	**0.61**
423383	0.09	---	0.02	---	---	---	---	---	---	0.08	**0.11**	---	**0.11**

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
Total	**41.72**	**0.00**	**24.09**	**0.00**	**0.04**	**7.49**	**6.62**	**0.72**	**0.17**	**30.59**	**69.72**	**0.00**	**69.72**

Table D1-14. Uninc. LA County, SCR at Reach 7: RAA Output and EWMP Implementation Plan

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
423483	0.10	---	0.06	---	---	---	---	---	---	0.09	**0.15**	---	**0.15**
423583	0.01	---	0.10	---	---	---	---	---	---	0.01	**0.10**	---	**0.10**
423683	0.00	---	0.01	---	---	---	---	---	---	0.00	**0.02**	---	**0.02**
423783	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
423883	0.12	---	0.28	---	---	---	0.00	---	---	0.11	**0.39**	---	**0.39**
423983	0.15	---	0.72	---	---	---	0.02	---	---	0.12	**0.86**	---	**0.86**
424083	0.07	---	1.39	---	---	---	0.03	---	---	0.05	**1.47**	---	**1.47**
424183	0.04	---	0.65	---	---	---	0.01	---	---	0.03	**0.70**	---	**0.70**
424283	0.03	---	1.07	---	---	---	---	---	---	0.03	**1.10**	---	**1.10**
424383	1.11	---	3.73	---	0.01	---	0.22	---	---	0.82	**4.77**	---	**4.77**
424483	1.45	---	2.98	---	---	---	0.10	---	---	1.29	**4.36**	---	**4.36**
424583	0.07	---	1.02	---	---	---	0.02	---	---	0.06	**1.09**	---	**1.09**
424683	0.08	---	1.01	---	---	---	0.00	---	---	0.08	**1.09**	---	**1.09**
424783	0.02	---	0.32	---	---	---	0.01	---	---	0.01	**0.34**	---	**0.34**
424883	0.02	---	0.40	---	---	---	0.02	---	---	0.01	**0.43**	---	**0.43**
424983	0.00	---	0.10	---	---	---	---	---	---	0.00	**0.10**	---	**0.10**
425083	0.02	---	0.44	---	---	---	0.00	---	---	0.01	**0.46**	---	**0.46**

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
425183	0.00	---	0.13	---	---	---	---	---	---	0.00	**0.13**	---	**0.13**
425283	0.07	---	0.59	---	0.05	---	0.00	---	---	0.05	**0.69**	---	**0.69**
425383	0.00	---	0.01	---	---	---	---	---	---	0.00	**0.01**	---	**0.01**
425483	0.00	---	0.01	---	---	---	---	---	---	0.00	**0.01**	---	**0.01**
425583	0.01	---	0.24	---	---	---	---	---	---	0.01	**0.24**	---	**0.24**
425683	0.00	---	0.14	---	---	---	---	---	---	0.00	**0.14**	---	**0.14**
425783	0.00	---	0.09	---	---	---	---	---	---	0.00	**0.09**	---	**0.09**
425883	0.00	---	0.01	---	---	---	---	---	---	0.00	**0.01**	---	**0.01**
425983	0.02	---	0.01	---	0.01	---	---	---	---	0.02	**0.04**	---	**0.04**
426083	0.00	---	0.03	---	---	---	---	---	---	0.00	**0.03**	---	**0.03**
426183	0.01	---	0.25	---	---	---	---	---	---	0.01	**0.26**	---	**0.26**
426283	0.09	---	0.51	---	---	---	---	---	---	0.05	**0.56**	---	**0.56**
426383	0.00	---	0.00	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
426483	---	---	---	---	---	---	---	---	---	---	**0.00**	---	**0.00**
426783	0.05	---	0.48	---	---	---	---	---	---	0.05	**0.53**	---	**0.53**
426883	0.01	---	0.13	---	---	---	---	---	---	0.01	**0.14**	---	**0.14**
426983	0.32	---	2.48	---	---	---	---	---	---	0.20	**2.68**	---	**2.68**
427083	0.17	---	0.53	---	---	---	---	---	---	0.09	**0.62**	---	**0.62**

Subwatershed ID	**COMPLIANCE TARGETS: BMP PERFORMANCE GOAL**		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
427183	0.00	---	0.05	---	---	---	---	---	---	0.00	**0.05**	---	**0.05**
427283	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
427383	0.47	---	2.16	---	0.03	---	0.04	---	---	0.38	**2.61**	---	**2.61**
427483	1.24	---	3.60	---	0.02	0.22	0.49	---	---	0.53	**4.85**	---	**4.85**
427583	0.37	---	2.28	---	0.00	---	0.05	---	---	0.26	**2.59**	---	**2.59**
427683	0.02	---	0.70	---	---	---	0.01	---	---	0.01	**0.73**	---	**0.73**
427783	0.75	---	1.23	---	0.00	0.05	0.28	---	---	0.45	**2.01**	---	**2.01**
427883	0.25	---	1.92	---	---	---	0.08	---	---	0.15	**2.15**	---	**2.15**
427983	0.16	---	1.06	---	---	---	0.04	---	---	0.12	**1.23**	---	**1.23**
428083	0.16	---	0.77	---	---	---	0.04	---	---	0.10	**0.92**	---	**0.92**
428183	0.02	---	0.46	---	---	---	---	---	---	0.02	**0.48**	---	**0.48**
428283	0.14	---	1.88	---	---	---	0.03	---	---	0.09	**2.00**	---	**2.00**
428383	0.24	---	2.24	0.00	---	---	0.05	---	---	0.20	**2.49**	---	**2.49**
428483	0.07	---	1.43	0.00	---	---	0.04	---	---	0.05	**1.52**	---	**1.52**
428583	0.05	---	0.26	---	---	0.01	0.01	---	---	0.03	**0.31**	---	**0.31**
429283	0.31	---	1.67	---	---	0.02	0.04	---	---	0.20	**1.92**	---	**1.92**
429383	0.07	---	0.90	---	---	---	---	---	---	0.06	**0.97**	---	**0.97**
429483	0.00	---	0.01	---	---	---	---	---	---	0.00	**0.01**	---	**0.01**

