Appendix 7.A

Detailed Recipe for Final EWMP Compliance (Compliance Targets and EWMP Implementation Strategy)

This appendix presents the detailed Compliance Targets and EWMP Implementation Strategy. A series of tables are presented below, organized first by jurisdiction and then by watershed. Index maps of the subwatershed IDs are presented in Appendix 7.B.

The following color-gradients and symbol legend applies to all tables in Appendix 7A:

RED = Subwatersheds with highest required % load reductions
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).

LIST OF TABLES:

Table 7A-1. Alhambra, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
635802	0.42	1.81	8%	0.12	---	---	0.29	---	---	0.00	---	---	**0.4**	1.81	**2.2**
635902	0.36	1.30	9%	0.10	---	---	0.24	---	---	---	---	---	**0.3**	1.30	**1.6**
636002	0.59	2.01	9%	0.13	---	---	0.42	---	---	---	---	---	**0.5**	2.01	**2.6**
636102	11.32	---	79%	0.41	---	0.02	0.00	1.85	---	0.01	---	7.23	**9.5**	---	**9.5**
636202	0.56	0.27	16%	0.03	---	---	0.04	0.26	---	0.00	---	0.11	**0.4**	0.27	**0.7**
636302	10.77	1.97	21%	0.36	---	0.15	0.46	0.42	---	0.47	---	1.82	**3.7**	1.97	**5.6**
636402	0.84	0.51	23%	0.03	---	---	0.09	0.35	0.00	0.24	---	0.01	**0.7**	0.51	**1.2**
Total	**24.9**	**7.8**	**32%**	**1.2**	**0.0**	**0.2**	**1.5**	**2.9**	**0.0**	**0.7**	**0.0**	**9.2**	**15.7**	**7.8**	**23.5**

Table 7A-2. Alhambra, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
612302	1.64	1.25	19%	0.11	---	---	0.36	0.51	---	0.26	---	---	**1.2**	1.25	**2.5**
612402	40.01	0.00	79%	0.60	---	---	0.43	11.65	0.01	0.00	---	17.39	**30.1**	0.00	**30.1**
612502	15.65	4.40	58%	0.32	---	---	0.39	8.55	7.01	---	---	---	**16.3**	4.40	**20.7**
614402	4.43	0.88	47%	0.10	---	---	0.31	2.71	0.00	0.26	---	---	**3.4**	0.88	**4.3**
614502	2.94	1.57	9%	0.08	---	---	0.09	---	1.72	2.10	---	---	**4.0**	1.57	**5.6**
614702	0.02	0.00	5%	---	---	---	---	---	---	0.11	---	---	**0.1**	0.00	**0.1**
614902	0.14	0.13	9%	0.01	---	0.00	0.00	---	---	0.42	---	---	**0.4**	0.13	**0.6**
615002	4.79	2.83	42%	0.16	---	---	0.31	2.43	4.79	0.00	---	---	**7.7**	2.83	**10.5**
615102	1.66	0.12	49%	0.03	---	0.24	0.00	0.68	2.38	0.00	---	---	**3.3**	0.12	**3.5**
615202	0.45	0.04	75%	0.03	---	0.41	---	---	0.02	0.02	---	---	**0.5**	0.04	**0.5**
615302	3.30	0.26	42%	0.09	---	0.18	0.04	1.25	13.46	---	---	---	**15.0**	0.26	**15.3**
615402	4.88	0.57	49%	0.11	---	---	0.00	2.76	9.88	---	---	---	**12.7**	0.57	**13.3**
615502	11.18	0.07	85%	0.15	---	---	0.04	3.40	14.72	0.01	---	3.08	**21.4**	0.07	**21.5**
615602	2.95	0.72	49%	0.07	---	---	0.07	1.67	5.02	0.02	---	---	**6.8**	0.72	**7.6**
615702	0.44	0.54	19%	0.02	---	---	0.11	0.10	0.65	---	---	---	**0.9**	0.54	**1.4**
615802	1.41	0.19	42%	0.03	---	---	0.00	0.74	4.23	0.00	---	---	**5.0**	0.19	**5.2**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
616102	6.30	0.94	47%	0.15	---	0.09	0.25	3.26	0.06	0.17	---	---	**4.0**	0.94	**4.9**
616202	0.96	0.47	47%	0.02	---	---	0.05	0.54	0.29	---	---	---	**0.9**	0.47	**1.4**
616602	0.20	0.71	11%	0.02	---	---	0.10	---	---	---	---	---	**0.1**	0.71	**0.8**
Total	**103.3**	**15.7**	**59%**	**2.1**	**0.0**	**0.9**	**2.6**	**40.3**	**64.2**	**3.4**	**0.0**	**20.5**	**133.9**	**15.7**	**149.6**

Table 7A-3. Burbank, Burbank Western Channel: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
659713	2.34	0.44	56%	0.07	---	---	0.07	1.53	---	---	0.00	---	**1.7**	0.44	**2.1**
659813	12.87	0.00	90%	0.25	0.00	---	0.09	3.76	---	0.14	---	5.60	**9.9**	0.00	**9.9**
660013	1.46	0.21	50%	0.06	---	---	0.04	0.84	---	0.07	0.00	---	**1.0**	0.21	**1.2**
660113	9.04	0.03	90%	0.16	---	0.10	0.12	3.72	---	0.98	---	1.96	**7.0**	0.03	**7.1**
660213	11.84	0.03	85%	0.36	---	0.38	0.01	1.54	---	0.99	0.06	5.07	**8.4**	0.03	**8.4**
660313	80.32	0.00	90%	1.39	---	0.50	1.05	16.36	---	1.30	---	32.76	**53.4**	0.00	**53.4**
660413	11.82	1.86	55%	0.38	---	1.26	1.18	---	---	8.29	0.06	0.00	**11.2**	1.86	**13.0**
660513	3.43	2.05	17%	0.22	---	0.44	0.34	---	---	1.82	0.10	---	**2.9**	2.05	**5.0**
660613	0.42	0.05	41%	0.01	---	---	0.00	0.28	---	0.00	---	---	**0.3**	0.05	**0.3**
660713	5.93	0.14	70%	0.11	---	0.15	0.06	2.59	---	1.40	---	---	**4.3**	0.14	**4.4**
660813	1.30	0.57	32%	0.06	---	0.62	0.11	0.00	---	0.00	0.06	---	**0.9**	0.57	**1.4**
660913	3.15	0.52	53%	0.06	---	---	0.00	---	---	---	0.83	---	**0.9**	0.52	**1.4**
661013	4.44	0.00	95%	0.09	---	0.00	0.03	0.71	---	0.01	0.00	2.27	**3.1**	0.00	**3.1**
661113	0.48	1.10	14%	0.10	---	---	0.34	---	---	---	0.00	---	**0.4**	1.10	**1.5**
661213	2.80	---	95%	0.07	---	---	---	0.20	---	---	---	1.62	**1.9**	---	**1.9**
661313	0.15	0.30	13%	0.02	---	0.01	0.03	---	---	---	0.08	---	**0.1**	0.30	**0.4**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028										For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs					
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
661413	2.42	0.41	55%	0.07	---	0.31	0.27	---	---	0.02	1.29	---	**2.0**	0.41	**2.4**
661513	0.05	0.01	90%	0.01	---	---	---	---	---	---	0.04	---	**0.0**	0.01	**0.1**
661613	0.71	0.12	58%	0.02	---	---	0.04	---	---	0.02	0.64	---	**0.7**	0.12	**0.8**
661713	0.21	0.12	41%	0.02	---	---	0.04	0.14	---	---	---	---	**0.2**	0.12	**0.3**
662313	---	0.00	10%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**155.2**	**8.0**	**75%**	**3.5**	**0.0**	**3.8**	**3.8**	**31.7**	**0.0**	**15.1**	**3.1**	**49.3**	**110.3**	**8.0**	**118.2**

Table 7A-4. Burbank, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
657613	0.89	1.55	14%	0.11	0.00	---	0.05	---	---	0.33	---	---	**0.5**	1.55	**2.0**
658413	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
658613	1.05	0.37	37%	0.01	---	---	0.06	---	---	0.60	---	---	**0.7**	0.37	**1.0**
658813	0.21	0.66	15%	0.02	---	---	0.10	---	---	0.02	---	---	**0.1**	0.66	**0.8**
658913	0.25	0.27	16%	0.01	---	---	0.03	---	---	0.13	---	---	**0.2**	0.27	**0.4**
659013	0.07	0.02	79%	0.01	---	---	0.00	---	---	0.04	---	---	**0.0**	0.02	**0.1**
659113	1.36	0.69	20%	0.03	---	---	0.10	---	---	0.75	---	---	**0.9**	0.69	**1.6**
659213	0.59	0.22	26%	0.01	---	---	0.03	---	---	0.34	---	---	**0.4**	0.22	**0.6**
659313	0.79	0.23	45%	0.01	---	---	0.05	---	---	0.45	---	---	**0.5**	0.23	**0.7**
659513	0.00	0.01	11%	0.00	---	---	---	---	---	0.00	---	---	**0.0**	0.01	**0.0**
659613	19.06	4.30	50%	0.64	---	1.89	1.31	6.24	---	0.00	2.55	0.00	**12.6**	4.30	**16.9**
662413	0.21	0.75	16%	0.04	---	---	0.03	0.04	---	0.07	---	---	**0.2**	0.75	**0.9**
662613	0.38	0.01	51%	0.01	---	0.22	0.01	0.02	---	0.01	---	---	**0.3**	0.01	**0.3**
662713	0.58	1.02	21%	0.04	---	0.02	0.16	---	---	0.06	---	---	**0.3**	1.02	**1.3**
662813	0.23	1.39	14%	0.10	---	---	0.03	---	---	0.00	---	---	**0.1**	1.39	**1.5**
662913	10.57	19.07	20%	0.80	---	1.82	1.53	0.66	---	0.71	0.51	0.00	**6.0**	19.07	**25.1**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
663013	8.33	2.65	45%	0.34	---	0.01	0.86	4.28	---	0.03	0.11	0.00	**5.6**	2.65	**8.3**
663213	0.27	0.47	22%	0.03	---	0.09	0.04	---	---	---	---	---	**0.2**	0.47	**0.6**
663313	0.70	2.97	15%	0.16	---	0.00	0.01	0.20	---	---	---	---	**0.4**	2.97	**3.3**
663413	1.89	0.53	56%	0.04	---	---	---	0.98	---	---	---	---	**1.0**	0.53	**1.5**
663613	2.09	1.12	45%	0.06	---	---	0.12	0.99	---	---	---	---	**1.2**	1.12	**2.3**
663813	0.00	0.00	14%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
663913	0.02	0.03	15%	0.00	---	---	0.01	---	---	---	---	---	**0.0**	0.03	**0.0**
664213	0.04	0.25	12%	0.03	---	---	---	---	---	---	---	---	**0.0**	0.25	**0.3**
Total	**49.6**	**38.6**	**32%**	**2.5**	**0.0**	**4.0**	**4.6**	**13.4**	**0.0**	**3.5**	**3.2**	**0.0**	**31.2**	**38.6**	**69.8**

Table 7A-5. Calabasas, McCoy-Dry Canyon Creek: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
698314	5.42	---	96%	0.04	---	---	0.15	---	---	---	---	4.61	**4.8**	---	**4.8**
698414	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
698814	18.05	---	95%	0.18	---	0.59	0.14	0.33	---	2.48	---	10.16	**13.9**	---	**13.9**
698914	16.58	---	95%	0.16	---	---	0.64	0.11	---	0.00	---	13.00	**13.9**	---	**13.9**
699014	2.34	3.10	21%	0.16	---	---	0.59	0.78	---	0.54	---	0.63	**2.7**	3.10	**5.8**
699214	11.41	---	90%	0.11	---	---	0.32	0.18	---	---	---	8.95	**9.5**	---	**9.5**
699314	14.75	---	81%	0.11	---	---	0.17	---	---	---	---	12.01	**12.3**	---	**12.3**
Total	**68.5**	**3.1**	**84%**	**0.8**	**0.0**	**0.6**	**2.0**	**1.4**	**0.0**	**3.0**	**0.0**	**49.4**	**57.1**	**3.1**	**60.2**

Table 7A-6. Glendale, Arroyo Seco: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
642529	0.00	0.00	23%	---	---	---	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
644329	0.00	0.02	13%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.02	**0.0**
644429	0.09	0.02	47%	0.00	---	---	---	---	---	0.00	---	0.07	**0.1**	0.02	**0.1**
Total	**0.1**	**0.0**	**41%**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.1**

Table 7A-7. Glendale, Burbank Western Channel: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
659729	0.93	0.12	56%	0.03	---	---	0.01	0.58	---	---	---	---	**0.6**	0.12	**0.7**
659829	---	0.00	10%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
659929	2.76	---	91%	0.03	---	---	0.04	0.57	---	---	---	1.01	**1.7**	---	**1.7**
660929	---	0.00	8%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
662329	---	0.01	10%	---	---	---	---	---	---	---	---	---	**0.0**	0.01	**0.0**
Total	**3.7**	**0.1**	**76%**	**0.1**	**0.0**	**0.0**	**0.0**	**1.1**	**0.0**	**0.0**	**0.0**	**1.0**	**2.3**	**0.1**	**2.4**

Table 7A-8. Glendale, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
648029	0.06	0.18	15%	0.01	---	---	0.04	---	---	0.00	---	---	**0.1**	0.18	**0.2**
648129	0.05	0.35	13%	0.05	---	---	---	---	---	---	---	---	**0.0**	0.35	**0.4**
648329	3.92	4.08	20%	0.30	---	0.04	0.39	1.42	---	0.99	---	---	**3.1**	4.08	**7.2**
648429	3.59	0.89	36%	0.12	---	---	0.04	1.97	---	0.30	---	---	**2.4**	0.89	**3.3**
648529	6.86	2.42	40%	0.22	---	---	0.23	3.24	---	0.87	---	0.00	**4.6**	2.42	**7.0**
648629	2.15	0.84	25%	0.12	---	0.04	0.39	---	---	0.96	---	---	**1.5**	0.84	**2.4**
648729	0.11	0.04	71%	0.01	---	0.00	0.00	---	---	0.18	---	---	**0.2**	0.04	**0.2**
648829	1.03	5.63	13%	0.20	---	---	0.61	---	---	0.20	---	---	**1.0**	5.63	**6.6**
648929	0.57	3.71	15%	0.10	---	---	0.42	---	---	---	---	---	**0.5**	3.71	**4.2**
649029	0.17	1.07	15%	0.03	---	---	0.12	---	---	0.01	---	---	**0.2**	1.07	**1.2**
649229	0.16	0.57	15%	0.04	---	---	0.01	0.06	---	0.02	---	---	**0.1**	0.57	**0.7**
650229	7.71	3.65	25%	0.50	---	0.21	0.04	5.56	---	1.35	---	---	**7.7**	3.65	**11.3**
650329	0.08	0.01	91%	0.00	---	---	---	---	---	0.20	---	---	**0.2**	0.01	**0.2**
650529	0.09	0.01	---	---	---	---	---	---	---	0.21	---	---	**0.2**	0.01	**0.2**
650629	0.38	0.05	26%	0.01	---	---	---	---	---	0.90	---	---	**0.9**	0.05	**1.0**
650729	2.58	0.79	40%	0.08	---	---	0.02	1.58	---	0.39	---	---	**2.1**	0.79	**2.8**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
650829	27.31	2.77	40%	0.71	---	0.35	0.10	16.20	---	4.26	---	0.01	**21.6**	2.77	**24.4**
650929	0.03	0.30	12%	0.02	---	---	---	---	---	---	---	---	**0.0**	0.30	**0.3**
651029	0.00	0.00	50%	0.00	---	---	---	---	---	0.00	---	---	**0.0**	0.00	**0.0**
651129	6.79	1.50	41%	0.23	---	0.02	0.06	4.12	---	0.82	---	0.00	**5.2**	1.50	**6.7**
651229	---	0.06	10%	---	---	---	---	---	---	---	---	---	**0.0**	0.06	**0.1**
657529	3.22	2.48	30%	0.16	---	0.05	0.32	0.77	---	1.05	---	---	**2.4**	2.48	**4.8**
657629	8.64	5.19	30%	0.58	---	0.10	0.09	5.06	---	1.05	---	---	**6.9**	5.19	**12.1**
657729	6.92	2.17	45%	0.23	---	0.16	0.55	3.64	---	0.62	---	---	**5.2**	2.17	**7.4**
657829	0.64	0.08	77%	0.01	---	0.00	0.02	0.39	---	0.02	---	---	**0.4**	0.08	**0.5**
657929	0.39	0.34	13%	0.00	---	---	0.01	---	---	0.18	---	---	**0.2**	0.34	**0.5**
658029	0.71	2.11	16%	0.07	---	---	0.32	---	---	0.07	---	---	**0.5**	2.11	**2.6**
658129	1.42	0.95	27%	0.02	---	---	0.10	0.05	---	0.57	---	---	**0.8**	0.95	**1.7**
658229	0.95	0.58	31%	0.01	---	---	0.00	---	---	0.45	---	---	**0.5**	0.58	**1.0**
658329	0.80	1.64	16%	0.07	---	---	0.24	---	---	0.23	---	---	**0.5**	1.64	**2.2**
658429	0.05	0.01	80%	0.00	---	---	---	---	---	0.03	---	---	**0.0**	0.01	**0.0**
658529	0.90	0.53	76%	0.02	---	---	---	---	---	0.42	---	---	**0.4**	0.53	**1.0**
658629	0.20	0.65	16%	0.02	---	---	0.11	---	---	0.02	---	---	**0.1**	0.65	**0.8**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
658729	0.30	0.32	18%	0.01	---	---	0.06	---	---	0.13	---	---	**0.2**	0.32	**0.5**
658829	0.04	0.16	14%	0.00	---	---	0.02	---	---	0.00	---	---	**0.0**	0.16	**0.2**
658929	0.00	0.01	16%	0.00	---	---	0.00	---	---	0.00	---	---	**0.0**	0.01	**0.0**
659029	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
659229	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
659429	2.00	1.82	40%	0.14	---	0.24	0.06	0.69	---	---	---	---	**1.1**	1.82	**3.0**
659529	2.78	1.72	40%	0.09	---	---	0.06	1.33	---	0.09	---	---	**1.6**	1.72	**3.3**
659629	0.03	0.00	71%	0.00	---	---	0.00	0.02	---	---	---	---	**0.0**	0.00	**0.0**
Total	**93.6**	**49.7**	**32%**	**4.2**	**0.0**	**1.2**	**4.5**	**46.1**	**0.0**	**16.6**	**0.0**	**0.0**	**72.6**	**49.7**	**122.3**