	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		**EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT** (BMP capacity expressed in units of acre-feet)										
	For Bacteria by 2029	For Metals by 2035	For Bacteria Attainment by 2029									For Metals Attainment by 2035	
			Low-Impact Development				Streets	Regional BMPs					
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	Additional Private Regional BMP capacity to address Metals	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
429683	0.00	---	0.01	---	---	---	0.00	---	---	0.00	**0.01**	---	**0.01**
429783	0.58	---	2.94	---	---	---	0.01	---	---	0.43	**3.38**	---	**3.38**
429883	0.04	---	0.74	---	---	---	---	---	---	0.04	**0.78**	---	**0.78**
429983	0.04	---	0.49	---	---	---	---	---	---	0.03	**0.53**	---	**0.53**
441083	0.04	---	0.14	---	---	---	---	---	---	0.04	**0.18**	---	**0.18**
441183	0.05	---	0.06	---	---	---	---	---	---	0.05	**0.11**	---	**0.11**
441283	0.03	---	---	---	---	---	---	---	0.00	0.03	**0.03**	---	**0.03**
441383	0.08	---	---	---	---	---	---	---	0.00	0.08	**0.08**	---	**0.08**
441483	0.01	---	0.01	---	---	---	---	---	---	0.01	**0.02**	---	**0.02**
441583	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
441683	0.00	---	---	---	---	---	---	---	---	0.00	**0.00**	---	**0.00**
441783	0.00	---	0.01	---	---	---	---	---	0.00	0.00	**0.02**	---	**0.02**
Total	**9.24**	**0.00**	**46.92**	**0.00**	**0.11**	**0.30**	**1.65**	**0.00**	**0.00**	**6.58**	**55.56**	**0.00**	**55.56**

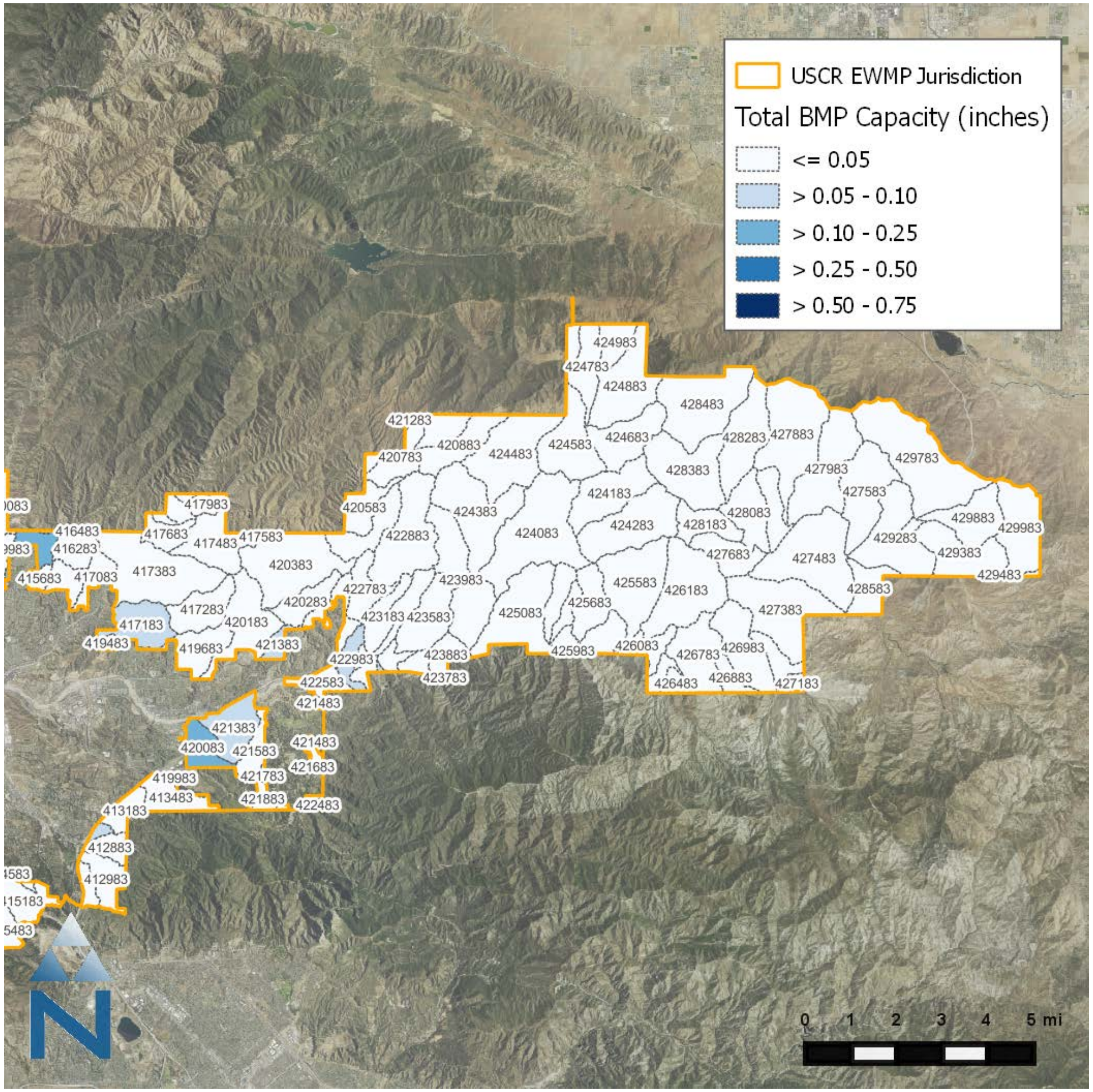

Figure D1-1. Uninc. L.A. County, East: Subwatershed map.