Table 7A-9. Glendale, Verdugo Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
651329	9.75	---	75%	0.17	---	0.10	0.21	1.03	5.35	0.02	---	3.65	**10.5**	---	**10.5**
651429	7.70	2.88	45%	0.16	---	0.00	0.35	3.02	---	1.40	---	0.01	**4.9**	2.88	**7.8**
651529	4.13	1.49	40%	0.16	---	0.12	0.25	3.70	---	0.03	---	---	**4.3**	1.49	**5.7**
651629	7.56	0.54	66%	0.10	---	0.00	0.08	1.46	---	1.09	---	2.08	**4.8**	0.54	**5.4**
651729	1.42	0.00	85%	0.03	---	0.14	---	0.76	---	0.00	---	0.76	**1.7**	0.00	**1.7**
651829	10.43	0.56	45%	0.19	0.00	0.01	0.50	2.99	---	0.36	---	3.14	**7.2**	0.56	**7.7**
651929	1.10	0.28	50%	0.02	---	0.02	0.03	0.61	---	0.00	---	0.00	**0.7**	0.28	**1.0**
652029	2.44	0.20	60%	0.04	---	0.26	0.08	0.62	---	0.62	---	0.00	**1.6**	0.20	**1.8**
652129	0.38	1.87	14%	0.06	---	---	0.25	---	---	0.00	---	0.00	**0.3**	1.87	**2.2**
652229	0.34	1.31	15%	0.04	---	0.00	0.21	---	---	0.00	---	0.01	**0.3**	1.31	**1.6**
652329	1.13	0.13	30%	0.01	---	0.01	0.00	0.03	---	1.09	---	---	**1.1**	0.13	**1.3**
652429	0.18	0.69	16%	0.02	---	0.00	0.11	---	---	---	---	---	**0.1**	0.69	**0.8**
652529	0.22	0.90	16%	0.03	---	0.01	0.15	---	---	0.00	---	0.00	**0.2**	0.90	**1.1**
652629	0.04	0.20	13%	0.01	---	---	0.01	---	---	0.01	---	0.00	**0.0**	0.20	**0.2**
652729	1.01	1.69	20%	0.07	---	0.20	0.07	0.37	---	0.21	---	0.00	**0.9**	1.69	**2.6**
652829	5.52	2.51	21%	0.10	---	0.10	0.41	0.34	---	0.85	---	1.64	**3.4**	2.51	**6.0**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
652929	0.15	1.94	13%	0.03	---	---	0.11	---	---	---	---	---	**0.1**	1.94	**2.1**
653029	0.05	0.70	12%	0.01	---	---	0.03	---	---	0.00	---	0.00	**0.0**	0.70	**0.7**
653129	3.98	0.11	56%	0.02	---	0.12	0.07	0.26	---	0.67	---	1.29	**2.4**	0.11	**2.6**
653229	0.31	1.63	15%	0.05	---	0.01	0.18	---	---	0.00	---	0.00	**0.2**	1.63	**1.9**
653329	3.98	4.26	35%	0.16	---	0.07	0.24	3.61	---	0.30	---	---	**4.4**	4.26	**8.7**
653429	0.43	1.36	20%	0.03	---	---	0.06	0.30	---	---	---	---	**0.4**	1.36	**1.8**
653529	1.61	1.36	35%	0.08	---	0.03	0.08	0.94	---	---	---	---	**1.1**	1.36	**2.5**
653629	1.90	0.37	46%	0.04	---	---	0.09	1.16	---	---	---	---	**1.3**	0.37	**1.7**
653729	0.09	0.58	14%	0.02	---	---	0.07	---	---	0.00	---	---	**0.1**	0.58	**0.7**
653829	0.66	1.41	21%	0.04	---	---	0.16	0.27	---	---	---	---	**0.5**	1.41	**1.9**
653929	0.02	0.12	15%	0.00	---	---	0.02	---	---	---	---	---	**0.0**	0.12	**0.1**
654029	0.26	1.65	14%	0.05	---	---	0.18	---	---	---	---	---	**0.2**	1.65	**1.9**
654129	0.09	0.39	15%	0.01	---	---	0.05	0.01	---	---	---	---	**0.1**	0.39	**0.5**
654229	1.79	0.74	47%	0.04	---	0.01	0.09	1.07	---	---	---	---	**1.2**	0.74	**2.0**
654629	2.01	0.36	45%	0.04	---	0.05	0.07	1.01	---	0.15	---	---	**1.3**	0.36	**1.7**
655129	2.36	0.48	50%	0.05	---	---	0.15	1.41	---	---	---	---	**1.6**	0.48	**2.1**
655229	0.60	0.56	31%	0.02	---	---	0.06	0.34	---	---	---	---	**0.4**	0.56	**1.0**
655329	0.17	0.17	25%	0.01	---	0.00	0.04	0.10	---	0.02	---	---	**0.2**	0.17	**0.3**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
655429	0.07	0.10	20%	0.00	---	---	0.01	0.02	---	0.00	---	---	**0.0**	0.10	**0.1**
655529	0.19	0.09	40%	0.00	---	0.02	0.01	0.09	---	---	---	---	**0.1**	0.09	**0.2**
655829	0.31	0.49	26%	0.02	---	---	0.06	0.15	---	0.00	---	---	**0.2**	0.49	**0.7**
655929	3.31	2.18	30%	0.13	---	---	0.34	1.68	---	0.09	---	---	**2.2**	2.18	**4.4**
656029	0.86	1.79	20%	0.06	---	0.03	0.17	0.34	---	---	---	---	**0.6**	1.79	**2.4**
656129	0.00	0.06	11%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.06	**0.1**
656229	9.98	1.37	55%	0.17	---	0.12	0.58	1.75	---	4.50	---	---	**7.1**	1.37	**8.5**
656329	0.03	0.28	14%	0.02	---	---	---	---	---	0.00	---	---	**0.0**	0.28	**0.3**
656429	0.08	0.24	19%	0.01	---	0.03	0.02	---	---	---	---	---	**0.1**	0.24	**0.3**
656529	1.02	0.87	31%	0.05	---	0.00	0.11	0.48	---	0.00	---	---	**0.6**	0.87	**1.5**
656629	3.02	1.31	40%	0.07	---	0.01	0.27	1.74	---	0.00	---	---	**2.1**	1.31	**3.4**
656729	0.04	0.17	15%	0.01	---	---	0.03	---	---	---	---	---	**0.0**	0.17	**0.2**
656829	0.02	0.09	15%	0.00	---	---	0.01	---	---	---	---	---	**0.0**	0.09	**0.1**
656929	0.13	0.31	20%	0.01	---	0.00	0.02	0.07	---	---	---	---	**0.1**	0.31	**0.4**
657129	0.67	0.51	30%	0.03	---	0.02	0.11	0.31	---	---	---	---	**0.5**	0.51	**1.0**
657229	0.05	0.44	15%	0.02	---	---	0.00	0.01	---	0.00	---	---	**0.0**	0.44	**0.5**
657329	0.00	0.02	12%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.02	**0.0**
Total	**93.6**	**43.7**	**41%**	**2.6**	**0.0**	**1.5**	**6.2**	**32.0**	**5.3**	**11.4**	**0.0**	**12.6**	**71.7**	**43.7**	**115.4**

Table 7A-10. Hidden Hills, Bell Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
700234	0.24	---	26%	0.01	---	---	0.00	0.08	---	---	---	0.19	**0.3**	---	**0.3**
Total	**0.2**	**0.0**	**26%**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.2**	**0.3**	**0.0**	**0.3**

Table 7A-11. Hidden Hills, McCoy-Dry Canyon Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
698834	6.39	---	89%	0.03	---	---	0.01	---	---	0.00	---	5.03	**5.1**	---	**5.1**
Total	**6.4**	**0.0**	**89%**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**5.0**	**5.1**	**0.0**	**5.1**

Table 7A-12. La Canada Flintridge, Arroyo Seco: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)		Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
642539	0.00	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**		0.00	**0.0**
642739	0.00	0.01	5%	0.00	---	---	---	---	---	---	---	---	**0.0**		0.01	**0.0**
642939	2.60	1.87	21%	0.38	---	---	0.14	1.40	---	---	---	---	**1.9**		1.87	**3.8**
643939	0.18	0.21	12%	0.02	---	---	---	0.12	---	---	---	---	**0.1**		0.21	**0.4**
644039	2.17	3.75	27%	0.12	---	0.02	0.32	1.07	---	---	---	---	**1.5**		3.75	**5.3**
644139	0.19	1.59	8%	0.05	---	---	0.10	---	---	---	---	---	**0.1**		1.59	**1.7**
644239	0.03	0.16	10%	0.00	---	---	0.02	---	---	---	---	---	**0.0**		0.16	**0.2**
644339	0.05	1.92	6%	0.04	---	---	0.00	---	---	---	---	---	**0.0**		1.92	**2.0**
644439	1.25	2.04	32%	0.06	---	---	0.10	0.87	---	0.00	---	---	**1.0**		2.04	**3.1**
644539	7.05	---	74%	0.09	---	---	0.20	0.28	---	---	---	4.72	**5.3**		---	**5.3**
644639	8.69	---	74%	0.09	---	0.01	0.29	1.71	---	---	---	4.07	**6.2**		---	**6.2**
644739	0.96	1.85	27%	0.06	---	0.00	0.20	0.47	---	---	---	---	**0.7**		1.85	**2.6**
644839	1.16	0.19	58%	0.02	---	---	0.06	0.79	---	---	---	---	**0.9**		0.19	**1.1**
644939	0.00	0.01	9%	0.00	---	---	---	---	---	---	---	---	**0.0**		0.01	**0.0**
645139	0.00	0.01	15%	0.00	---	---	0.00	---	---	---	---	---	**0.0**		0.01	**0.0**
645339	0.00	0.01	9%	0.00	---	---	---	---	---	---	---	---	**0.0**		0.01	**0.0**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
645439	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
645639	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**24.3**	**13.6**	**39%**	**0.9**	**0.0**	**0.0**	**1.4**	**6.7**	**0.0**	**0.0**	**0.0**	**8.8**	**17.9**	**13.6**	**31.5**

Table 7A-13. La Canada Flintridge, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
648939	0.11	0.00	37%	0.00	---	---	0.00	0.02	---	---	---	0.07	**0.1**	0.00	**0.1**
649039	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**0.1**	**0.0**	**37%**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.1**

Table 7A-14. La Canada Flintridge, Verdugo Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
653339	1.81	4.85	9%	0.08	---	---	0.17	---	---	0.49	---	---	**0.7**	4.85	**5.6**
653439	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
654239	7.58	0.00	64%	0.11	---	0.04	0.23	0.91	---	0.00	---	4.09	**5.4**	0.00	**5.4**
654339	0.02	0.24	9%	0.00	---	---	0.01	---	---	---	---	---	**0.0**	0.24	**0.3**
654439	0.11	0.32	16%	0.01	---	---	0.02	0.03	---	---	---	---	**0.1**	0.32	**0.4**
654539	0.03	0.06	21%	0.00	---	---	0.00	0.02	---	---	---	---	**0.0**	0.06	**0.1**
654639	0.30	0.33	21%	0.01	---	---	0.06	0.13	---	---	---	---	**0.2**	0.33	**0.5**
654739	0.03	0.18	10%	0.00	---	---	0.02	---	---	---	---	---	**0.0**	0.18	**0.2**
654839	0.00	0.01	10%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**
Total	**9.9**	**6.0**	**41%**	**0.2**	**0.0**	**0.0**	**0.5**	**1.1**	**0.0**	**0.5**	**0.0**	**4.1**	**6.5**	**6.0**	**12.4**

Table 7A-15. Los Angeles, Aliso Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)		Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
692549	40.74	---	95%	0.65	0.03	1.99	1.08	7.14	---	0.91	---	6.13	**17.9**		---	**17.9**
692649	2.77	1.55	11%	0.14	---	0.08	0.33	---	---	7.84	---	0.24	**8.6**		1.55	**10.2**
692749	12.30	---	79%	0.43	0.85	0.07	0.17	6.65	---	0.16	---	6.15	**14.5**		---	**14.5**
692849	113.32	---	85%	2.15	0.18	---	2.51	32.32	---	0.00	---	44.04	**81.2**		---	**81.2**
692949	0.44	2.81	8%	0.14	---	---	0.24	---	---	---	---	---	**0.4**		2.81	**3.2**
693049	0.58	2.98	9%	0.18	---	---	0.27	---	---	0.00	---	0.01	**0.5**		2.98	**3.4**
693149	0.64	2.02	10%	0.11	---	---	0.43	---	---	---	---	---	**0.5**		2.02	**2.6**
693249	0.45	1.11	12%	0.07	0.00	---	0.31	---	---	---	---	---	**0.4**		1.11	**1.5**
693349	6.60	1.44	31%	0.17	0.02	0.07	0.53	---	---	0.53	---	1.44	**2.8**		1.44	**4.2**
693449	5.40	3.30	16%	0.31	0.12	---	1.26	0.54	---	0.49	---	1.34	**4.1**		3.30	**7.4**
693549	13.43	0.39	30%	0.16	---	---	0.69	---	---	2.25	---	6.22	**9.3**		0.39	**9.7**
693649	9.14	0.79	20%	0.14	0.01	---	0.65	---	---	1.48	---	4.10	**6.4**		0.79	**7.2**
693749	9.93	3.71	12%	0.46	0.28	---	0.85	---	0.00	1.48	---	4.04	**7.1**		3.71	**10.8**
693849	0.57	2.07	10%	0.10	0.00	---	0.39	---	---	0.00	---	0.00	**0.5**		2.07	**2.6**
693949	0.04	0.26	9%	0.03	---	---	0.01	---	---	---	---	---	**0.0**		0.26	**0.3**
694049	0.00	0.01	8%	0.00	---	---	0.00	---	---	---	---	---	**0.0**		0.01	**0.0**
Total	**216.4**	**22.4**	**62%**	**5.2**	**1.5**	**2.2**	**9.7**	**46.6**	**0.0**	**15.1**	**0.0**	**73.7**	**154.2**		**22.4**	**176.6**

Table 7A-16. Los Angeles, Arroyo Seco: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
640249	13.23	0.37	48%	0.50	---	0.15	0.78	3.36	3.11	0.01	---	---	**7.9**	0.37	**8.3**
640349	0.14	0.20	7%	0.14	---	---	0.00	---	0.00	---	---	---	**0.1**	0.20	**0.3**
640449	0.13	0.05	12%	0.03	---	0.08	0.01	---	---	0.01	---	---	**0.1**	0.05	**0.2**
640549	11.04	0.49	9%	0.54	0.02	---	1.37	---	13.09	0.05	---	---	**15.1**	0.49	**15.6**
640649	5.29	0.08	38%	0.20	---	---	0.15	4.45	0.00	0.00	---	---	**4.8**	0.08	**4.9**
640749	6.02	0.07	47%	0.22	0.00	0.24	0.22	2.89	---	3.28	---	---	**6.9**	0.07	**6.9**
640849	10.06	0.01	63%	0.23	---	0.35	0.54	2.98	0.01	5.00	---	---	**9.1**	0.01	**9.1**
640949	1.20	0.02	37%	0.06	---	0.22	0.01	0.43	---	0.04	---	---	**0.7**	0.02	**0.8**
641049	2.44	0.01	48%	0.05	---	---	0.08	1.63	0.02	0.44	---	---	**2.2**	0.01	**2.2**
641149	0.92	0.01	48%	0.02	---	0.02	0.04	0.69	0.13	---	---	---	**0.9**	0.01	**0.9**
641449	0.03	0.00	64%	0.00	---	0.02	0.00	---	---	0.01	---	---	**0.0**	0.00	**0.0**
641549	1.09	0.01	49%	0.03	---	0.11	0.11	---	0.60	0.00	---	---	**0.9**	0.01	**0.9**
641649	0.00	0.00	13%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
642049	0.00	0.00	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**51.6**	**1.3**	**39%**	**2.0**	**0.0**	**1.2**	**3.3**	**16.4**	**17.0**	**8.8**	**0.0**	**0.0**	**48.8**	**1.3**	**50.1**

Table 7A-17. Los Angeles, Bell Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
699949	14.85	0.00	90%	0.17	0.44	---	0.16	4.12	---	0.01	---	7.88	**12.8**	0.00	**12.8**
700049	1.95	3.34	16%	0.17	0.00	---	0.65	0.80	---	---	---	---	**1.6**	3.34	**5.0**
700149	0.25	0.83	10%	0.04	---	---	0.17	---	---	---	---	---	**0.2**	0.83	**1.0**
700249	5.03	13.98	10%	0.69	0.01	---	2.53	0.92	---	---	---	---	**4.1**	13.98	**18.1**
700349	1.55	4.25	11%	0.22	---	---	0.85	0.23	---	---	---	---	**1.3**	4.25	**5.6**
700449	2.08	1.71	21%	0.13	---	0.02	0.38	0.07	---	1.36	---	---	**2.0**	1.71	**3.7**
Total	**25.7**	**24.1**	**23%**	**1.4**	**0.5**	**0.0**	**4.7**	**6.1**	**0.0**	**1.4**	**0.0**	**7.9**	**22.0**	**24.1**	**46.1**

Table 7A-18. Los Angeles, Browns Canyon Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
695649	46.69	---	90%	0.73	2.02	---	1.24	6.86	---	---	---	20.67	**31.5**	---	**31.5**
695749	57.14	---	89%	0.98	0.09	---	0.75	6.98	---	---	---	36.68	**45.5**	---	**45.5**
695849	3.49	---	95%	0.04	---	---	0.02	0.48	---	---	---	2.12	**2.7**	---	**2.7**
695949	0.07	0.82	11%	0.04	---	---	---	0.09	---	---	---	---	**0.1**	0.82	**1.0**
696049	22.76	---	95%	0.42	0.03	0.07	0.14	3.81	---	---	---	11.24	**15.7**	---	**15.7**
696149	0.00	0.01	11%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**
696249	3.39	---	98%	0.05	---	---	0.22	---	---	---	---	2.47	**2.7**	---	**2.7**
696449	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
696649	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
696749	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**133.5**	**0.8**	**89%**	**2.3**	**2.1**	**0.1**	**2.4**	**18.2**	**0.0**	**0.0**	**0.0**	**73.2**	**98.3**	**0.8**	**99.1**

Table 7A-19. Los Angeles, Bull Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
688549	37.49	0.14	90%	0.56	0.00	---	0.75	2.15	---	1.56	---	14.90	**19.9**	0.14	**20.1**
688649	0.83	2.20	10%	0.09	0.01	---	0.38	---	---	0.00	---	---	**0.5**	2.20	**2.7**
688749	51.63	0.00	80%	0.68	0.05	---	1.94	1.27	---	0.00	---	37.49	**41.4**	0.00	**41.4**
688849	5.24	0.43	60%	0.09	---	---	0.39	1.59	---	---	---	---	**2.1**	0.43	**2.5**
688949	15.72	0.00	89%	0.19	0.01	0.01	0.63	1.89	---	0.10	---	5.46	**8.3**	0.00	**8.3**
689049	1.12	5.27	9%	0.25	0.01	---	0.71	---	---	---	---	---	**1.0**	5.27	**6.2**
689149	9.47	---	90%	0.12	0.00	0.03	0.44	3.56	---	---	---	1.57	**5.7**	---	**5.7**
689249	4.80	1.29	43%	0.15	0.01	---	0.51	3.43	---	1.80	---	---	**5.9**	1.29	**7.2**
689349	1.26	3.25	11%	0.17	---	---	0.68	0.14	---	0.37	---	---	**1.4**	3.25	**4.6**
689449	0.30	1.35	9%	0.07	---	---	0.21	---	---	---	---	---	**0.3**	1.35	**1.6**
689549	0.44	1.45	10%	0.07	0.01	---	0.30	---	---	---	---	---	**0.4**	1.45	**1.8**
689649	4.41	1.99	25%	0.12	---	1.73	0.47	---	---	1.41	---	---	**3.7**	1.99	**5.7**
689749	43.01	0.60	90%	1.35	0.01	15.98	0.30	---	---	11.77	---	---	**29.4**	0.60	**30.0**
689849	25.86	0.34	80%	0.64	---	0.70	---	---	---	23.13	---	---	**24.5**	0.34	**24.8**
689949	24.91	0.49	82%	0.60	---	6.23	0.00	---	---	15.81	---	---	**22.6**	0.49	**23.1**
690049	0.52	1.10	8%	0.05	0.00	---	0.14	---	---	0.27	---	---	**0.5**	1.10	**1.6**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
690149	9.59	1.53	16%	0.24	---	0.29	0.39	---	---	8.15	---	---	**9.1**	1.53	**10.6**
690249	1.65	0.83	32%	0.10	---	---	0.01	1.09	---	0.01	---	---	**1.2**	0.83	**2.1**
690349	0.97	0.46	8%	0.04	---	---	---	---	---	0.87	---	---	**0.9**	0.46	**1.4**
690449	0.30	2.01	7%	0.12	0.00	---	0.07	---	---	0.05	---	---	**0.2**	2.01	**2.3**
690549	0.03	0.31	6%	0.02	---	---	---	---	---	---	---	---	**0.0**	0.31	**0.3**
690749	0.12	1.44	6%	0.09	---	---	---	---	---	---	---	---	**0.1**	1.44	**1.5**
690949	0.01	0.12	7%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.12	**0.1**
691049	0.01	0.05	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.05	**0.1**
Total	**239.7**	**26.7**	**65%**	**5.9**	**0.1**	**25.0**	**8.3**	**15.1**	**0.0**	**65.3**	**0.0**	**59.4**	**179.1**	**26.7**	**205.8**

Table 7A-20. Los Angeles, Burbank Western Channel: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
659749	0.00	0.00	7%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
660349	10.86	0.00	90%	0.22	0.10	---	0.01	1.13	---	0.29	---	5.53	**7.3**	0.00	**7.3**
660949	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
661049	0.04	0.01	54%	0.00	---	---	---	0.04	---	---	---	---	**0.0**	0.01	**0.0**
661149	0.01	0.10	7%	0.01	---	---	0.00	---	---	---	---	---	**0.0**	0.10	**0.1**
661249	9.19	0.01	90%	0.21	0.01	---	0.22	1.11	---	0.40	---	4.60	**6.6**	0.01	**6.6**
661549	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
661749	4.22	---	90%	0.06	0.00	---	0.17	0.42	---	---	---	2.87	**3.5**	---	**3.5**
661849	11.13	0.06	95%	0.30	0.23	---	0.21	1.27	---	0.01	1.64	2.98	**6.6**	0.06	**6.7**
661949	20.30	0.00	90%	0.29	0.10	---	0.53	4.67	---	---	0.00	8.84	**14.4**	0.00	**14.4**
662049	10.49	0.00	84%	0.13	0.01	0.00	0.12	3.84	---	0.99	0.00	3.70	**8.8**	0.00	**8.8**
662149	1.70	2.89	22%	0.11	0.00	---	0.18	1.28	---	0.02	---	---	**1.6**	2.89	**4.5**
662249	1.41	1.17	26%	0.06	0.63	---	0.10	0.38	---	---	---	---	**1.2**	1.17	**2.3**
662349	0.21	1.66	9%	0.07	0.01	---	0.11	---	---	---	---	---	**0.2**	1.66	**1.8**
Total	**69.5**	**5.9**	**75%**	**1.5**	**1.1**	**0.0**	**1.7**	**14.1**	**0.0**	**1.7**	**1.6**	**28.5**	**50.2**	**5.9**	**56.1**

Table 7A-21. Los Angeles, Compton Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
602349	0.00	0.00	5%	---	---	---	---	---	---	0.00	---	0.00	**0.0**	0.00	**0.0**
602449	22.55	0.00	84%	0.41	0.02	---	0.37	8.71	---	0.11	0.29	5.78	**15.7**	0.00	**15.7**
603649	4.45	0.06	69%	0.08	---	---	0.04	1.60	---	---	1.47	---	**3.2**	0.06	**3.2**
603949	0.18	0.01	37%	0.01	---	0.00	0.00	0.09	---	0.02	0.02	---	**0.1**	0.01	**0.2**
604049	15.40	0.01	90%	0.28	0.01	---	0.24	5.14	---	---	2.30	3.21	**11.2**	0.01	**11.2**
604149	3.91	0.09	58%	0.08	0.03	---	0.07	1.82	---	0.08	0.71	---	**2.8**	0.09	**2.9**
604249	1.67	0.03	58%	0.10	---	0.00	---	0.83	---	0.04	0.19	0.13	**1.3**	0.03	**1.3**
604349	48.93	---	91%	0.98	0.30	---	0.04	22.94	---	2.04	---	8.50	**34.8**	---	**34.8**
604449	7.04	0.23	63%	0.16	0.01	0.01	0.37	1.95	---	2.78	0.00	---	**5.3**	0.23	**5.5**
604549	14.79	0.00	84%	0.24	0.01	---	0.05	4.86	---	0.95	0.00	4.92	**11.0**	0.00	**11.0**
604649	11.83	0.00	91%	0.20	0.00	---	0.46	3.61	---	---	0.00	3.39	**7.7**	0.00	**7.7**
604749	11.88	0.00	90%	0.18	0.03	---	0.00	5.55	---	---	0.01	3.02	**8.8**	0.00	**8.8**
604849	1.07	0.73	9%	0.58	0.02	---	---	---	---	0.01	0.30	0.10	**1.0**	0.73	**1.7**
604949	8.02	0.08	74%	0.18	0.01	0.00	0.18	1.54	---	2.79	---	---	**4.7**	0.08	**4.8**
605049	30.69	---	84%	0.50	0.00	---	0.83	14.51	---	0.03	0.02	8.27	**24.2**	---	**24.2**
605149	7.23	---	91%	0.10	---	---	0.13	3.02	---	---	---	1.48	**4.7**	---	**4.7**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
605249	17.45	---	85%	0.33	0.02	---	---	8.72	---	---	---	4.68	**13.8**	---	**13.8**
605349	14.25	---	84%	0.28	0.02	---	---	7.88	---	---	---	3.89	**12.1**	---	**12.1**
605449	17.72	---	89%	0.28	0.02	---	0.01	9.74	---	---	---	4.98	**15.0**	---	**15.0**
605549	31.31	---	84%	0.56	0.02	---	0.04	14.57	---	0.02	---	10.92	**26.1**	---	**26.1**
605649	7.51	---	91%	0.11	0.01	---	0.04	3.28	---	---	---	1.51	**5.0**	---	**5.0**
605749	33.24	---	84%	0.55	0.01	---	0.87	17.16	---	0.01	0.05	7.64	**26.3**	---	**26.3**
605849	3.72	0.19	48%	0.11	0.00	---	---	2.88	---	---	---	---	**3.0**	0.19	**3.2**
605949	5.82	0.19	53%	0.15	---	---	0.09	4.88	---	---	---	---	**5.1**	0.19	**5.3**
606049	0.21	0.45	6%	0.16	0.01	---	0.01	---	---	---	---	---	**0.2**	0.45	**0.6**
606149	14.20	---	90%	0.23	0.01	---	0.00	5.02	---	---	---	4.49	**9.7**	---	**9.7**
606249	4.05	0.28	43%	0.12	0.02	---	0.02	3.37	---	---	---	---	**3.5**	0.28	**3.8**
606349	1.96	0.16	32%	0.08	---	---	0.02	1.58	---	---	---	---	**1.7**	0.16	**1.8**
606449	9.11	---	85%	0.19	---	---	---	2.12	---	---	---	5.14	**7.4**	---	**7.4**
Total	**350.2**	**2.5**	**77%**	**7.2**	**0.6**	**0.0**	**3.9**	**157.3**	**0.0**	**8.9**	**5.4**	**82.1**	**265.4**	**2.5**	**267.9**