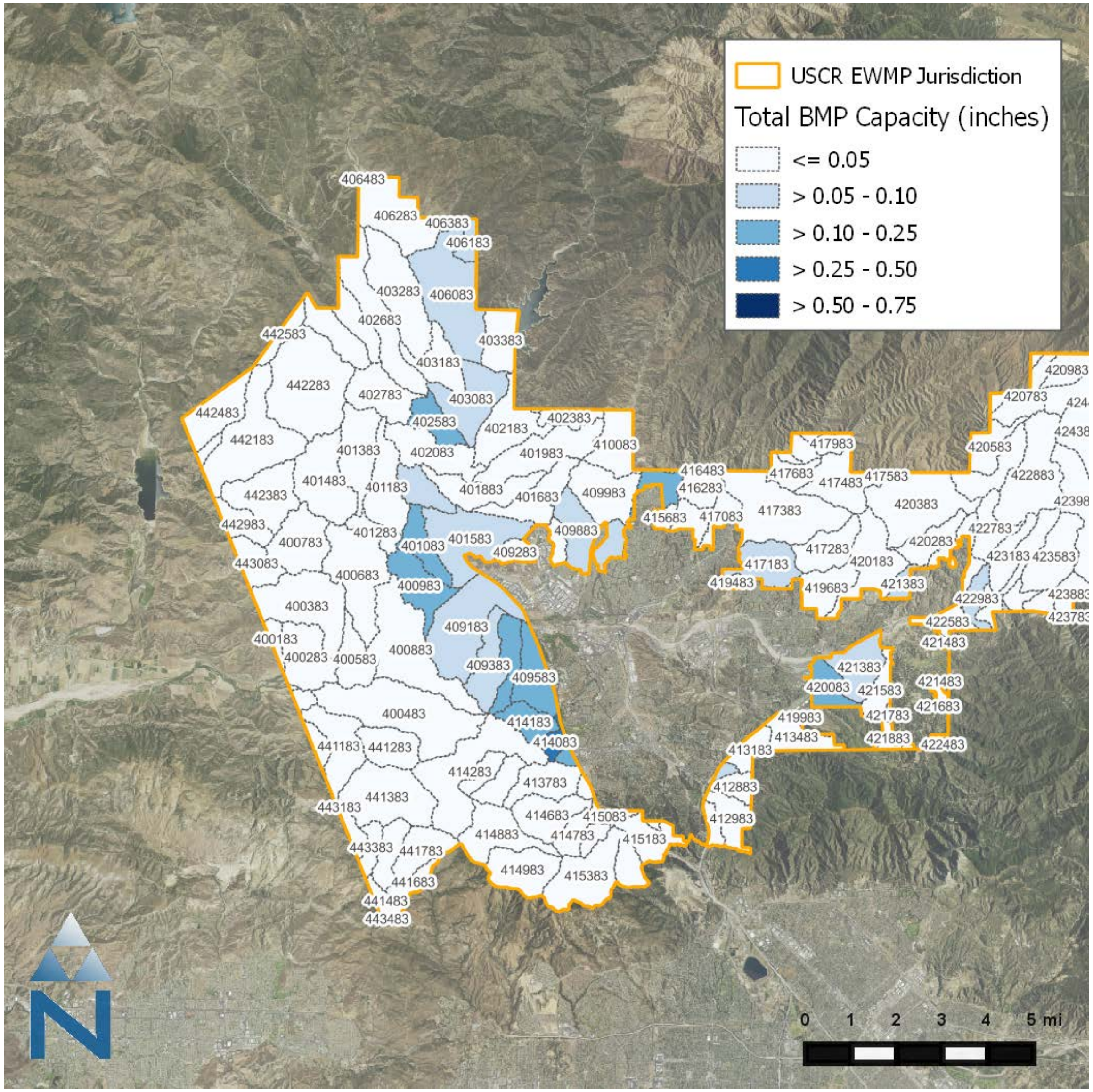

Figure D1-2. Uninc. L.A. County, West: Subwatershed map.

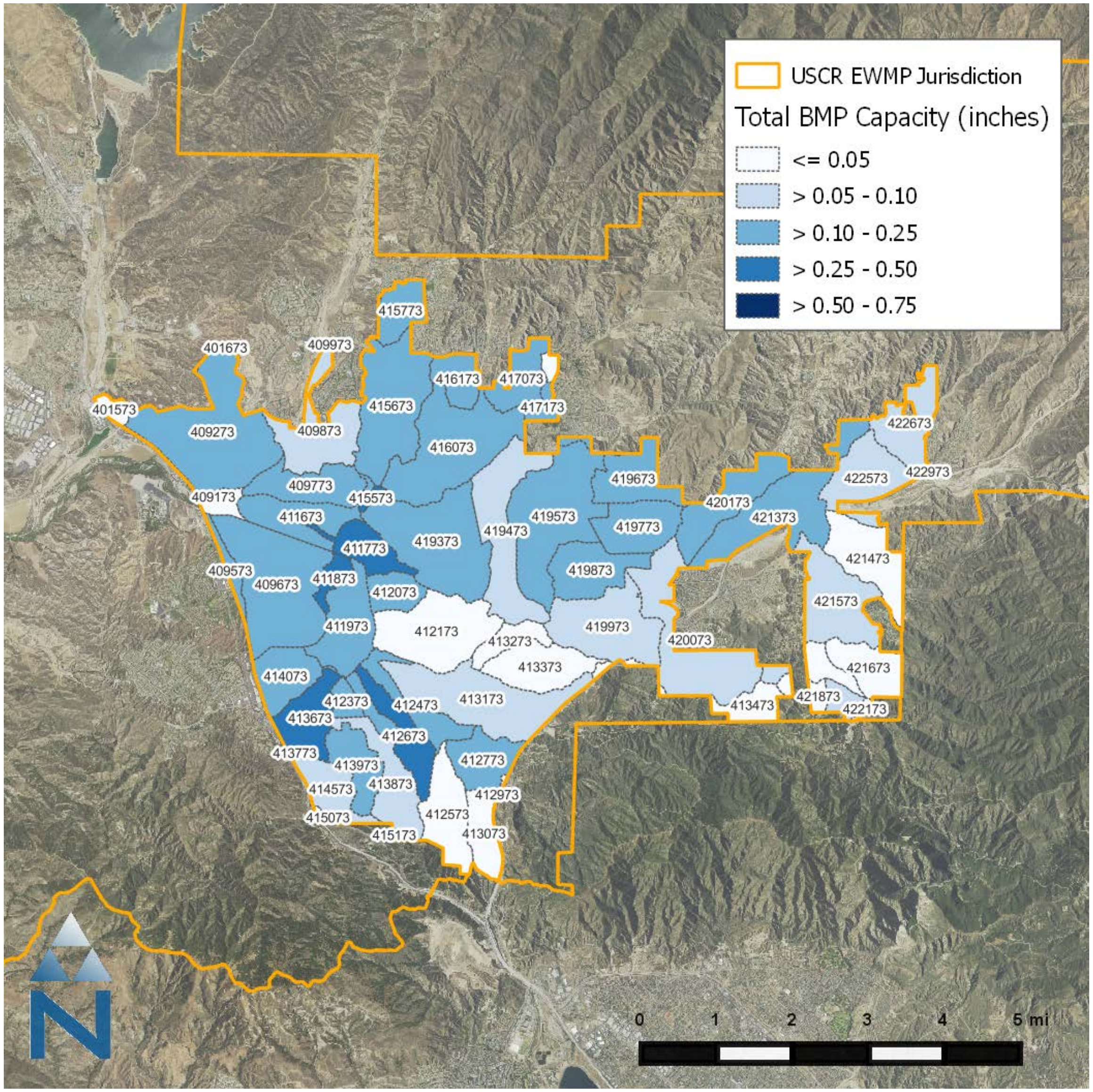

Figure D1-3. Santa Clarita: Subwatershed map.

APPENDIX E1

Legal Authorities

ATTACHMENT A

LEGAL AUTHORITY CERTIFICATION

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COUNTY OF LOS ANGELES
OFFICE OF THE COUNTY COUNSEL
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500 WEST TEMPLE STREET
LOS ANGELES, CALIFORNIA 90012-2713

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December 16, 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 90013-2343

Attention: Mr. Ivar Ridgeway

Re: Certification By Legal Counsel For County of Los Angeles' Annual Report

Dear Mr. Unger:

Pursuant to the requirements of Part VI(A)(2)(b) of Order No. R4-2012-0175 (the "Order"), the Office of the County Counsel of the County of Los Angeles makes the following certification in support of the Annual Report of the County of Los Angeles ("County"):

Certification Pursuant To Order Part VI(A)(2)(b)

"*Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and this Order.*"

The County has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order.

Order Part VI(A)(2)(b)(i)

"*Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR §122.26(d)(2)(i)(A-F) and this Order*"

Citations Of Applicable Ordinances Or Other Legal Authorities

Although many portions of State law, the Charter of the County of Los Angeles and the Los Angeles County Code are potentially applicable to the implementation and enforcement of these requirements, the primary applicable laws and ordinances are as follows:

Los Angeles County Code, Title 12, Chapter 12.80 STORMWATER AND RUNOFF POLLUTION CONTROL, including:

§12.80.010 - §12.80.360 Definitions

§12.80.370 Short title.

§12.80.380 Purpose and intent.

§12.80.390 Applicability of this chapter.

§12.80.400 Standards, guidelines and criteria.

§12.80.410 Illicit discharges prohibited.

§12.80.420 Installation or use of illicit connections prohibited.

§12.80.430 Removal of illicit connection from the storm drain system.

§12.80.440 Littering and other discharge of polluting or damaging substances prohibited.

§12.80.450 Stormwater and runoff pollution mitigation for construction activity.

§12.80.460 Prohibited discharges from industrial or commercial activity.

§12.80.470 Industrial/commercial facility sources required to obtain a NPDES permit.

§12.80.480 Public facility sources required to obtain a NPDES permit.

§12.80.490 Notification of uncontrolled discharges required.

§12.80.500 Good housekeeping provisions.

§12.80.510 Best management practices for construction activity.

§12.80.520 Best management practices for industrial and commercial facilities.

§12.80.530 Installation of structural BMPs.

§12.80.540 BMPs to be consistent with environmental goals.

§12.80.550 Enforcement—Director's powers and duties.

§12.80.560 Identification for inspectors and maintenance personnel.

§12.80.570 Obstructing access to facilities prohibited.

§12.80.580 Inspection to ascertain compliance—Access required.

§12.80.590 Interference with inspector prohibited.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.80.650 Conflicts with other code sections.

§12.80.660 Severability.

§12.80.700 Purpose.

§12.80.710 Applicability.

§12.80.720 Registration required.

§12.80.730 Exempt facilities.

§12.80.740 Certificate of inspection—Issuance by the director.

§12.80.750 Certificate of inspection—Suspension or revocation.

§12.80.760 Certificate of inspection—Termination.

§12.80.770 Service fees.

§12.80.780 Fee schedule.

§12.80.790 Credit for overlapping inspection programs.

§12.80.800 Annual review of fees.

Los Angeles County Code, Title 12, Chapter 12.84 LOW IMPACT DEVELOPMENT STANDARDS, including:

§12.84.410 Purpose.

§12.84.420 Definitions.

§12.84.430 Applicability.

§12.84.440 Low Impact Development Standards.

§12.84.445 Hydromodification Control.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Los Angeles County Code, Title 22 PLANNING AND ZONING, Part 6 ENFORCEMENT PROCEDURES, including:

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

Los Angeles County Code, Title 26 BUILDING CODE, including:

§26.103 Violations And Penalties

§26.104 Organization And Enforcement

§26.105 Appeals Boards

§26.106 Permits

§26.107 Fees

§26.108 Inspections

California Government Code §6502

California Government Code §23004

Relationship Of Applicable Ordinances Or Other Legal Authorities To The Requirements of 40 CFR §122.26(d)(2)(i)(A-F) And The Order

Although, depending upon the particular issue, there may be multiple ways in which particular sections of the County's ordinances and State law relate to the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order, the table below indicates the basic relationship with Part VI(A)(2)(a) of the Order:

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
i. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.	§12.80.410 [illicit discharge prohibited]; §12.80.450 [construction] §12.80.460 [industrial and commercial] §12.80.470 and .480 [industrial and commercial NPDES requirements] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties] §26.104 [enforcement] §26.106 [permits] §26.108 [inspections]
ii. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.	§12.80.410 [illicit discharge prohibited]
iii. Prohibit and eliminate illicit discharges and illicit connections to the MS4.	§12.80.410 [illicit discharge prohibited]; §12.80.420 [illicit connections prohibited]
iv. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.	§12.80.410 [illicit discharge prohibited]; §12.80.440 [littering and other polluting prohibited]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
v. Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows).	§12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.620 [nuisance abatement] §12.80.635 [violation penalty] §12.80.640 [penalties not exclusive] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties] §26.104 [enforcement] §26.106 [permits] §26.108 [inspections]
vi. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.	Same as item v., above

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
vii. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Copermittees.	California Government Code §6502 and §23004
viii. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation.	California Government Code §6502 and §23004
ix. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4.	§12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.80.620 [nuisance abatement] §12.80.635 [violation penalty] §12.80.640 [penalties not exclusive] §22.60.380 [enforcement.] §26.106 [permits] §26.108 [inspections]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
x. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations.	§12.80.450 [construction mitigation] §12.80.500 [good housekeeping practices] §12.80.510 [construction BMPs] §12.80.520 [industrial/commercial BMPs] §12.84.440 [LID standards] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections]
xi. Require that structural BMPs are properly operated and maintained.	§12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections]
xii. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.	§12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections]

<u>Order Part VI(A)(2)(b)(ii)</u>

"*Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.*"

The local administrative and legal procedures available to mandate compliance with the above ordinances are specified in those ordinances, particularly in:

§12.80.550 Enforcement—Director's powers and duties.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Title 26, §103 Violations And Penalties

Title 26, §104 Organization And Enforcement

Title 26, §105 Appeals Boards

Title 26, §106 Permits

Title 22 PLANNING AND ZONING, Part 6 ENFORCEMENT PROCEDURES, including:

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

The County attempts to first resolve each enforcement action administratively. However, the above cited ordinances also provide the County with the authority to pursue such actions in the judicial system as necessary.