Table 7A-22. Los Angeles, LA River—above Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
691149	0.28	0.13	31%	0.02	---	---	0.02	0.18	---	0.00	---	---	**0.2**	0.13	**0.4**
691249	2.51	0.23	58%	0.06	---	---	0.19	1.81	0.01	0.00	---	---	**2.1**	0.23	**2.3**
691349	0.28	0.30	21%	0.03	0.00	---	0.04	0.06	---	0.00	---	---	**0.1**	0.30	**0.4**
691449	30.04	0.02	95%	0.38	0.01	0.50	1.11	3.96	2.78	0.03	---	15.98	**24.8**	0.02	**24.8**
691549	1.11	0.04	74%	0.05	---	---	0.04	0.57	0.21	0.00	---	0.00	**0.9**	0.04	**0.9**
691649	17.31	0.04	95%	0.19	0.01	0.03	0.35	3.00	0.16	0.44	---	3.45	**7.6**	0.04	**7.7**
691749	0.64	3.21	9%	0.10	0.01	---	0.38	---	0.02	0.01	---	---	**0.5**	3.21	**3.7**
691849	1.76	0.01	95%	0.01	---	1.49	0.01	0.10	0.00	---	---	---	**1.6**	0.01	**1.6**
691949	35.16	0.00	95%	0.49	0.11	0.01	0.68	5.44	9.94	0.04	---	13.37	**30.1**	0.00	**30.1**
692049	8.05	0.00	95%	0.14	0.04	---	0.05	0.97	0.00	13.96	---	2.13	**17.3**	0.00	**17.3**
692149	3.97	0.00	95%	0.06	---	0.63	0.12	0.01	0.49	---	---	---	**1.3**	0.00	**1.3**
692249	24.14	0.00	95%	0.27	0.01	---	0.33	1.14	11.28	---	---	8.12	**21.2**	0.00	**21.2**
692349	42.53	0.00	96%	0.40	0.18	---	0.34	7.44	19.90	---	---	4.97	**33.2**	0.00	**33.2**
692449	3.41	3.32	26%	0.20	0.02	0.03	0.52	2.00	0.07	---	---	---	**2.8**	3.32	**6.2**
694149	0.02	0.09	10%	0.01	---	---	---	0.01	---	---	---	---	**0.0**	0.09	**0.1**
694249	1.55	2.60	17%	0.09	0.01	---	0.28	1.03	0.03	---	---	---	**1.4**	2.60	**4.0**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
694349	11.53	---	84%	0.16	0.00	---	0.30	2.55	---	---	---	5.78	**8.8**	---	**8.8**
694449	27.58	---	95%	0.43	0.07	---	0.85	1.32	---	---	---	19.61	**22.3**	---	**22.3**
694549	18.46	---	84%	0.17	0.04	---	0.43	1.28	---	---	---	12.01	**13.9**	---	**13.9**
694649	2.71	2.75	27%	0.17	---	---	0.44	1.71	---	---	---	---	**2.3**	2.75	**5.1**
694749	35.29	---	95%	0.54	0.03	---	1.44	---	---	---	---	25.16	**27.2**	---	**27.2**
694849	6.94	---	91%	0.07	0.01	---	0.18	0.51	---	---	---	3.95	**4.7**	---	**4.7**
694949	10.35	3.94	37%	0.33	0.02	4.24	0.54	2.26	---	5.03	---	---	**12.4**	3.94	**16.4**
695049	0.21	0.47	16%	0.03	---	---	0.07	0.08	---	---	---	---	**0.2**	0.47	**0.6**
695149	46.79	---	95%	0.83	0.01	---	1.14	2.99	---	---	---	27.74	**32.7**	---	**32.7**
695249	0.65	0.40	21%	0.03	---	0.08	0.07	0.19	---	0.18	---	---	**0.6**	0.40	**0.9**
695349	8.19	0.01	95%	0.10	---	1.71	0.42	0.20	---	2.34	---	---	**4.8**	0.01	**4.8**
695449	0.18	0.15	21%	0.03	---	---	0.00	0.13	---	---	---	---	**0.2**	0.15	**0.3**
695549	0.10	0.25	13%	0.01	---	---	0.05	0.03	---	---	---	---	**0.1**	0.25	**0.3**
697449	1.58	0.77	42%	0.07	---	---	0.12	1.14	---	---	---	---	**1.3**	0.77	**2.1**
697549	16.10	---	85%	0.30	0.00	---	0.41	2.70	---	---	---	8.72	**12.1**	---	**12.1**
697649	76.04	0.06	90%	1.03	0.03	0.03	0.98	9.17	---	41.56	---	16.22	**69.0**	0.06	**69.1**
697749	20.41	0.00	89%	0.36	0.01	0.30	0.11	3.14	---	0.18	---	12.13	**16.2**	0.00	**16.2**
697849	20.20	---	90%	0.39	0.01	0.02	0.10	3.63	---	0.44	---	9.89	**14.5**	---	**14.5**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
697949	59.01	0.00	95%	0.72	0.08	---	0.59	6.02	---	0.00	---	39.22	**46.6**	0.00	**46.6**
698049	6.86	---	90%	0.09	0.00	---	0.08	2.00	---	---	---	3.02	**5.2**	---	**5.2**
699449	17.91	---	90%	0.22	---	---	0.37	3.42	---	---	---	8.83	**12.8**	---	**12.8**
699549	31.00	---	90%	0.38	---	0.12	0.90	4.78	---	8.78	---	6.69	**21.6**	---	**21.6**
699649	4.30	6.59	25%	0.32	0.01	---	1.15	1.82	---	---	---	---	**3.3**	6.59	**9.9**
699749	10.86	0.04	95%	0.10	0.00	0.08	0.34	0.34	---	8.15	---	---	**9.0**	0.04	**9.0**
699849	0.30	0.14	44%	0.01	---	---	0.02	0.25	---	---	---	---	**0.3**	0.14	**0.4**
700549	43.74	---	95%	0.52	0.14	---	1.87	15.57	---	---	---	9.01	**27.1**	---	**27.1**
700649	8.70	---	95%	0.11	0.01	---	0.43	1.56	---	---	---	2.06	**4.2**	---	**4.2**
700749	0.01	0.08	16%	0.00	---	---	0.01	0.00	---	---	---	---	**0.0**	0.08	**0.1**
700849	8.93	---	89%	0.15	---	---	0.20	0.55	---	---	---	5.80	**6.7**	---	**6.7**
700949	0.48	3.33	9%	0.30	---	---	0.13	---	---	---	---	---	**0.4**	3.33	**3.8**
701049	0.00	0.01	10%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**
701149	0.01	0.05	10%	0.00	---	---	0.01	---	---	---	---	---	**0.0**	0.05	**0.1**
Total	**668.2**	**29.0**	**84%**	**10.5**	**0.9**	**9.3**	**18.2**	**97.1**	**44.9**	**81.1**	**0.0**	**263.9**	**525.8**	**29.0**	**554.8**

Table 7A-23. Los Angeles, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
600549	0.03	0.22	8%	0.03	---	---	---	---	---	---	---	---	**0.0**	0.22	**0.2**
635849	0.05	0.12	12%	0.02	---	---	---	0.02	---	0.14	---	---	**0.2**	0.12	**0.3**
635949	0.48	0.60	29%	0.11	---	---	0.06	0.65	---	0.00	---	---	**0.8**	0.60	**1.4**
636149	0.00	0.09	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.09	**0.1**
636249	1.14	4.04	8%	0.34	0.05	---	0.72	---	---	0.00	---	0.00	**1.1**	4.04	**5.2**
636349	0.03	0.30	7%	0.00	---	---	0.02	---	---	---	---	---	**0.0**	0.30	**0.3**
636449	0.00	0.00	39%	---	---	---	---	0.00	---	0.00	---	0.00	**0.0**	0.00	**0.0**
636649	0.00	0.00	12%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
636749	0.29	3.03	7%	0.23	---	---	0.00	---	---	---	---	---	**0.2**	3.03	**3.3**
636849	3.74	3.82	16%	0.56	---	0.19	0.04	0.02	---	0.19	---	---	**1.0**	3.82	**4.8**
636949	0.22	2.56	6%	0.15	0.00	---	0.02	---	---	0.01	0.03	---	**0.2**	2.56	**2.8**
637049	0.02	0.03	11%	0.00	---	---	---	0.01	---	---	---	---	**0.0**	0.03	**0.0**
637149	0.63	4.46	8%	0.40	0.08	---	0.02	---	---	---	---	---	**0.5**	4.46	**5.0**
637249	0.01	0.12	7%	0.01	---	---	0.00	---	---	---	0.01	---	**0.0**	0.12	**0.1**
637649	0.01	0.06	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.06	**0.1**
637749	14.44	5.97	38%	1.01	0.11	---	0.00	11.26	---	---	---	---	**12.4**	5.97	**18.4**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
637849	0.19	1.05	8%	0.16	---	---	---	---	---	---	---	---	**0.2**	1.05	**1.2**
638049	0.09	0.64	7%	0.07	---	---	---	---	---	---	---	---	**0.1**	0.64	**0.7**
638149	0.63	3.53	8%	0.54	0.00	---	---	---	---	---	---	---	**0.5**	3.53	**4.1**
638249	6.31	0.57	68%	0.26	---	1.29	---	0.02	---	0.46	---	---	**2.0**	0.57	**2.6**
638349	9.52	3.53	32%	0.57	0.13	0.09	---	7.17	---	---	---	---	**8.0**	3.53	**11.5**
638449	44.67	2.09	91%	0.77	0.05	0.13	0.03	21.32	---	10.53	---	6.22	**39.1**	2.09	**41.1**
638549	13.38	4.26	32%	0.71	0.08	---	---	10.33	---	---	---	---	**11.1**	4.26	**15.4**
638649	0.28	2.02	8%	0.24	---	---	---	---	---	---	---	---	**0.2**	2.02	**2.3**
638749	2.22	1.97	19%	0.27	---	1.24	0.00	---	---	0.57	---	---	**2.1**	1.97	**4.0**
638849	4.60	1.64	32%	0.22	0.10	0.05	---	3.47	---	---	---	---	**3.8**	1.64	**5.5**
638949	1.49	15.15	7%	0.85	0.48	0.06	0.01	---	---	0.00	---	---	**1.4**	15.15	**16.6**
639049	2.18	7.44	21%	0.36	0.04	---	0.24	3.02	---	0.00	---	---	**3.7**	7.44	**11.1**
639149	10.72	1.30	26%	0.64	0.01	1.59	0.00	2.59	---	2.42	---	---	**7.3**	1.30	**8.6**
639249	10.47	1.28	58%	0.52	0.70	0.03	0.01	3.24	---	7.45	---	---	**11.9**	1.28	**13.2**
639349	0.18	0.84	9%	0.16	---	---	---	---	---	---	---	---	**0.2**	0.84	**1.0**
639449	45.01	2.20	74%	1.16	1.68	0.29	0.56	1.45	8.86	14.79	---	---	**28.8**	2.20	**31.0**
639549	16.15	1.74	37%	0.19	0.00	---	0.46	1.61	0.00	22.01	---	---	**24.3**	1.74	**26.0**
639649	0.68	8.51	6%	0.43	0.07	0.01	0.01	---	---	0.09	---	---	**0.6**	8.51	**9.1**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
639749	2.28	0.12	32%	0.11	0.70	---	0.02	0.98	---	0.17	---	---	**2.0**	0.12	**2.1**
639849	8.86	4.67	10%	0.59	0.03	---	0.83	---	---	6.28	---	---	**7.7**	4.67	**12.4**
639949	1.65	0.03	89%	0.08	---	0.88	---	0.12	0.05	0.00	---	---	**1.1**	0.03	**1.2**
640049	0.14	0.37	18%	0.03	---	---	0.03	0.15	---	0.00	---	---	**0.2**	0.37	**0.6**
640149	10.98	0.37	84%	0.27	---	1.29	---	---	8.59	---	---	---	**10.2**	0.37	**10.5**
647349	0.19	0.61	10%	0.05	---	0.10	0.00	---	---	0.00	---	---	**0.2**	0.61	**0.8**
647449	0.39	2.27	8%	0.14	---	---	0.23	---	---	---	0.00	---	**0.4**	2.27	**2.6**
647549	3.87	6.54	31%	0.53	---	1.04	0.35	1.24	---	0.00	1.55	---	**4.7**	6.54	**11.2**
647649	1.33	4.50	44%	0.18	0.03	---	0.54	1.06	0.00	---	0.01	---	**1.8**	4.50	**6.3**
647749	0.29	2.28	7%	0.12	---	0.00	0.15	---	---	---	0.00	---	**0.3**	2.28	**2.6**
647849	0.03	0.28	7%	0.02	---	---	0.00	---	---	---	---	---	**0.0**	0.28	**0.3**
647949	0.02	0.60	6%	0.06	---	0.06	0.00	---	---	---	---	---	**0.1**	0.60	**0.7**
648049	3.28	16.56	8%	0.90	0.03	---	1.90	---	0.00	0.00	---	---	**2.8**	16.56	**19.4**
648149	2.65	10.52	9%	0.56	0.30	---	1.43	---	---	0.00	---	---	**2.3**	10.52	**12.8**
648249	0.49	2.85	8%	0.20	0.00	0.00	0.16	---	---	---	---	---	**0.4**	2.85	**3.2**
648349	0.95	6.48	7%	0.37	---	---	0.18	---	---	0.20	---	---	**0.8**	6.48	**7.2**
648449	1.75	1.79	10%	0.08	0.00	---	0.14	---	---	0.73	---	---	**1.0**	1.79	**2.7**
648649	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
648749	0.00	0.00	---	---	---	---	---	---	---	0.00	---	---	**0.0**	0.00	**0.0**
649149	0.78	1.10	21%	0.11	0.14	0.15	0.02	0.11	---	---	---	---	**0.5**	1.10	**1.6**
649249	0.40	2.92	7%	0.14	---	---	0.18	---	---	---	---	---	**0.3**	2.92	**3.2**
649349	0.13	1.30	8%	0.10	---	---	0.00	---	---	---	---	---	**0.1**	1.30	**1.4**
649449	0.41	0.60	21%	0.06	0.00	---	---	0.19	---	---	---	---	**0.3**	0.60	**0.9**
649549	1.27	2.34	33%	0.13	---	---	0.26	1.69	---	---	---	---	**2.1**	2.34	**4.4**
649649	1.91	2.71	21%	0.21	0.00	0.12	0.17	0.85	---	0.02	---	---	**1.4**	2.71	**4.1**
649749	0.23	1.16	8%	0.05	0.01	0.01	0.12	---	---	---	---	---	**0.2**	1.16	**1.3**
649849	1.07	0.07	79%	0.05	---	0.69	0.03	---	---	0.05	---	---	**0.8**	0.07	**0.9**
649949	0.91	0.17	19%	0.02	---	0.02	0.07	---	---	0.51	---	---	**0.6**	0.17	**0.8**
650049	2.13	0.86	10%	0.07	---	---	0.18	---	---	1.15	---	---	**1.4**	0.86	**2.3**
650149	0.68	0.08	64%	0.00	---	0.43	0.00	---	---	---	---	---	**0.4**	0.08	**0.5**
650249	0.23	1.27	8%	0.06	0.00	---	0.10	---	---	0.02	---	---	**0.2**	1.27	**1.5**
650349	1.16	1.07	30%	0.06	0.70	---	0.04	---	---	0.58	---	---	**1.4**	1.07	**2.4**
650449	1.58	0.50	41%	0.04	---	0.98	0.01	---	---	0.02	---	---	**1.0**	0.50	**1.5**
650549	0.70	0.61	8%	0.04	0.00	---	0.03	---	---	1.51	---	---	**1.6**	0.61	**2.2**
650649	7.64	0.57	85%	0.22	0.00	2.83	0.07	---	---	0.89	---	---	**4.0**	0.57	**4.6**
650749	1.75	0.12	79%	0.13	0.08	1.04	---	---	---	---	---	---	**1.3**	0.12	**1.4**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
650849	0.04	0.34	9%	0.03	0.00	0.00	---	---	---	---	---	---	**0.0**	0.34	**0.4**
650949	0.52	0.92	17%	0.11	0.20	0.18	---	---	---	---	---	---	**0.5**	0.92	**1.4**
651049	4.57	3.05	26%	0.28	2.36	0.32	---	0.00	---	0.38	---	---	**3.3**	3.05	**6.4**
651149	0.66	0.57	23%	0.08	---	0.03	---	---	---	0.31	---	---	**0.4**	0.57	**1.0**
651249	1.94	1.90	26%	0.19	0.64	---	---	0.26	---	---	---	---	**1.1**	1.90	**3.0**
657549	1.30	0.08	82%	0.04	0.74	---	---	---	---	---	---	---	**0.8**	0.08	**0.9**
657649	0.00	0.00	21%	0.00	---	---	---	0.00	---	---	---	---	**0.0**	0.00	**0.0**
659449	0.59	0.14	60%	0.03	0.40	---	---	---	---	---	---	---	**0.4**	0.14	**0.6**
659549	1.18	0.16	72%	0.04	0.74	---	0.00	---	---	---	---	---	**0.8**	0.16	**0.9**
659649	0.02	0.02	16%	0.00	---	---	0.00	0.01	---	---	---	---	**0.0**	0.02	**0.0**
662449	0.06	0.57	9%	0.04	0.00	---	---	---	---	0.00	---	---	**0.0**	0.57	**0.6**
662549	0.01	0.02	9%	0.00	---	---	---	---	---	0.00	---	---	**0.0**	0.02	**0.0**
662649	1.30	1.16	10%	0.13	---	---	---	---	---	0.63	---	---	**0.8**	1.16	**1.9**
662749	0.00	0.00	14%	0.00	---	---	0.00	---	---	0.00	---	---	**0.0**	0.00	**0.0**
662849	0.06	0.49	9%	0.04	---	---	0.00	---	---	---	---	---	**0.0**	0.49	**0.5**
662949	4.63	0.57	53%	0.09	0.64	---	0.11	1.67	---	0.20	---	0.00	**2.7**	0.57	**3.3**
663049	0.00	0.00	9%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
663149	0.03	0.59	7%	0.04	---	---	---	---	---	0.00	---	---	**0.0**	0.59	**0.6**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
663249	0.01	0.21	9%	0.02	---	---	0.00	---	---	---	---	---	**0.0**	0.21	**0.2**
663349	0.05	0.87	7%	0.05	---	---	---	---	---	---	---	---	**0.0**	0.87	**0.9**
663449	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
663549	0.08	0.11	22%	0.01	---	---	---	0.04	---	---	---	---	**0.0**	0.11	**0.2**
663649	0.90	0.82	26%	0.04	0.03	---	0.11	0.31	---	---	---	---	**0.5**	0.82	**1.3**
663749	0.53	2.19	16%	0.10	0.01	---	0.16	0.44	---	---	---	---	**0.7**	2.19	**2.9**
663849	0.10	0.69	10%	0.03	---	---	0.02	0.01	---	---	---	---	**0.1**	0.69	**0.7**
663949	18.17	1.31	63%	0.39	0.23	0.23	0.81	6.01	---	3.79	---	0.04	**11.5**	1.31	**12.8**
664049	5.69	0.52	58%	0.11	0.01	---	0.16	3.39	---	0.22	---	---	**3.9**	0.52	**4.4**
664149	8.18	1.74	49%	0.30	0.05	---	0.32	4.87	---	---	---	---	**5.5**	1.74	**7.3**
664249	26.49	0.59	79%	0.99	0.01	3.82	1.08	0.00	27.99	0.48	1.75	0.00	**36.1**	0.59	**36.7**
664349	44.18	0.51	84%	1.54	2.10	0.70	0.14	1.82	---	8.17	13.09	---	**27.6**	0.51	**28.1**
664449	0.11	0.80	10%	0.05	---	---	0.00	0.00	---	---	---	---	**0.1**	0.80	**0.9**
664549	11.90	3.85	42%	0.28	0.04	---	0.14	6.02	---	---	---	---	**6.5**	3.85	**10.3**
664649	1.66	7.56	16%	0.28	0.01	---	0.70	1.13	---	---	---	---	**2.1**	7.56	**9.7**
664749	3.65	2.48	26%	0.14	0.01	---	0.09	1.86	---	---	---	---	**2.1**	2.48	**4.6**
664849	0.18	1.99	7%	0.06	---	---	0.07	---	---	---	---	---	**0.1**	1.99	**2.1**
664949	75.07	8.07	63%	1.52	0.10	0.63	2.11	23.92	0.02	13.08	---	---	**41.4**	8.07	**49.4**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
665049	18.97	4.30	49%	0.42	0.04	0.08	0.79	4.03	9.06	0.77	0.00	---	**15.2**	4.30	**19.5**
665149	31.14	6.69	47%	0.95	0.18	---	1.01	14.28	0.30	2.00	0.00	---	**18.7**	6.69	**25.4**
665249	32.63	8.82	59%	0.92	0.21	0.17	0.76	---	38.00	0.36	0.00	---	**40.4**	8.82	**49.2**
665349	4.29	1.44	42%	0.19	---	---	0.19	0.89	---	2.86	---	---	**4.1**	1.44	**5.6**
665449	1.42	7.66	8%	0.31	0.11	---	0.47	---	---	---	---	---	**0.9**	7.66	**8.5**
665549	1.88	1.46	27%	0.09	0.01	---	0.13	0.80	---	---	---	---	**1.0**	1.46	**2.5**
665649	0.21	0.90	10%	0.03	0.03	---	0.06	---	---	---	---	---	**0.1**	0.90	**1.0**
665749	0.12	0.37	16%	0.02	0.00	---	0.06	0.07	---	---	---	---	**0.1**	0.37	**0.5**
665849	1.02	5.80	9%	0.25	0.06	---	0.37	---	---	---	---	---	**0.7**	5.80	**6.5**
665949	3.15	2.04	31%	0.09	0.04	---	0.20	1.41	---	---	---	---	**1.7**	2.04	**3.8**
666049	0.01	0.10	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.10	**0.1**
682949	1.31	1.42	27%	0.08	0.00	---	0.03	0.60	---	---	---	---	**0.7**	1.42	**2.1**
683049	1.07	6.83	12%	0.19	0.03	---	0.78	0.23	---	---	---	---	**1.2**	6.83	**8.1**
683149	2.98	4.66	22%	0.15	0.06	---	0.38	1.35	---	---	---	---	**1.9**	4.66	**6.6**
683249	0.19	1.24	9%	0.04	0.01	---	0.13	---	---	---	---	---	**0.2**	1.24	**1.4**
683349	0.21	1.76	8%	0.04	0.00	---	0.14	---	---	---	---	---	**0.2**	1.76	**2.0**
683449	7.13	1.78	48%	0.14	0.05	---	0.24	3.80	---	---	---	---	**4.2**	1.78	**6.0**
683549	0.13	1.50	8%	0.04	---	---	0.08	---	---	---	---	---	**0.1**	1.50	**1.6**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
683649	2.86	1.04	37%	0.07	0.01	---	0.12	1.45	---	---	---	---	**1.6**	1.04	**2.7**
683749	0.25	1.85	8%	0.05	0.00	---	0.18	---	---	---	---	---	**0.2**	1.85	**2.1**
683849	0.61	3.94	9%	0.11	0.02	---	0.27	---	---	---	---	---	**0.4**	3.94	**4.3**
683949	2.02	5.79	8%	0.38	0.03	---	1.14	---	---	0.01	---	---	**1.6**	5.79	**7.3**
684049	0.10	0.73	8%	0.02	0.01	---	0.06	---	---	---	---	---	**0.1**	0.73	**0.8**
684149	0.02	0.47	7%	0.01	0.01	---	---	---	---	---	---	---	**0.0**	0.47	**0.5**
684249	0.59	4.39	8%	0.12	0.03	---	0.39	---	---	---	---	---	**0.5**	4.39	**4.9**
684349	1.30	1.50	17%	0.13	0.75	---	0.21	---	---	---	---	---	**1.1**	1.50	**2.6**
684449	1.45	5.28	8%	0.33	0.12	---	0.86	---	---	0.02	---	---	**1.3**	5.28	**6.6**
684549	0.50	4.27	8%	0.12	0.03	---	0.31	---	---	---	---	---	**0.5**	4.27	**4.7**
684649	0.04	0.40	7%	0.03	---	---	---	---	---	---	---	---	**0.0**	0.40	**0.4**
684749	0.23	0.95	7%	0.06	---	---	0.13	---	---	---	---	---	**0.2**	0.95	**1.1**
684849	0.01	0.09	7%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.09	**0.1**
684949	0.46	2.76	8%	0.11	0.02	---	0.29	---	---	---	---	---	**0.4**	2.76	**3.2**
685049	54.10	2.53	63%	1.03	0.39	2.65	0.86	1.23	---	29.93	---	---	**36.1**	2.53	**38.6**
685149	1.06	9.32	8%	0.41	0.21	---	0.28	---	---	---	---	---	**0.9**	9.32	**10.2**
685249	0.01	0.08	7%	0.01	---	---	0.00	---	---	---	---	---	**0.0**	0.08	**0.1**
685349	0.87	0.21	32%	0.04	0.00	---	0.04	0.61	---	---	---	---	**0.7**	0.21	**0.9**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
685449	0.09	0.48	7%	0.03	---	---	0.04	---	---	---	---	---	**0.1**	0.48	**0.6**
685549	0.07	0.34	7%	0.02	0.00	---	0.03	---	---	0.00	---	---	**0.1**	0.34	**0.4**
685649	16.00	1.15	47%	0.36	0.17	---	0.38	8.20	---	12.95	---	---	**22.1**	1.15	**23.2**
685749	1.21	4.08	8%	0.27	0.02	---	0.73	---	---	---	---	---	**1.0**	4.08	**5.1**
685849	0.01	0.07	8%	0.01	---	---	0.00	---	---	---	---	---	**0.0**	0.07	**0.1**
685949	1.29	5.66	7%	0.42	0.04	---	0.61	---	---	0.03	---	---	**1.1**	5.66	**6.7**
686049	0.03	0.08	11%	0.01	---	---	0.00	0.01	---	---	---	---	**0.0**	0.08	**0.1**
686149	2.05	9.18	7%	0.75	0.06	---	0.88	---	---	0.04	---	---	**1.7**	9.18	**10.9**
686249	3.86	0.69	38%	0.09	0.02	---	0.22	1.28	---	---	---	---	**1.6**	0.69	**2.3**
686349	0.05	0.58	6%	0.04	---	---	---	---	---	---	---	---	**0.0**	0.58	**0.6**
686449	0.84	0.73	17%	0.06	0.00	---	0.17	0.13	---	---	---	---	**0.4**	0.73	**1.1**
686549	1.47	6.91	7%	0.50	0.05	---	0.68	---	---	---	---	---	**1.2**	6.91	**8.1**
686649	1.28	3.13	17%	0.11	0.02	---	0.35	0.37	---	---	---	---	**0.8**	3.13	**4.0**
686749	0.53	2.82	9%	0.09	0.08	---	0.34	---	---	---	---	---	**0.5**	2.82	**3.3**
686849	3.37	2.06	21%	0.25	0.01	---	0.13	1.56	---	---	---	---	**1.9**	2.06	**4.0**
686949	1.25	4.13	8%	0.27	0.04	---	0.73	---	---	---	---	---	**1.0**	4.13	**5.2**
687049	23.68	2.25	63%	0.96	---	3.16	0.10	0.29	---	2.15	---	---	**6.7**	2.25	**8.9**
687149	1.48	10.93	8%	0.68	0.17	---	0.40	---	---	---	---	---	**1.2**	10.93	**12.2**