Very truly yours,

JOHN F. KRATTLI
County Counsel

By Judith A. Fries
JUDITH A. FRIES
Principal Deputy County Counsel
Public Works Division

JAF:jyj

ATTACHMENT A

COUNSEL CERTIFICATION ON THE LACFCD'S LEGAL AUTHORITY

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COUNTY OF LOS ANGELES
OFFICE OF THE COUNTY COUNSEL
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December 16, 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 90013-2343

Attention: Mr. Ivar Ridgeway

Re: Certification By Legal Counsel For Los Angeles County Flood Control District's Annual Report

Dear Mr. Unger:

Pursuant to the requirements of Part VI(A)(2)(b) of Order No. R4-2012-0175 (the "Order"), the Office of the County Counsel of the County of Los Angeles makes the following certification in support of the Annual Report of the Los Angeles County Flood Control District ("LACFCD"):

Certification Pursuant To Order Part VI(A)(2)(b)

"*Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and this Order.*"

LACFCD has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order.

Order Part VI(A)(2)(b)(i)

"*Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR §122.26(d)(2)(i)(A-F) and this Order*"

Citations Of Applicable Ordinances Or Other Legal Authorities

Although many portions of State law, the Charter of the County of Los Angeles, the Los Angeles County Code and LACFCD's Flood Control District Code ("Code") are potentially applicable to the implementation and enforcement of these requirements, the primary applicable laws and ordinances are as follows:

Los Angeles County Code, Title 12, Chapter 12.80 STORMWATER AND RUNOFF POLLUTION CONTROL, including:

§12.80.010 - §12.80.360 Definitions

§12.80.370 Short title.

§12.80.380 Purpose and intent.

§12.80.390 Applicability of this chapter.

§12.80.400 Standards, guidelines and criteria.

§12.80.410 Illicit discharges prohibited.

§12.80.420 Installation or use of illicit connections prohibited.

§12.80.430 Removal of illicit connection from the storm drain system.

§12.80.440 Littering and other discharge of polluting or damaging substances prohibited.

§12.80.450 Stormwater and runoff pollution mitigation for construction activity.

§12.80.460 Prohibited discharges from industrial or commercial activity.

§12.80.470 Industrial/commercial facility sources required to obtain a NPDES permit.

§12.80.480 Public facility sources required to obtain a NPDES permit.

§12.80.490 Notification of uncontrolled discharges required.

§12.80.500 Good housekeeping provisions.

§12.80.510 Best management practices for construction activity.

§12.80.520 Best management practices for industrial and commercial facilities.

§12.80.530 Installation of structural BMPs.

§12.80.540 BMPs to be consistent with environmental goals.

§12.80.550 Enforcement—Director's powers and duties.

§12.80.560 Identification for inspectors and maintenance personnel.

§12.80.570 Obstructing access to facilities prohibited.

§12.80.580 Inspection to ascertain compliance—Access required.

§12.80.590 Interference with inspector prohibited.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.80.650 Conflicts with other code sections.

§12.80.660 Severability.

§12.80.700 Purpose.

§12.80.710 Applicability.

§12.80.720 Registration required.

§12.80.730 Exempt facilities.

§12.80.740 Certificate of inspection—Issuance by the director.

§12.80.750 Certificate of inspection—Suspension or revocation.

§12.80.760 Certificate of inspection—Termination.

§12.80.770 Service fees.

§12.80.780 Fee schedule.

§12.80.790 Credit for overlapping inspection programs.

§12.80.800 Annual review of fees.

Los Angeles County Code, Title 12, Chapter 12.84 LOW IMPACT DEVELOPMENT STANDARDS, including:

§12.84.410 Purpose.

§12.84.420 Definitions.

§12.84.430 Applicability.

§12.84.440 Low Impact Development Standards.

§12.84.445 Hydromodification Control.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Los Angeles County Code, Title 22 PLANNING AND ZONING, Part 6 ENFORCEMENT PROCEDURES, including:

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

Los Angeles County Code, Title 26 BUILDING CODE, including:

§26.103 Violations And Penalties

§26.104 Organization And Enforcement

§26.105 Appeals Boards

§26.106 Permits

§26.107 Fees

§26.108 Inspections

LACFCD Code Chapter 21 - STORMWATER AND RUNOFF POLLUTION CONTROL including:

§21.01 Purpose and Intent

§21.03 Definitions

§21.05 Standards, Guidelines, and Criteria

§21.07 Prohibited Discharges

§21.09 Installation or Use of Illicit Connections Prohibited

§21.11 Littering Prohibited

§21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity

§21.15 Notification of Uncontrolled Discharges Required

§21.17 Requirement to Monitor and Analyze

§21.19 Conflicts With Other Code Sections

§21.21 Severability

§21.23 Violation a Public Nuisance

California Government Code §6502

California Government Code §23004

California Water Code §8100 *et. seq.*

Relationship Of Applicable Ordinances Or Other Legal Authorities To The Requirements of 40 CFR §122.26(d)(2)(i)(A-F) And The Order

Although, depending upon the particular issue, there may be multiple ways in which particular sections of the County of Los Angeles' ordinances, LACFCD's ordinances, and statutes relate to the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order, the table below indicates the basic relationship with Part VI(A)(2)(a) of the Order:

Order Part VI(A)(2)(a) Items	**Primary Applicable Ordinance/Statute**
i. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.450 [construction] §12.80.460 [industrial and commercial] §12.80.470 and .480 [industrial and commercial NPDES requirements] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§26.104 [enforcement] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
ii. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited] LACFCD Code: §21.07 Prohibited Discharges
iii. Prohibit and eliminate illicit discharges and illicit connections to the MS4.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.420 [illicit connections prohibited] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.23 Violation a Public Nuisance

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
iv. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.440 [littering and other polluting prohibited] LACFCD Code: §19.07 Interference With or Placing Obstructions, Refuse, Contaminating Substances, or Invasive Species in Facilities Prohibited §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
v. Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows).	Los Angeles County Code: §12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.620 [nuisance abatement] §12.80.635 [violation penalty]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§12.80.640 [penalties not exclusive] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties] §26.104 [enforcement] §26.106 [permits] §26.108 [inspections] LACFCD Code: §19.11 Violation a Public Nuisance §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.19 Conflicts With Other Code Sections §21.23 Violation a Public Nuisance
vi. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.	Same as item v., above
vii. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Copermittees.	California Government Code §6502 California Government Code §23004
viii. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation.	California Government Code §6502 California Government Code §23004
ix. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4.	Los Angeles County Code: §12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.80.620 [nuisance abatement] §12.80.635 [violation penalty] §12.80.640 [penalties not exclusive] §22.60.380 [enforcement.] §26.106 [permits] §26.108 [inspections]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
x. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations.	Los Angeles County Code: §12.80.450 [construction mitigation] §12.80.500 [good housekeeping practices] §12.80.510 [construction BMPs] §12.80.520 [industrial/commercial BMPs] §12.84.440 [LID standards] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
xi. Require that structural BMPs are properly operated and maintained.	Los Angeles County Code: §12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze

Order Part VI(A)(2)(a) Items	**Primary Applicable Ordinance/Statute**
	§21.23 Violation a Public Nuisance
xii. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.	Los Angeles County Code: §12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance

Order Part VI(A)(2)(b)(ii)

"*Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.*"

The local administrative and legal procedures available to mandate compliance with the above ordinances are specified in those ordinances, particularly in:

Los Angeles County Code:

§12.80.550 Enforcement—Director's powers and duties.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Title 26, §103 Violations And Penalties

Title 26, §104 Organization And Enforcement

Title 26, §105 Appeals Boards

Title 26, §106 Permits

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

LACFCD Code:

§21.05 Standards, Guidelines, and Criteria

§21.07 Prohibited Discharges

§21.09 Installation or Use of Illicit Connections Prohibited

§21.11 Littering Prohibited

§21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity

§21.15 Notification of Uncontrolled Discharges Required

§21.17 Requirement to Monitor and Analyze

§21.23 Violation a Public Nuisance

LACFCD attempts to first resolve each enforcement action administratively. However, the above cited ordinances also provide LACFCD with the authority to pursue such actions in the judicial system as necessary.

Very truly yours,

JOHN F. KRATTLI
County Counsel

By Judith Fries
JUDITH A. FRIES
Principal Deputy County Counsel
Public Works Division

JAF:jyj

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November 25, 2014

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013-1105

Re: Legal Authority Certification for the City of Santa Clarita

Dear Mr. Unger:

The City of Santa Clarita ("City) hereby submits the following certification, required by Part VI.A.2.b of Order No.R4-2012-0175, issued by the Regional Water Quality Control Board – Los Angeles Region ("RWQCB"), adopted on December 28, 2012 and entitled "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)" [NPDES No. CAS004001] (the"2012 NPDES Permit"). Part VI.A.2.b of the 2012 NPDES Permit requires the City, as a Permittee under the 2012 NPDES Permit, to submit an annual statement certified by its City Attorney that the City has the legal authority within its jurisdiction to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and the 2012 NPDES Permit.

The table on the following page lists the requirements of the 2012 NPDES Permit and 40 CFR § 122.26(d)(2)(i)(A-F), and provides citations to the municipal code sections and state laws through which the City complies with each of these requirements. As the table demonstrates, the City has all of the legal authority required within its jurisdiction to implement and enforce the 2012 NPDES Permit and the requirements of 40 CFR § 122.26(d)(2)(i)(A-F).

Requirements	Legal Authorities
i. Control the contribution of pollutants to the City's MSR from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. (2012 NPDES Permit, Part VI.A.2.a.i; 40 CFR § 122.26(d)(2)(i)(A))	*Municipal Code Section:* *10.04.040 Control of Pollutants from Sites of Industrial Activities*
ii. Prohibit all non-storm water discharges through the City's MS4 to receiving waters not otherwise authorized or conditionally exempt. (2012 NPDES Permit, Part	*Municipal Code Section:* *10.04.020 Illicit Discharges Prohibited*

VI.A.2.a.ii)	
iii. Prohibit and eliminate illicit discharges and illicit connections to the MS4. (2012 NPDES Permit, Part VI.A.2.a.iii; 40 CFR § 122.26(d)(2)(i)(B))	*Municipal Code Section: 10.04.020 Illicit Discharges Prohibited and 10.04.030 Illicit Connections Prohibited*
iv. Control the discharge of spills, dumping, or disposal of materials other than storm water to the City's MS4. (2012 NPDES Permit, Part VI.A.2.a.iv; 40 CFR § 122.26(d)(2)(i)(C))	*Municipal Code Section: 10.04.050 Spills, Dumping and Disposal Prohibited*
v. Require compliance with the conditions in the City's ordinances, permits, contracts or orders. (2012 NPDES Permit, Part VI.A.2.a.v; 40 CFR § 122.26(d)(2)(i)(E))	*Municipal Code Sec. 10.04.080 Violation and 10.04.090 Notices of Violation—Administrative Orders—Enforcement*
vi. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders. (2012 NPDES Permit, Part VI.A.2.a.vi; 40 CFR § 122.26(d)(2)(i)(F))	*Municipal Code Section: 10.04.080 Violation and 10.04.090 Notices of Violation—Administrative Orders—Enforcement*
vii. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-Permittees. (2012 NPDES Permit, Part VI.A.2.a.vii; 40 CFR § 122.26(d)(2)(i)(D))	*Government Code Section 6500 et seq, Joint Powers Authority; City also working toward an interagency agreement by approving MOU 13-00291 for the development of an Enhanced Watershed Management Program*
viii. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4. (2012 NPDES Permit, Part VI.A.2.a.viii)	*Government Code Section 6500 et seq, Joint Powers Authority; City also working toward an interagency agreement by approving MOU 13-00291 for the development of an Enhanced Watershed Management Program*

ix. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable ordinances, permits, contracts and orders, and with the provisions of the 2012 NPDES Permit. (2012 NPDES Permit, Part VI.A.2.a.ix)	*Municipal Code Section: 10.04.120 Illicit Discharges Prohibited*
x. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations. (2012 NPDES Permit, Part VI.A.2.a.x)	*Municipal Code Section:10.04.060 Best Management Practices Required*
xi. Require that structural BMPs are properly operated and maintained. (2012 NPDES Permit, Part VI.A.2.a.xi)	*Municipal Code Section: 10.04.120 Inspections—Searches*
xii. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4. (2012 NPDES Permit, Part VI.A.2.a.xii)	*Municipal Code Section: 10.04.120 Inspections—Searches*

Part VI.A.2.b of the 2012 NPDES Permit further requires this statement to identify the local administrative and legal procedures available to mandate compliance with the City municipal code sections cited in the table above, and a statement as to whether enforcement actions can be completed administratively or judicially.