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
687249	15.83	6.75	74%	0.37	1.02	0.03	0.27	2.89	---	12.30	---	---	**16.9**	6.75	**23.6**
687349	1.84	0.71	16%	0.09	---	0.00	0.01	0.15	---	1.06	---	---	**1.3**	0.71	**2.0**
687449	1.38	0.58	28%	0.05	---	0.09	0.18	0.18	---	0.16	---	---	**0.7**	0.58	**1.2**
687549	14.25	5.99	37%	0.33	0.07	0.00	0.78	2.85	---	8.63	---	---	**12.7**	5.99	**18.6**
687649	2.12	1.92	10%	0.13	0.05	---	0.48	---	---	1.43	---	---	**2.1**	1.92	**4.0**
687749	0.01	0.02	9%	0.00	---	---	0.01	---	---	---	---	---	**0.0**	0.02	**0.0**
687849	0.91	1.15	17%	0.06	0.01	---	0.08	0.55	---	0.05	---	---	**0.8**	1.15	**1.9**
687949	1.11	6.59	8%	0.22	0.07	---	0.76	---	---	---	---	---	**1.0**	6.59	**7.6**
688049	23.68	38.87	21%	1.79	0.07	1.64	2.60	0.01	---	0.17	---	---	**6.3**	38.87	**45.2**
688149	6.97	15.20	8%	0.55	0.05	---	1.69	---	0.03	4.06	---	0.00	**6.4**	15.20	**21.6**
688249	17.68	17.70	9%	0.73	0.02	0.08	2.12	---	---	13.90	---	---	**16.9**	17.70	**34.6**
688349	0.57	3.94	8%	0.13	0.03	---	0.33	---	---	0.00	---	---	**0.5**	3.94	**4.4**
688449	0.04	0.39	9%	0.03	---	---	0.01	---	---	---	---	---	**0.0**	0.39	**0.4**
Total	**785.2**	**467.9**	**32%**	**40.2**	**18.5**	**28.4**	**41.5**	**173.6**	**92.9**	**191.0**	**16.4**	**6.3**	**608.8**	**467.9**	**1,076.7**

Table 7A-24. Los Angeles, McCoy-Dry Canyon Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
698149	11.87	0.00	95%	0.12	0.00	---	0.31	0.42	---	0.13	---	9.07	**10.1**	0.00	**10.1**
698249	16.93	---	95%	0.16	0.01	---	0.37	1.60	---	---	---	11.33	**13.5**	---	**13.5**
698349	33.22	---	84%	0.35	0.35	---	0.62	2.61	---	---	---	23.98	**27.9**	---	**27.9**
698449	0.24	1.09	9%	0.04	---	---	0.16	---	---	0.02	---	---	**0.2**	1.09	**1.3**
698549	14.82	---	95%	0.15	0.01	---	0.39	2.48	---	---	---	9.59	**12.6**	---	**12.6**
698649	6.94	---	90%	0.07	0.00	---	0.20	0.73	---	---	---	4.55	**5.6**	---	**5.6**
698749	8.27	---	96%	0.07	0.01	---	0.28	0.50	---	---	---	5.72	**6.6**	---	**6.6**
698849	5.11	---	95%	0.05	---	---	0.16	0.14	---	0.10	---	3.66	**4.1**	---	**4.1**
699049	10.70	---	79%	0.12	---	---	0.28	---	---	0.18	---	8.42	**9.0**	---	**9.0**
699149	1.42	3.37	16%	0.15	0.01	---	0.61	0.43	---	---	---	---	**1.2**	3.37	**4.5**
Total	**109.5**	**4.5**	**84%**	**1.3**	**0.4**	**0.0**	**3.4**	**8.9**	**0.0**	**0.4**	**0.0**	**76.3**	**90.7**	**4.5**	**95.2**

Table 7A-25. Los Angeles, Tujunga Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)		Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
666149	4.83	2.92	37%	0.16	0.04	0.13	0.23	2.12	---	---	---	---	**2.7**		2.92	**5.6**
666249	5.66	3.53	32%	0.17	0.02	---	0.35	2.60	---	---	---	---	**3.1**		3.53	**6.7**
666349	2.47	4.14	21%	0.16	0.14	0.02	0.26	0.78	---	---	---	---	**1.4**		4.14	**5.5**
666449	6.12	4.55	37%	0.25	0.03	---	0.69	2.67	---	0.00	---	---	**3.6**		4.55	**8.2**
666549	4.90	9.36	16%	0.49	0.01	0.58	0.82	0.51	---	0.65	---	---	**3.1**		9.36	**12.4**
666649	1.82	7.14	9%	0.33	0.03	0.28	0.71	---	---	0.26	---	---	**1.6**		7.14	**8.8**
666749	0.88	4.06	9%	0.17	0.08	---	0.29	---	---	0.01	---	---	**0.6**		4.06	**4.6**
666849	0.60	4.10	8%	0.28	---	---	0.13	---	---	---	---	---	**0.4**		4.10	**4.5**
666949	0.80	5.80	8%	0.46	0.04	---	0.00	---	---	0.01	---	---	**0.5**		5.80	**6.3**
667049	0.52	3.12	8%	0.18	---	---	0.20	---	---	---	---	---	**0.4**		3.12	**3.5**
667149	2.04	11.26	8%	0.44	0.06	---	1.09	---	---	---	---	---	**1.6**		11.26	**12.9**
667249	1.62	3.89	13%	0.22	0.34	---	0.46	---	---	0.00	---	---	**1.0**		3.89	**4.9**
667349	0.55	5.65	8%	0.40	---	---	0.03	---	---	---	---	---	**0.4**		5.65	**6.1**
667449	0.70	8.65	7%	0.34	0.04	---	0.17	---	---	0.04	---	---	**0.6**		8.65	**9.2**
667549	9.10	1.42	53%	0.17	0.01	0.10	0.41	---	---	5.79	---	---	**6.5**		1.42	**7.9**
667649	28.16	15.35	32%	1.06	0.12	0.07	2.08	17.06	---	2.12	---	---	**22.5**		15.35	**37.9**
667749	0.64	1.61	12%	0.08	---	0.14	0.29	---	---	---	---	---	**0.5**		1.61	**2.1**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
667849	0.05	0.13	10%	0.02	---	---	0.00	0.01	---	---	---	---	**0.0**	0.13	**0.2**
667949	12.87	0.13	95%	0.02	---	9.35	0.00	0.18	---	---	---	---	**9.6**	0.13	**9.7**
668049	0.42	1.07	12%	0.05	---	0.07	0.19	---	---	---	---	---	**0.3**	1.07	**1.4**
668149	1.65	2.93	17%	0.19	0.05	0.65	0.24	---	---	---	---	---	**1.1**	2.93	**4.1**
668249	18.54	0.18	95%	0.39	0.04	7.31	0.07	0.61	2.02	0.32	---	---	**10.8**	0.18	**11.0**
668349	1.99	6.57	10%	0.28	0.00	0.04	1.13	---	---	---	---	---	**1.5**	6.57	**8.0**
668449	5.48	4.62	38%	0.24	0.06	---	0.68	2.94	---	---	---	---	**3.9**	4.62	**8.5**
668549	1.06	2.86	11%	0.39	0.04	0.12	0.30	---	---	---	---	---	**0.9**	2.86	**3.7**
668649	48.27	10.63	13%	2.05	0.51	0.07	1.66	---	---	29.40	---	---	**33.7**	10.63	**44.3**
668749	38.06	---	87%	0.75	0.02	0.23	1.97	16.68	---	---	---	10.38	**30.0**	---	**30.0**
668849	11.42	---	91%	0.20	0.06	---	0.50	4.73	---	---	---	3.37	**8.9**	---	**8.9**
668949	0.43	0.76	14%	0.08	---	0.09	0.18	---	---	---	---	---	**0.3**	0.76	**1.1**
669049	0.19	0.63	10%	0.06	---	---	0.10	---	---	---	---	---	**0.2**	0.63	**0.8**
669149	0.60	2.82	9%	0.13	0.01	---	0.37	---	---	0.01	---	---	**0.5**	2.82	**3.3**
669249	0.07	0.36	8%	0.01	---	---	0.04	---	---	---	---	---	**0.1**	0.36	**0.4**
669349	2.86	1.79	40%	0.12	---	---	0.31	1.72	---	0.01	---	---	**2.2**	1.79	**3.9**
669449	1.72	3.56	9%	0.23	0.06	---	0.23	---	---	1.02	---	---	**1.5**	3.56	**5.1**
669549	1.30	6.02	8%	0.41	0.03	---	0.54	---	---	0.02	---	---	**1.0**	6.02	**7.0**
669649	0.41	1.61	7%	0.08	0.01	---	0.15	---	---	0.09	---	---	**0.3**	1.61	**1.9**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
669749	0.87	2.00	11%	0.20	0.01	---	0.26	0.08	0.11	0.08	---	---	**0.7**	2.00	**2.8**
669849	0.07	0.02	8%	0.00	---	---	0.00	---	0.60	0.02	---	---	**0.6**	0.02	**0.6**
669949	0.13	0.65	8%	0.10	---	---	0.00	---	---	0.00	---	---	**0.1**	0.65	**0.8**
670049	5.82	0.02	84%	0.10	---	1.53	0.30	---	---	0.01	---	---	**2.0**	0.02	**2.0**
670149	0.68	2.25	8%	0.11	0.00	---	0.31	---	---	---	---	---	**0.4**	2.25	**2.7**
670249	1.81	4.96	9%	0.28	0.01	---	0.66	---	---	0.42	---	---	**1.4**	4.96	**6.3**
670349	0.96	1.09	10%	0.07	0.07	0.02	0.00	---	---	0.69	---	---	**0.9**	1.09	**1.9**
670449	6.27	1.81	9%	0.15	0.01	0.00	0.14	---	---	5.40	---	---	**5.7**	1.81	**7.5**
670549	0.17	0.00	96%	0.01	---	---	---	---	---	0.15	---	---	**0.2**	0.00	**0.2**
670649	1.25	0.80	11%	0.08	---	---	0.15	---	---	0.87	---	---	**1.1**	0.80	**1.9**
670749	2.70	0.42	7%	0.03	---	---	0.02	---	---	2.42	---	---	**2.5**	0.42	**2.9**
670849	3.41	0.23	15%	0.05	---	---	0.04	---	---	3.02	---	---	**3.1**	0.23	**3.3**
670949	0.36	0.00	87%	0.01	---	---	---	---	---	0.32	---	---	**0.3**	0.00	**0.3**
671049	2.14	4.29	18%	0.32	---	0.89	0.38	---	---	0.00	---	---	**1.6**	4.29	**5.9**
671149	0.73	2.24	10%	0.09	---	---	0.42	---	---	---	---	---	**0.5**	2.24	**2.8**
671349	0.01	0.03	9%	0.00	---	---	0.00	0.00	---	---	---	---	**0.0**	0.03	**0.0**
671449	0.97	4.17	10%	0.30	---	---	0.42	---	---	---	---	---	**0.7**	4.17	**4.9**
671549	0.04	0.10	18%	0.01	---	---	0.03	---	---	---	---	---	**0.0**	0.10	**0.1**
671649	0.25	0.75	11%	0.03	---	---	0.14	---	---	---	---	---	**0.2**	0.75	**0.9**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
671749	0.21	0.61	10%	0.02	---	---	0.11	---	---	---	---	---	**0.1**	0.61	**0.8**
671849	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
671949	0.09	0.25	11%	0.01	---	---	0.05	---	---	---	---	---	**0.1**	0.25	**0.3**
672649	14.30	0.30	90%	0.67	---	9.85	0.07	---	---	0.58	0.00	---	**11.2**	0.30	**11.5**
672749	1.56	3.77	11%	0.57	0.12	0.42	0.13	---	---	0.02	0.00	---	**1.3**	3.77	**5.0**
672849	0.02	0.03	21%	0.00	---	---	0.00	0.01	---	---	---	---	**0.0**	0.03	**0.0**
672949	0.10	0.36	9%	0.02	0.00	---	0.07	---	---	---	---	---	**0.1**	0.36	**0.4**
673049	0.06	0.34	8%	0.02	0.00	---	0.03	---	---	---	---	---	**0.1**	0.34	**0.4**
673149	0.05	0.16	9%	0.01	---	---	0.03	---	---	---	---	---	**0.0**	0.16	**0.2**
673349	0.06	0.30	10%	0.01	---	---	0.04	---	---	---	---	---	**0.0**	0.30	**0.4**
673449	0.00	0.00	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
673549	1.09	2.29	10%	0.18	---	---	0.64	---	---	0.02	---	0.21	**1.1**	2.29	**3.3**
673649	0.00	0.00	91%	0.00	---	---	---	---	---	0.00	---	0.00	**0.0**	0.00	**0.0**
673849	0.34	1.45	8%	0.09	---	---	0.20	---	---	---	---	---	**0.3**	1.45	**1.7**
673949	0.04	0.10	10%	0.01	---	---	0.00	0.02	---	---	---	---	**0.0**	0.10	**0.1**
674049	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
674149	0.01	0.04	8%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.04	**0.1**
675249	1.78	7.54	11%	0.26	0.01	0.00	0.71	---	---	0.60	---	---	**1.6**	7.54	**9.1**
675349	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
675449	0.00	0.01	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.01	**0.0**
675549	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
675649	6.69	1.24	68%	0.10	0.02	0.09	0.20	---	---	4.55	---	---	**5.0**	1.24	**6.2**
675749	0.92	3.48	11%	0.12	0.01	---	0.44	---	---	0.15	---	---	**0.7**	3.48	**4.2**
675849	0.01	0.13	9%	0.01	---	---	0.00	---	---	0.00	---	---	**0.0**	0.13	**0.1**
675949	0.59	3.94	9%	0.12	0.00	0.02	0.32	---	---	0.00	---	---	**0.5**	3.94	**4.4**
676049	1.35	2.37	18%	0.08	0.00	0.76	0.10	---	---	0.08	---	---	**1.0**	2.37	**3.4**
676149	5.83	0.92	68%	0.11	0.00	0.44	0.40	---	---	1.40	---	---	**2.4**	0.92	**3.3**
676249	2.44	0.75	17%	0.03	---	---	0.11	---	---	2.74	---	---	**2.9**	0.75	**3.6**
676349	2.08	5.74	9%	0.18	0.04	---	0.47	---	---	1.45	---	---	**2.1**	5.74	**7.9**
676449	0.51	5.55	8%	0.17	0.03	---	0.17	---	---	0.01	---	---	**0.4**	5.55	**5.9**
676549	0.57	4.70	8%	0.15	0.01	---	0.32	---	---	---	---	---	**0.5**	4.70	**5.2**
676649	0.12	0.60	10%	0.03	---	---	0.06	---	---	---	---	---	**0.1**	0.60	**0.7**
676749	0.02	0.09	11%	0.00	---	---	0.01	0.00	---	---	---	---	**0.0**	0.09	**0.1**
676949	0.04	0.24	10%	0.01	---	---	0.02	---	---	---	---	---	**0.0**	0.24	**0.3**
Total	**288.3**	**216.4**	**32%**	**16.0**	**2.2**	**33.3**	**24.9**	**52.7**	**2.7**	**64.8**	**0.0**	**14.0**	**210.6**	**216.4**	**427.0**

Table 7A-26. Los Angeles, Verdugo Wash: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
651349	0.01	0.11	8%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.11	**0.1**
656749	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
656949	0.33	0.44	22%	0.02	---	---	0.05	0.18	---	---	---	---	**0.2**	0.44	**0.7**
657049	0.15	0.67	10%	0.03	0.00	---	0.09	---	---	---	---	---	**0.1**	0.67	**0.8**
657149	0.87	0.86	21%	0.04	0.00	---	0.12	0.43	---	---	---	---	**0.6**	0.86	**1.5**
657349	9.25	---	58%	0.14	0.00	---	0.39	---	---	---	---	6.15	**6.7**	---	**6.7**
657449	0.05	0.38	10%	0.01	---	---	0.02	---	---	---	---	---	**0.0**	0.38	**0.4**
Total	**10.7**	**2.5**	**41%**	**0.3**	**0.0**	**0.0**	**0.7**	**0.6**	**0.0**	**0.0**	**0.0**	**6.2**	**7.7**	**2.5**	**10.1**

Table 7A-27. Montebello, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
610755	---	0.05	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.05	**0.1**
610855	0.34	2.30	9%	0.27	---	---	---	---	---	---	---	---	**0.3**	2.30	**2.6**
610955	0.82	0.76	8%	0.04	---	---	0.04	---	---	1.09	0.04	---	**1.2**	0.76	**2.0**
611055	2.70	3.78	16%	0.50	---	0.01	0.02	1.30	---	---	0.12	0.00	**1.9**	3.78	**5.7**
611155	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
611255	13.46	---	90%	0.50	---	0.03	0.02	1.29	---	---	---	7.73	**9.6**	---	**9.6**
611355	0.95	0.22	53%	0.03	---	---	0.01	0.50	---	---	---	---	**0.5**	0.22	**0.8**
611455	2.88	0.35	42%	0.07	---	---	0.20	1.73	---	---	---	---	**2.0**	0.35	**2.4**
611555	17.42	0.00	89%	0.32	---	0.65	0.31	2.51	---	3.95	0.46	4.86	**13.1**	0.00	**13.1**
611655	2.88	1.90	27%	0.31	---	0.25	0.05	1.10	---	0.04	0.00	0.00	**1.8**	1.90	**3.7**
611855	19.96	0.17	95%	0.31	---	1.81	0.16	6.89	---	4.67	2.16	1.56	**17.6**	0.17	**17.7**
611955	8.10	0.73	74%	0.20	---	0.68	0.16	0.00	---	2.00	0.60	0.00	**3.7**	0.73	**4.4**
612055	2.47	0.35	49%	0.05	---	0.11	0.03	1.24	---	0.11	0.21	0.03	**1.8**	0.35	**2.1**
612155	10.44	0.68	79%	0.19	---	0.35	0.33	---	---	3.71	0.63	0.08	**5.3**	0.68	**6.0**
612255	1.29	0.27	48%	0.03	---	---	0.06	0.66	---	0.00	0.29	0.04	**1.1**	0.27	**1.3**
612655	3.76	1.65	42%	0.22	---	0.31	0.01	1.26	---	0.83	0.00	0.00	**2.6**	1.65	**4.3**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
612755	22.10	5.11	53%	0.49	---	1.57	1.02	4.76	---	6.22	3.46	0.18	**17.7**	5.11	**22.8**
612855	5.53	0.05	90%	0.10	---	0.16	0.11	1.75	---	0.00	0.20	2.71	**5.0**	0.05	**5.1**
612955	2.11	0.20	68%	0.04	---	---	0.12	1.42	---	---	0.00	---	**1.6**	0.20	**1.8**
613055	3.17	0.74	37%	0.08	---	1.38	0.31	0.58	---	0.00	0.12	---	**2.5**	0.74	**3.2**
613155	4.95	2.88	16%	0.25	---	0.12	0.55	0.46	---	0.32	0.01	1.90	**3.6**	2.88	**6.5**
613255	0.18	1.34	16%	0.10	---	---	0.00	0.16	---	0.00	---	---	**0.3**	1.34	**1.6**
613655	1.52	5.88	21%	0.27	---	---	0.07	1.88	---	0.00	---	---	**2.2**	5.88	**8.1**
Total	**127.0**	**29.4**	**59%**	**4.4**	**0.0**	**7.4**	**3.6**	**29.5**	**0.0**	**22.9**	**8.3**	**19.1**	**95.2**	**29.4**	**124.6**

Table 7A-28. Monterey Park, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
635556	0.01	0.02	6%	0.00	---	---	---	---	---	0.00	0.02	---	**0.0**	0.02	**0.0**
635656	0.57	0.16	34%	0.02	---	0.00	---	---	---	0.31	0.00	---	**0.3**	0.16	**0.5**
635756	1.09	1.23	7%	0.09	---	---	---	---	---	0.22	0.03	---	**0.3**	1.23	**1.6**
635856	0.04	0.40	7%	0.03	---	---	---	---	---	0.01	---	---	**0.0**	0.40	**0.4**
637456	0.10	0.00	43%	0.00	---	0.01	---	0.03	---	0.00	0.04	---	**0.1**	0.00	**0.1**
637556	5.34	2.26	47%	0.39	0.04	---	---	2.61	---	0.68	---	---	**3.7**	2.26	**6.0**
639756	0.07	0.01	42%	0.00	---	---	---	0.03	---	0.00	0.10	---	**0.1**	0.01	**0.1**
Total	**7.2**	**4.1**	**32%**	**0.5**	**0.0**	**0.0**	**0.0**	**2.7**	**0.0**	**1.2**	**0.2**	**0.0**	**4.7**	**4.1**	**8.7**

Table 7A-29. Monterey Park, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
612156	18.02	7.69	32%	0.68	0.40	0.10	---	1.53	---	13.98	0.00	0.00	**16.7**	7.69	**24.4**
612256	50.76	0.00	95%	0.64	---	0.02	---	9.71	---	0.01	11.21	21.55	**43.1**	0.00	**43.2**
612356	6.92	0.44	90%	0.12	---	---	---	1.53	---	0.59	0.00	2.70	**4.9**	0.44	**5.4**
612456	0.65	0.23	31%	0.02	---	---	---	0.47	0.00	0.00	---	---	**0.5**	0.23	**0.7**
612756	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
613156	0.01	0.00	90%	0.00	---	---	---	---	---	0.00	---	0.00	**0.0**	0.00	**0.0**
613656	0.56	1.18	33%	0.05	---	---	---	0.89	---	0.00	---	---	**0.9**	1.18	**2.1**
613756	1.50	0.13	82%	0.11	---	---	---	---	---	1.41	---	---	**1.5**	0.13	**1.6**
613956	11.95	2.52	42%	0.35	---	0.13	---	5.97	0.06	0.48	0.00	0.00	**7.0**	2.52	**9.5**
614556	13.45	0.32	95%	0.16	---	---	---	2.56	1.73	0.90	---	6.10	**11.4**	0.32	**11.8**
614656	1.57	0.43	31%	0.05	---	---	---	1.07	---	---	---	---	**1.1**	0.43	**1.6**
Total	**105.4**	**12.9**	**59%**	**2.2**	**0.4**	**0.3**	**0.0**	**23.7**	**1.8**	**17.4**	**11.2**	**30.4**	**87.3**	**12.9**	**100.3**