The City's municipal code contains both administrative and judicial enforcement options. The City may issue an administrative citation to enforce any provision of its Municipal Code. Title 23, Chapter 23.20 of the City's municipal code contains the procedures applicable to the issuance of administrative citations. That Chapter also makes reference to the schedule of administrative fines applicable as adopted by the City Council via resolution. An administrative citation may be appealed to a hearing officer, and the decision of the hearing officer on the appeal may be appealed to the superior court. The City's municipal code also authorizes violations of the code to be enforced judicially through criminal and civil proceedings. A violation of the City's storm water ordinances is a misdemeanor and a public nuisance (City municipal code section 10.04.080 and section 10.04.100). The procedures for issuing a criminal citation are contained in Title 23, Chapter 23.10 of the City's municipal code. In addition, the City may bring a civil action to abate the public nuisance, and the procedures for abatement actions are contained in Title 23, Chapter 23.30 of the City's municipal code.

If you have any questions regarding this statement, please feel free to contact me at your convenience.

Sincerely,

Burke, Williams & Sorensen, LLP

Joseph M. Montes

Joseph M. Montes, City Attorney
City of Santa Clarita

cc: Oliver Cramer, Project Coordinator

APPENDIX E2

Response to Comments

EWMP Reference	Comment/Revision	Response
General		
Section 7.3	Please include more information to support the proposed final milestone of 2035. . .	Provided justification in Section 7.3.
Water Body Pollutant Classification		
Section 3.1	Include description of Santa Clara River reaches, tributaries and lakes within the EWMP area. . .	Figure ES-1 and 4-1 replaced with figure labeling the lakes and tributaries. Table inserted (Table 3-2) to include reach descriptions.
Table 3-2	Revise Table 3-2 to address the following comments. . .	Changes made to Table 3-2 as requested. Please note this is now Table 3-4 in the revised EWMP.
Table 4-4, 4-5, Appendix A1 Table A1-13	Clarify in footnotes that Reach 4B is located in Ventura County but was considered for the purposes of understanding downstream waterquality	Added a footnote for clarification to Tables 4-4, 4-5, A1-11, A1-13.
Table 4-4	Revise Table 4-4 and Appendix A1 Table A1-13 . . .	Revised Table 4-4, A1-13, to omit Reach 7 chloride, ammonia, nitrate and nitrite, and Reach 6 ammonia, nitrate and nitrite. Please note this is now Table 4-6 in the revised EWMP.
Appendix A1 Table A1-6	Revise Table A1-6. . .	Revised Table A1-6 to omit Reach 7 chloride, Reach 6 ammonia, nitrate and nitrite.
Source Assessment		
Appendix A1 Section A1-4.3 & Figure A1-8	Revise to include Permit Att.A major outfall description, and add any additional applicable major outfalls to figure A1-8	Added the requested description, and revised the map to include the additional outfalls.
Section 4.2.2	Evaluate Ventura County MS4 data and include them, if reasonable representative of the EWMP area	Evaluated the Ventura County MS4 data from the ROWD, and included a description in Section 4.2.2.
Prioritization		
Table ES-1, 4-6, Appendix A1 Table A1-14	Revise the tables to address the following comments. . .	Revised tables with footnotes explaining the justification for including constituents as priorities. Please note that Table 4-6 is now Table 4-8 in the revised EWMP.
MCMs		
Table 5-1	Indicate which pollutants and pollutant sources will be targeted under the Group's PIPP	Included prioritized pollutants/sources in Table 5-1.
Table 5-1	Clarify how the inspection frequencies will change, and how the determination will be made on what facilities will be targeted	Added text to Table 5-1 for clarification.
Section 5.3	For specificity, state that institutional control measures for non-stormwater discharge meet requirements of Part III.A of the LA County MS4 Permit	Added the requested text.
Appendix B2	Modify table consistency with Table5-1, Appendic C8, and EWMP Water Quality Priorities	Appendix B2 table modified for consistency - Added "X" for water quality priorities in each row, and modified some row titles to be consistent with App C8. Note that some row headers will not match completely, since Appendix C8 focuses on enhanced MCMs and Appendix B2 includes all MCMs.
Selection of Watershed Control Measures		
Executive Summary	Align description of Structural BMPs in ES with Section 5.1 of draft EWMP	Added "retain" to the ES description.
Tables 6-4, 7-5, Appendix D1 Tables D1-1 to D1-14	Provide clarification on relationship between Exceedance Volumes in Table 6-4 and the Control Measure Capacities in Table 7-5 and Appendix D1 Tables D1-1 to D1-14	Clarification provided in a footnote to Table 7-5, and in revisions made to Section 6. Please note that Table 7-5 is now Table 7-6 in the revised EWMP.
Section 7.3.1 & Table 7-5	Include interim milestones for enhanced MCMs, interim milestones within this permit term for planning and design steps for structural projects to be completed in the next permit term; and indicate if Trash TMDL interim milestones were met.	Added Table 7-2 to show interim milestones with the current Permit term (including already completed items).
EWMP Provisions		
Section 8	Update to include any additional sources of funding that were secured for any proposed BMPs	No additional funding has been secured at this time, and no changes were made.
Tables ES-2 & 8-1	Add footnotes to the tables for clarity	Footnotes added
Appendix C5 Table C5-2	Move trash removal BMPs to table C5-1	Trash BMPs moved to table C5-1.
RAA		