Table 7A-30. Pasadena, Arroyo Seco: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)		Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
640861	0.57	0.00	67%	0.01	---	---	0.03	0.03	---	0.47	---	---	**0.5**		0.00	**0.5**
641061	1.21	0.00	37%	0.02	---	---	0.07	0.12	---	0.94	---	---	**1.2**		0.00	**1.2**
641561	0.13	0.02	9%	0.01	0.00	---	0.02	---	0.01	0.13	---	---	**0.2**		0.02	**0.2**
641661	0.27	0.04	10%	0.13	0.00	0.01	0.54	---	---	0.01	---	---	**0.7**		0.04	**0.7**
641761	0.08	0.03	7%	0.03	---	---	0.04	---	---	0.00	---	---	**0.1**		0.03	**0.1**
641861	0.14	0.02	9%	0.03	---	---	0.10	---	---	---	---	---	**0.1**		0.02	**0.1**
641961	0.14	0.44	7%	0.03	---	---	0.06	---	---	0.01	---	---	**0.1**		0.44	**0.5**
642061	0.50	0.55	7%	0.07	---	0.00	0.09	---	---	0.01	---	---	**0.2**		0.55	**0.7**
642161	0.17	0.20	10%	0.03	---	---	0.12	---	---	0.00	---	---	**0.1**		0.20	**0.3**
642261	28.64	3.76	48%	0.69	---	2.68	1.14	---	---	8.86	---	---	**13.4**		3.76	**17.1**
642461	0.08	0.31	7%	0.04	---	---	0.02	---	---	---	---	---	**0.1**		0.31	**0.4**
642561	0.46	0.73	9%	0.09	---	0.01	0.27	---	---	0.00	---	---	**0.4**		0.73	**1.1**
642661	0.45	0.11	19%	0.02	---	0.04	0.04	---	---	0.67	---	---	**0.8**		0.11	**0.9**
642761	0.14	0.20	10%	0.01	---	0.03	0.05	---	---	---	---	---	**0.1**		0.20	**0.3**
642861	2.52	0.01	90%	0.03	---	0.49	0.02	0.02	---	0.61	---	---	**1.2**		0.01	**1.2**
642961	11.60	1.05	67%	0.46	---	7.10	0.10	---	---	0.00	---	---	**7.7**		1.05	**8.7**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
643061	0.00	0.00	57%	0.00	---	0.00	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
643161	0.00	0.00	5%	---	---	---	---	---	---	0.00	---	---	**0.0**	0.00	**0.0**
643361	0.00	0.00	15%	0.00	---	---	0.00	---	---	0.00	---	---	**0.0**	0.00	**0.0**
643661	0.59	0.02	79%	0.00	---	0.30	0.01	0.01	---	0.00	---	---	**0.3**	0.02	**0.3**
643961	0.00	0.02	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.02	**0.0**
644161	0.00	0.00	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
644361	0.00	0.01	5%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.01	**0.0**
644961	0.00	0.04	9%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.04	**0.0**
645161	0.00	0.00	18%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
645361	0.00	0.00	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
645461	0.00	0.00	5%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
645561	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
645661	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
645961	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**47.7**	**7.6**	**39%**	**1.7**	**0.0**	**10.7**	**2.7**	**0.2**	**0.0**	**11.7**	**0.0**	**0.0**	**27.0**	**7.6**	**34.6**

Table 7A-31. Pasadena, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
636461	1.22	0.30	47%	0.02	---	---	0.04	0.69	0.00	0.01	---	---	**0.8**	0.30	**1.1**
648161	0.15	0.64	10%	0.05	---	---	0.12	0.00	---	0.00	---	---	**0.2**	0.64	**0.8**
648761	0.00	0.00	79%	0.00	---	---	---	---	---	0.00	---	---	**0.0**	0.00	**0.0**
649061	0.00	0.00	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**1.4**	**0.9**	**32%**	**0.1**	**0.0**	**0.0**	**0.2**	**0.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.9**	**0.9**	**1.9**

Table 7A-32. Pasadena, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
615961	0.07	0.04	19%	0.00	---	---	0.00	0.02	0.64	---	---	---	**0.7**	0.04	**0.7**
616061	67.10	0.74	89%	0.84	---	1.25	0.23	12.68	---	25.59	---	14.19	**54.8**	0.74	**55.5**
616461	4.94	0.61	47%	0.10	---	0.01	0.04	2.37	0.04	0.01	---	0.51	**3.1**	0.61	**3.7**
616561	2.67	1.43	31%	0.11	---	---	0.00	1.76	---	0.00	---	0.03	**1.9**	1.43	**3.3**
616661	0.17	0.02	68%	0.00	---	---	0.01	0.09	0.04	---	---	---	**0.1**	0.02	**0.2**
616761	0.55	0.16	41%	0.01	---	---	0.03	0.36	0.04	---	---	---	**0.4**	0.16	**0.6**
616861	32.72	0.09	90%	0.39	---	0.10	0.17	7.73	13.61	0.04	---	13.58	**35.6**	0.09	**35.7**
616961	20.16	0.61	79%	0.24	---	1.42	0.33	1.88	0.01	2.24	---	0.00	**6.1**	0.61	**6.7**
619561	6.49	0.75	43%	0.17	---	---	0.30	4.32	---	---	---	---	**4.8**	0.75	**5.5**
619661	7.08	0.50	58%	0.15	---	0.04	0.27	4.42	---	0.72	0.00	---	**5.6**	0.50	**6.1**
619761	11.28	2.47	37%	0.33	---	0.06	0.53	6.84	---	0.59	---	---	**8.4**	2.47	**10.8**
619861	10.13	---	89%	0.12	---	---	0.01	2.52	---	0.00	---	4.26	**6.9**	---	**6.9**
619961	1.22	0.14	50%	0.03	---	---	0.04	0.86	---	---	---	---	**0.9**	0.14	**1.1**
620061	2.34	0.66	32%	0.08	---	0.01	0.12	1.32	---	0.64	---	---	**2.2**	0.66	**2.8**
620161	9.58	5.21	42%	0.29	---	0.07	0.80	0.98	---	2.99	---	---	**5.1**	5.21	**10.3**
620261	28.61	6.56	42%	0.73	---	0.36	1.19	10.67	---	4.34	---	---	**17.3**	6.56	**23.9**

Subwatershed ID	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL — For Metals by 2028: 24-hour Volume Managed (acre-ft)	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL — For Bacteria by 2037: Additional 24-hour Volume Managed (acre-ft)	EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet) — For Metals Attainment by 2028: % Load Reduction Critical Condition	Low-Impact Development: Ordinance	Low-Impact Development: Planned LID	Low-Impact Development: Public LID	Low-Impact Development: Residential LID	Streets: Green Streets	Regional BMPs: Very High (public, owned)	Regional BMPs: High (public, owned)	Regional BMPs: Medium (public, non-owned)	Regional BMPs: Private	Total BMP Capacity (acre-ft)	For Bacteria Attainment by 2037: Regional BMPs (private)	For Bacteria Attainment by 2037: Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
622961	0.57	0.02	32%	0.02	---	---	---	0.04	---	0.31	0.03	---	**0.4**	0.02	**0.4**
623061	10.62	0.17	47%	0.25	---	0.03	0.36	4.67	---	0.56	1.86	---	**7.7**	0.17	**7.9**
623161	0.65	0.09	60%	0.01	---	---	0.04	0.38	---	---	0.03	---	**0.5**	0.09	**0.5**
623261	3.11	0.06	74%	0.05	---	0.06	0.20	1.33	---	0.25	0.65	---	**2.5**	0.06	**2.6**
623361	2.47	0.15	37%	0.07	---	---	0.15	1.14	---	0.29	0.27	---	**1.9**	0.15	**2.1**
624161	1.63	0.82	21%	0.11	---	---	0.00	0.46	---	0.56	0.00	---	**1.1**	0.82	**1.9**
624261	0.28	0.15	10%	0.01	---	---	0.02	---	---	0.12	---	---	**0.1**	0.15	**0.3**
624361	0.04	0.12	11%	0.01	---	---	0.03	---	---	0.00	---	---	**0.0**	0.12	**0.2**
624461	6.59	0.90	42%	0.18	---	0.06	0.19	3.56	---	1.06	---	---	**5.0**	0.90	**5.9**
624561	1.13	0.44	31%	0.04	---	---	0.03	0.61	---	0.03	---	---	**0.7**	0.44	**1.1**
624661	0.11	0.30	10%	0.01	---	---	0.06	---	---	0.04	---	---	**0.1**	0.30	**0.4**
624761	7.70	1.43	42%	0.24	---	0.15	0.32	4.58	---	0.79	---	---	**6.1**	1.43	**7.5**
624861	9.02	0.01	68%	0.18	---	0.00	0.59	2.31	---	2.50	0.00	---	**5.6**	0.01	**5.6**
624961	0.69	0.02	79%	0.02	---	0.21	0.03	0.24	---	0.01	---	---	**0.5**	0.02	**0.5**
625061	4.12	0.40	63%	0.10	---	0.21	0.36	---	---	0.94	0.18	---	**1.8**	0.40	**2.2**
625161	0.03	0.60	8%	0.03	---	---	0.00	---	---	---	---	---	**0.0**	0.60	**0.6**
625261	0.02	0.45	10%	0.02	---	---	0.01	0.01	---	0.00	---	---	**0.0**	0.45	**0.5**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
625361	3.43	1.32	31%	0.24	---	1.87	0.07	---	---	1.76	---	---	**3.9**	1.32	**5.3**
625461	1.02	0.11	48%	0.03	---	0.02	0.03	0.65	---	0.00	---	---	**0.7**	0.11	**0.8**
625561	1.88	0.06	79%	0.02	---	3.29	---	---	---	0.00	---	---	**3.3**	0.06	**3.4**
625661	0.10	0.19	7%	0.00	---	0.00	---	---	---	0.01	---	---	**0.0**	0.19	**0.2**
625761	0.04	0.00	72%	---	---	0.02	---	---	---	---	---	---	**0.0**	0.00	**0.0**
625861	0.84	0.06	65%	0.01	---	---	0.05	0.44	---	---	---	---	**0.5**	0.06	**0.6**
625961	0.19	0.02	42%	0.01	---	---	---	0.10	---	---	0.03	---	**0.1**	0.02	**0.2**
626061	0.06	0.48	10%	0.01	---	---	0.02	---	---	0.00	---	---	**0.0**	0.48	**0.5**
626161	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
629161	0.05	0.36	9%	0.01	---	---	0.04	---	---	---	0.00	---	**0.0**	0.36	**0.4**
Total	**261.5**	**28.7**	**59%**	**5.2**	**0.0**	**9.2**	**6.7**	**79.3**	**14.4**	**46.4**	**3.1**	**32.6**	**196.8**	**28.7**	**225.6**

Table 7A-33. Rosemead, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
613268	0.05	0.13	16%	0.00	---	---	0.00	0.03	---	---	---	---	**0.0**	0.13	**0.2**
613568	0.56	1.08	16%	0.05	---	---	0.03	0.32	---	---	---	---	**0.4**	1.08	**1.5**
613668	0.44	2.06	11%	0.08	---	---	0.05	0.19	---	---	---	---	**0.3**	2.06	**2.4**
613868	0.02	0.04	16%	0.00	---	---	---	0.01	---	---	---	---	**0.0**	0.04	**0.1**
613968	1.90	0.89	26%	0.08	---	---	0.09	1.20	---	---	---	---	**1.4**	0.89	**2.3**
614068	2.92	1.20	31%	0.08	---	0.04	0.09	1.45	---	0.11	---	---	**1.8**	1.20	**3.0**
614168	2.24	0.68	32%	0.08	---	---	0.11	1.44	---	---	---	---	**1.6**	0.68	**2.3**
614268	0.25	1.60	8%	0.07	---	0.05	0.09	---	---	---	---	---	**0.2**	1.60	**1.8**
614468	0.00	0.00	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
614568	7.43	1.14	53%	0.17	---	0.11	0.17	1.87	---	1.96	---	---	**4.3**	1.14	**5.4**
614668	4.45	1.38	32%	0.17	---	---	0.15	2.89	---	---	---	---	**3.2**	1.38	**4.6**
617068	2.42	---	84%	0.03	---	---	---	0.12	---	---	---	1.58	**1.7**	---	**1.7**
617168	0.00	0.01	8%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.01	**0.0**
617268	8.41	---	90%	0.17	---	---	0.15	2.33	---	---	---	2.92	**5.6**	---	**5.6**
617368	0.12	0.51	10%	0.06	---	---	---	0.02	---	---	---	---	**0.1**	0.51	**0.6**
617468	15.18	---	90%	0.24	---	---	0.45	5.28	---	---	---	4.74	**10.7**	---	**10.7**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
617568	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
617668	---	0.02	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.02	**0.0**
617768	9.08	---	90%	0.14	---	---	0.33	2.03	---	---	---	3.57	**6.1**	---	**6.1**
617968	1.35	0.21	53%	0.03	---	---	0.10	0.70	---	---	---	---	**0.8**	0.21	**1.0**
618068	7.69	---	90%	0.11	---	---	0.24	1.89	---	---	---	3.23	**5.5**	---	**5.5**
618168	0.27	1.14	10%	0.05	---	0.03	0.15	---	---	---	---	---	**0.2**	1.14	**1.4**
618268	7.52	---	95%	0.11	---	0.15	0.23	2.69	---	---	---	2.12	**5.3**	---	**5.3**
618368	0.00	0.01	11%	0.00	---	0.00	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**
618468	0.07	0.01	67%	0.00	---	0.05	0.00	---	---	---	---	---	**0.1**	0.01	**0.1**
618568	0.00	0.00	17%	0.00	---	0.00	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
618668	1.11	0.32	22%	0.05	---	0.12	0.01	0.00	---	0.63	---	0.25	**1.1**	0.32	**1.4**
621268	0.05	0.20	10%	0.01	---	---	0.04	---	---	---	---	---	**0.0**	0.20	**0.2**
621368	18.09	---	85%	0.29	---	---	0.46	4.11	---	---	---	9.53	**14.4**	---	**14.4**
621468	0.30	1.36	10%	0.06	---	---	0.20	---	---	---	---	---	**0.3**	1.36	**1.6**
621968	0.10	0.08	21%	0.01	---	---	0.00	0.06	---	---	---	---	**0.1**	0.08	**0.2**
Total	**92.0**	**14.1**	**59%**	**2.1**	**0.0**	**0.6**	**3.1**	**28.6**	**0.0**	**2.7**	**0.0**	**27.9**	**65.1**	**14.1**	**79.2**

Table 7A-34. San Fernando, Tujunga Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
668670	0.53	0.47	8%	0.07	---	---	---	---	---	0.30	---	---	**0.4**	0.47	**0.8**
669170	0.93	2.39	11%	0.13	---	0.07	0.20	---	---	0.32	---	---	**0.7**	2.39	**3.1**
669270	0.25	1.74	9%	0.07	---	0.26	0.05	---	0.01	0.00	---	---	**0.4**	1.74	**2.1**
669370	0.07	0.15	11%	0.01	---	---	0.01	0.03	---	0.00	---	---	**0.0**	0.15	**0.2**
669770	1.25	0.79	9%	0.06	---	---	0.08	---	1.22	0.43	---	---	**1.8**	0.79	**2.6**
669870	16.45	1.07	84%	0.38	---	0.34	0.53	---	12.09	0.29	---	---	**13.6**	1.07	**14.7**
669970	0.65	2.53	9%	0.35	---	0.00	0.16	---	0.07	0.00	---	---	**0.6**	2.53	**3.1**
670070	0.80	2.61	9%	0.13	---	0.01	0.43	---	---	0.05	---	---	**0.6**	2.61	**3.2**
670170	0.05	0.21	7%	0.01	---	---	0.02	---	---	---	---	---	**0.0**	0.21	**0.2**
670270	0.01	0.03	8%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.03	**0.0**
Total	**21.0**	**12.0**	**33%**	**1.2**	**0.0**	**0.7**	**1.5**	**0.0**	**13.4**	**1.4**	**0.0**	**0.0**	**18.2**	**12.0**	**30.2**

Table 7A-35. San Gabriel, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
614271	2.81	---	90%	0.04	---	---	0.05	0.66	---	---	---	1.50	**2.3**	---	**2.3**
614371	10.93	---	90%	0.16	---	0.00	0.27	4.00	---	---	---	4.40	**8.8**	---	**8.8**
614471	7.43	---	79%	0.11	---	0.02	0.03	1.69	---	---	---	3.68	**5.5**	---	**5.5**
614571	0.07	0.01	92%	0.00	---	---	0.00	---	---	0.09	---	---	**0.1**	0.01	**0.1**
614771	2.07	0.40	31%	0.07	---	0.18	0.15	0.25	---	0.87	---	---	**1.5**	0.40	**1.9**
614871	3.54	0.00	95%	0.04	---	0.04	0.16	---	---	1.66	---	---	**1.9**	0.00	**1.9**
614971	0.30	0.69	10%	0.02	---	---	0.09	---	---	0.56	---	---	**0.7**	0.69	**1.4**
615071	1.00	0.68	22%	0.05	---	---	---	0.67	---	---	---	---	**0.7**	0.68	**1.4**
615271	0.02	0.05	15%	0.00	---	---	0.01	---	---	0.01	---	---	**0.0**	0.05	**0.1**
616171	6.78	---	90%	0.09	---	0.00	0.07	1.59	---	---	---	2.71	**4.5**	---	**4.5**
616371	2.40	0.22	64%	0.05	---	0.01	0.18	1.18	---	---	---	---	**1.4**	0.22	**1.6**
616671	1.13	0.08	53%	0.02	---	0.02	0.09	0.59	---	---	---	---	**0.7**	0.08	**0.8**
618071	0.44	0.03	66%	0.01	---	---	0.03	0.30	---	---	---	---	**0.3**	0.03	**0.4**
618171	0.28	0.06	26%	0.01	---	---	0.03	0.18	---	---	---	---	**0.2**	0.06	**0.3**
618271	0.39	0.09	26%	0.02	---	---	0.03	0.26	---	---	---	---	**0.3**	0.09	**0.4**
618371	0.32	1.73	9%	0.05	---	---	0.20	---	---	---	---	---	**0.3**	1.73	**2.0**