EWMP Reference	Comment/Revision	Response
Executive Summary	For clarity, revise discssion on page ES-4 to state that the purpose of the RAA is to demonstrate that the selected WCMs will result in compliance with applicable water quality-based effluent limitations and receiving water limitations in Parts V.A and VI.E and Attachment L of the permit. Please note that if land uses in the portion of the City of Santa Clarita within the Los Angeles River watershed change in the future, including the construction of any MS4 infrastructure, the EWMP must be modified to address MS4 discharges from this area to the LA River, including but not limited to requirements pertaining to MS4 discharges in Attachment O of the LA County MS4 Permit.	Added clarifying text to page ES-4.
Table 6-3	Acknowledge that permit Attachment L includes WQBELs and RWLs, applicable in dry weather, thatare based on a single sample maximum threshold as well as the geometric mean threshold	Text added to footnote 1 of Table 6-3.
Table 6-6	Table 6-6 of the draft EWMP specifies a runoff volume retention approach for E. coli and non-metals water quality priorities. Please explicitly indicate which non-metals water quality priorities are addressed. Specifically, indicate each category 1 (nitrogen compounds, salts) and category 2 and 3 pollutant that will be addressed by the bacteria control measures. If a non-metal pollutant is not addressed by the bacteria control measures, provide justification for why it does not need to be addressed. For example, if data indicate that MS4 discharges are achieving WQBELs and Receiving Water Limitations for nitrogen compounds and salts, include this finding and support for it in the EWMP.	Clarification added to footnotes of Table 6-6 as requested.
Table 6-3	For Table 6-3 of the draft EWMP, a footnote should be added to nutrients to acknowledge the existing TMDL indicating a 1-hr average and a 30-day average effluent limitation for ammonia and a 30-day average effluent limitation for nitrite+nitrate.	Footnote added to Table 6-3.
Section 6 & Appendix C	Additional Comments in **Enclosure 2**	Comments addressed in new Appendix C-10
Enclosure 2 – C.P. Lai's Comments on Section 6		
1	The EWMP separately defines critical conditions for the two limiting pollutants, bacteria and zinc. For zinc and other metals, the critical condition is defined as the 90th percentile Exceedance Volume (EV) as explained in Section 6.2.3.1. Board staff understands that this "EV' approach provides assurance that the receiving water limitations (RWLs) will be met instream. Please also provide a comparison of the EV by subbasin with the 90th percentile of pollutant (zinc) load to account for conditions in which flow may be high but concentration may not exceed the RWL.	Appendix C-10 contains the requested information; added bar graph comparing 90th percentile conditions for total zinc with the EV approach
2	Please provide the model results for the baseline condition in terms of runoff volume, pollutant concentration and pollutant loading, as well as the estimated allowable loads and required load reductions, based on the 90th percentile critical condition of runoff volume and pollutant concentration, for each modeled subbasin for each pollutant modeled.	Appendix C-10 contains the requested information; Added two tables (E. coli and zinc) demonstrating the baseline and managed flow/load.

EWMP Reference	Comment/Revision	Response
3	In the report, a summary statistic of percent reduction is provided, however some numbers to arrive at calculating the percentage are missing. Per the RAA Guidelines, the model results for the proposed control measures and potential BMPs should be provided to demonstrate the effectiveness of the proposed BMPs that would achieve the required reductions as described in Sections 6 and presented in Table 6-6. As such, the detailed reasonable assurance analysis (RAA) for the proposed BMPs specifically for analysis regions South Fork SCR, SCR at County Line, Bouquet Creek, Mint Canyon and Castaic Creek in terms of influent volume and concentration, treated volume and concentration, and effluent volume and concentration through BMPs should be provided in the EWMP report to demonstrate the BMP effectiveness as indicated in Table C4-7 and Table C8-1 and C8-2 and the compliance with final water quality limits.	Added additional information to Table 6-6 to demonstrate how % reduction calculation is performed. In addition, Appendix C-1 contains additional RAA outputs to demonstrate effectiveness of EWMP BMPs.
4	Finally, please provide an example validation for a representative waterbody within the USCR or in another EWMP area that demonstrates that with all proposed BMPs in place, as determined from the initial analysis of the necessary volume and/or pollutant load reduction, will result in achieving the RWLs.	Appendix C-10 contains the requested information; added section discussing regional validation example to demonstrate achievement of RWLs.
Email comments from RWQCB on 10/6/15		
	Note that in addition to the comments provided to the Group, please ensure that all clarifications provided to Regional Board Staff post meeting with the Group are incorporated into the applicable RAA sections of the Revised EWMP:	
	RAA Memo (dated 9/23/15)	Included in new Appendix C-10
	Exceedance Volume clarification email to RB staff on 10/1/15	Included in new Appendix C-10
	Hydrology calibration clarification email to RB staff on 10/5/15 in response to following question: Can you also provide some additional input on what you did to try to improve upon the hydrology calibration? I am looking over Table 6-1 and Appendix C-1. In C-1 you state that the hydrology calibration was updated to reflect three observations (on page C1-1), yet the level of agreement for both locations, shown in Table 6-1, is still in the middle of the "fair" range. Are there things that you can do through data collection to improve the calibration in future updates of the RAA?	No changes made to document as this email was a clarification question. Response included here. The Santa Clara watershed has complex groundwater basin dynamics. Portions of the mainstem and upper tributary flows disappear, and some of that water reappears further downstream in the basin. When groundwater levels are high, more instream runoff reaches the downstream gages and vice versa. These effects are seasonal and drought dependent. The LSPC model can't fully capture those complex subsurface dynamics. While the model could be modified to reach "Very Good" or "Good" instream conditions on paper, the regional calibration metrics for rainfall-runoff that are consistent with other EWMPs / urbanized areas were maintained in the model. While the USCR instream dynamics may not be fully captured by the LSPC model, we are confident in the LSPC predictions of runoff from the MS4, due to the Very Good calibrations that have been attained regionally in watersheds with less complex groundwater dynamics. The prediction of runoff from the urbanized areas is most critical to the RAA, which is driven by capturing the critical bacteria storm prior to discharge into receiving water. The predicted runoff volumes from impervious areas of the USCR subwatersheds during the bacteria storm and/or 85th percentile, 24-hour storm are likely minimally impacted by the groundwater dynamics that affecting the instream calibration. In cases like this, our opinion is that accepting "Fair" when we are limited in our ability to fully characterize certain unknown physical behavior of the natural system is a more prudent course of action than forcing the model to match just for the sake of achieving "Good" calibration metrics. A "good" model that's over-calibrated wouldn't more accurately predict baseline conditions or BMP performance for the EWMP.

EWMP Reference	Comment/Revision	Response
	Response to email about Baseline pollutant loads, estimated allowable pollutant loads & required pollutant load reductions, based on the 90th percentile critical condition of runoff volume and pollutant concentration, at each sub-watershed area for each pollutant	Included in new Appendix C-10