Subwatershed ID	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL — For Metals by 2028: 24-hour Volume Managed (acre-ft)	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL — For Bacteria by 2037: Additional 24-hour Volume Managed (acre-ft)	EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet) — For Metals Attainment by 2028: % Load Reduction Critical Condition	Low-Impact Development: Ordinance	Low-Impact Development: Planned LID	Low-Impact Development: Public LID	Low-Impact Development: Residential LID	Streets: Green Streets	Regional BMPs: Very High (public, owned)	Regional BMPs: High (public, owned)	Regional BMPs: Medium (public, non-owned)	Regional BMPs: Private	Total BMP Capacity (acre-ft)	For Bacteria Attainment by 2037: Regional BMPs (private)	For Bacteria Attainment by 2037: Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
618471	5.24	0.72	59%	0.10	---	0.03	0.30	3.53	---	---	---	---	**3.9**	0.72	**4.7**
618571	8.20	1.13	53%	0.20	---	0.16	0.17	3.67	---	1.46	---	---	**5.7**	1.13	**6.8**
618671	3.76	1.20	42%	0.14	---	0.05	0.08	1.79	---	0.81	---	0.09	**3.0**	1.20	**4.2**
618771	1.94	0.34	42%	0.05	---	---	0.09	1.22	---	0.12	---	0.00	**1.5**	0.34	**1.8**
618871	8.31	0.04	84%	0.11	---	---	0.08	1.95	---	0.50	---	3.84	**6.5**	0.04	**6.5**
618971	5.02	0.64	59%	0.09	---	---	0.32	2.79	---	---	---	---	**3.2**	0.64	**3.8**
619071	0.38	1.94	9%	0.06	---	0.01	0.22	---	---	0.00	---	---	**0.3**	1.94	**2.2**
619171	0.30	1.32	10%	0.05	---	---	0.17	---	---	---	---	---	**0.2**	1.32	**1.5**
621371	0.02	0.01	28%	0.00	---	---	0.00	0.01	---	---	---	---	**0.0**	0.01	**0.0**
622271	0.65	0.40	27%	0.03	---	---	0.02	0.41	---	0.00	---	---	**0.5**	0.40	**0.9**
623471	0.32	0.11	27%	0.01	---	---	0.00	0.24	---	0.00	---	---	**0.3**	0.11	**0.4**
623671	0.01	0.01	13%	0.00	---	---	0.00	0.00	---	---	---	---	**0.0**	0.01	**0.0**
Total	**74.1**	**11.9**	**59%**	**1.6**	**0.0**	**0.5**	**2.8**	**27.0**	**0.0**	**6.1**	**0.0**	**16.2**	**54.2**	**11.9**	**66.1**

Table 7A-36. San Marino, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
615872	2.40	0.13	69%	0.03	---	---	0.12	1.20	1.95	---	---	---	**3.3**	0.13	**3.4**
615972	2.15	0.13	69%	0.03	---	---	0.11	1.10	1.01	---	---	---	**2.3**	0.13	**2.4**
616372	10.91	0.00	90%	0.12	---	---	0.34	2.73	0.00	---	---	3.98	**7.2**	0.00	**7.2**
616472	0.14	0.13	21%	0.00	---	---	0.00	0.09	0.03	---	---	---	**0.1**	0.13	**0.3**
616572	0.14	2.92	7%	0.11	---	---	0.00	---	---	---	---	---	**0.1**	2.92	**3.0**
616672	10.56	1.10	69%	0.10	---	0.07	0.31	5.36	22.96	---	---	---	**28.8**	1.10	**29.9**
616772	0.11	0.01	75%	0.00	---	---	0.00	0.06	---	---	---	---	**0.1**	0.01	**0.1**
616872	0.64	0.08	13%	0.00	---	---	0.00	---	9.66	---	---	---	**9.7**	0.08	**9.7**
616972	1.26	0.10	63%	0.02	---	---	0.07	0.66	0.00	---	---	---	**0.7**	0.10	**0.8**
619072	4.02	0.54	53%	0.10	---	---	0.40	2.46	---	---	---	---	**3.0**	0.54	**3.5**
619172	0.03	0.10	15%	0.00	---	---	0.02	---	---	---	---	---	**0.0**	0.10	**0.1**
619272	1.91	0.16	55%	0.04	---	---	0.19	1.06	---	0.00	---	---	**1.3**	0.16	**1.5**
619372	1.22	0.28	38%	0.03	---	---	0.10	0.70	---	0.00	---	---	**0.8**	0.28	**1.1**
619472	2.35	0.55	54%	0.04	---	---	0.12	1.48	---	---	---	---	**1.6**	0.55	**2.2**
619572	4.50	0.65	53%	0.09	---	---	0.17	3.09	---	0.00	---	---	**3.4**	0.65	**4.0**
619772	0.70	0.06	65%	0.01	---	---	0.03	0.42	---	---	---	---	**0.5**	0.06	**0.5**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
623972	0.50	0.09	31%	0.02	---	---	0.04	0.30	---	0.00	---	---	**0.4**	0.09	**0.4**
624272	1.72	0.12	53%	0.03	---	---	0.11	1.13	---	0.04	---	---	**1.3**	0.12	**1.4**
Total	**45.3**	**7.2**	**59%**	**0.8**	**0.0**	**0.1**	**2.1**	**21.8**	**35.6**	**0.0**	**0.0**	**4.0**	**64.4**	**7.2**	**71.6**

Table 7A-37. South El Monte, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028										For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs					
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
613278	0.36	4.92	9%	0.21	0.04	---	0.05	---	---	---	---	---	**0.3**	4.92	**5.2**
613378	1.93	4.85	15%	0.27	0.35	0.61	0.28	---	---	---	---	---	**1.5**	4.85	**6.4**
613478	11.58	1.94	63%	0.33	0.01	1.22	0.21	1.62	---	5.33	---	---	**8.7**	1.94	**10.7**
617078	0.07	0.89	8%	0.05	---	---	---	---	---	---	---	---	**0.0**	0.89	**0.9**
617178	41.19	---	90%	0.84	0.34	0.04	0.19	3.63	---	0.91	---	21.86	**27.8**	---	**27.8**
617578	0.44	0.35	22%	0.02	---	---	0.00	0.33	---	---	---	---	**0.3**	0.35	**0.7**
617678	0.01	0.03	8%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.03	**0.0**
617778	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
617978	0.00	0.01	10%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.01	**0.0**
Total	**55.6**	**13.0**	**59%**	**1.7**	**0.7**	**1.9**	**0.7**	**5.6**	**0.0**	**6.2**	**0.0**	**21.9**	**38.7**	**13.0**	**51.7**

Table 7A-38. South El Monte, San Gabriel River: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2026	For Bacteria by 2040	For Metals Attainment by 2026											For Bacteria Attainment by 2040	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
515578	8.34	---	79%	0.17	---	0.49	0.11	1.66	---	---	1.72	1.41	**5.6**	---	**5.6**
515678	0.38	0.61	14%	0.03	---	0.00	0.08	0.17	0.24	---	---	---	**0.5**	0.61	**1.1**
Total	**8.7**	**0.6**	**64%**	**0.2**	**0.0**	**0.5**	**0.2**	**1.8**	**0.2**	**0.0**	**1.7**	**1.4**	**6.1**	**0.6**	**6.7**

Table 7A-39. South Pasadena, Arroyo Seco: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
640780	0.00	0.00	18%	0.00	---	---	0.00	---	---	0.00	---	---	**0.0**	0.00	**0.0**
640980	0.11	0.00	50%	0.01	0.09	---	---	---	---	---	---	---	**0.1**	0.00	**0.1**
641280	1.87	0.01	46%	0.05	---	---	0.05	1.33	---	0.00	---	---	**1.4**	0.01	**1.4**
641380	1.92	0.03	36%	0.09	---	---	0.11	1.66	---	0.01	---	---	**1.9**	0.03	**1.9**
641480	0.68	0.00	40%	0.05	---	0.02	0.07	0.53	---	0.50	---	---	**1.2**	0.00	**1.2**
641580	0.71	0.00	36%	0.04	---	0.19	0.10	---	0.12	0.12	---	---	**0.6**	0.00	**0.6**
Total	**5.3**	**0.0**	**40%**	**0.2**	**0.1**	**0.2**	**0.3**	**3.5**	**0.1**	**0.6**	**0.0**	**0.0**	**5.1**	**0.0**	**5.2**

Table 7A-40. South Pasadena, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
636280	2.08	1.74	26%	0.19	---	0.00	0.58	1.03	---	1.60	---	0.00	**3.4**	1.74	**5.1**
636480	15.10	4.69	36%	0.43	---	0.04	0.74	6.92	0.05	4.52	---	0.65	**13.3**	4.69	**18.0**
639580	2.57	0.18	35%	0.03	---	---	0.13	0.02	---	3.60	---	---	**3.8**	0.18	**4.0**
Total	**19.8**	**6.6**	**34%**	**0.6**	**0.0**	**0.0**	**1.4**	**8.0**	**0.0**	**9.7**	**0.0**	**0.6**	**20.5**	**6.6**	**27.1**

Table 7A-41. South Pasadena, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
615880	1.32	0.09	70%	0.02	---	---	0.03	0.69	2.81	0.02	---	---	**3.6**	0.09	**3.7**
615980	3.72	0.28	61%	0.07	---	---	0.10	1.57	12.21	0.01	---	---	**14.0**	0.28	**14.2**
616080	0.59	0.01	30%	0.02	---	---	---	0.01	0.00	0.38	---	0.12	**0.5**	0.01	**0.5**
Total	**5.6**	**0.4**	**59%**	**0.1**	**0.0**	**0.0**	**0.1**	**2.3**	**15.0**	**0.4**	**0.0**	**0.1**	**18.1**	**0.4**	**18.4**

Table 7A-42. Temple City, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
621381	0.01	0.15	12%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.15	**0.2**
621581	0.51	0.08	56%	0.01	---	---	---	0.41	---	---	---	---	**0.4**	0.08	**0.5**
621781	10.94	1.02	50%	0.27	---	0.07	---	7.63	---	---	0.91	---	**8.9**	1.02	**9.9**
621881	0.03	0.47	11%	0.02	---	---	---	---	---	---	---	---	**0.0**	0.47	**0.5**
622081	16.33	0.95	65%	0.37	---	1.05	---	8.84	---	---	1.10	---	**11.4**	0.95	**12.3**
622181	8.60	0.01	95%	0.16	---	0.12	---	1.48	---	0.17	0.02	4.98	**6.9**	0.01	**6.9**
622281	0.04	0.01	50%	0.00	---	0.03	---	0.01	---	---	---	---	**0.0**	0.01	**0.0**
622381	1.57	0.11	56%	0.04	---	0.00	---	1.04	---	---	0.23	---	**1.3**	0.11	**1.4**
622481	2.43	0.14	55%	0.05	---	---	---	1.13	---	0.07	0.89	---	**2.1**	0.14	**2.3**
622581	3.06	0.26	40%	0.08	---	---	---	1.30	---	0.42	0.99	---	**2.8**	0.26	**3.0**
622681	1.96	0.14	57%	0.03	---	---	---	0.77	---	---	0.95	---	**1.7**	0.14	**1.9**
622781	0.89	0.34	16%	0.03	---	---	---	0.05	---	---	0.77	---	**0.8**	0.34	**1.2**
622881	0.94	0.05	62%	0.02	---	---	---	0.64	---	---	0.12	---	**0.8**	0.05	**0.8**
623481	3.45	0.15	60%	0.08	---	0.14	---	1.31	---	0.90	0.01	---	**2.4**	0.15	**2.6**
623581	0.06	0.01	45%	0.00	---	---	---	0.04	---	---	0.02	---	**0.1**	0.01	**0.1**
623681	0.00	0.00	40%	---	---	---	---	0.00	---	---	---	---	**0.0**	0.00	**0.0**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
626981	4.41	0.55	51%	0.12	---	---	---	3.41	---	---	---	---	**3.5**	0.55	**4.1**
627081	1.70	0.20	50%	0.05	---	---	---	1.30	---	---	---	---	**1.4**	0.20	**1.6**
627281	3.65	0.42	51%	0.10	---	---	---	2.83	---	---	---	---	**2.9**	0.42	**3.3**
629681	0.01	0.00	50%	0.00	---	---	---	0.00	---	---	---	---	**0.0**	0.00	**0.0**
629781	1.42	0.29	36%	0.05	---	---	---	1.08	---	---	---	---	**1.1**	0.29	**1.4**
629881	0.00	0.00	12%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**62.0**	**5.4**	**59%**	**1.5**	**0.0**	**1.4**	**0.0**	**33.3**	**0.0**	**1.6**	**6.0**	**5.0**	**48.7**	**5.4**	**54.0**

Table 7A-43. Uninc. LA County, Aliso Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
693183	3.61	---	91%	0.13	---	---	---	---	---	---	---	3.12	**3.3**	---	**3.3**
693283	0.56	---	93%	0.02	---	---	---	---	---	---	---	0.45	**0.5**	---	**0.5**
693883	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
693983	0.03	0.45	9%	0.05	---	---	---	---	---	---	---	---	**0.1**	0.45	**0.5**
Total	**4.2**	**0.5**	**70%**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**3.6**	**3.8**	**0.5**	**4.2**

Table 7A-44. Uninc. LA County, Arroyo Seco: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
642283	1.06	0.08	42%	0.02	---	---	0.04	0.44	---	0.39	---	---	**0.9**	0.08	**1.0**
642383	4.80	1.67	16%	0.22	---	0.18	0.44	---	---	6.30	---	---	**7.1**	1.67	**8.8**
642783	0.30	0.01	63%	0.00	---	---	0.01	0.16	---	0.02	---	---	**0.2**	0.01	**0.2**
642883	8.94	0.30	68%	0.15	0.04	0.54	0.38	3.87	---	1.77	0.02	---	**6.8**	0.30	**7.1**
642983	0.15	0.29	9%	0.02	---	---	0.07	---	---	0.00	---	---	**0.1**	0.29	**0.4**
643083	4.27	0.49	53%	0.10	---	0.32	0.31	---	---	0.09	0.05	---	**0.9**	0.49	**1.4**
643183	1.37	0.01	74%	0.01	---	0.08	0.03	---	---	0.86	---	---	**1.0**	0.01	**1.0**
643283	1.89	0.15	32%	0.06	---	0.11	0.03	---	---	1.82	---	---	**2.0**	0.15	**2.2**
643383	0.01	0.01	14%	0.00	---	---	0.00	---	---	0.01	---	---	**0.0**	0.01	**0.0**
643683	16.74	0.42	37%	0.41	---	0.26	1.50	---	---	8.63	0.37	---	**11.2**	0.42	**11.6**
643783	0.12	0.03	21%	0.00	---	---	0.01	0.01	---	0.12	---	---	**0.1**	0.03	**0.2**
643883	1.85	0.45	12%	0.04	---	---	0.11	---	---	2.51	0.00	---	**2.7**	0.45	**3.1**
644983	0.00	0.01	18%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**
Total	**41.5**	**3.9**	**39%**	**1.0**	**0.0**	**1.5**	**2.9**	**4.5**	**0.0**	**22.5**	**0.4**	**0.0**	**33.0**	**3.9**	**36.9**

Table 7A-45. Uninc. LA County, Bell Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
700383	0.89	---	26%	0.03	---	---	0.12	0.07	---	---	---	0.54	**0.8**	---	**0.8**
700483	0.00	0.03	7%	0.00	---	---	0.00	---	---	0.00	---	---	**0.0**	0.03	**0.0**
Total	**0.9**	**0.0**	**26%**	**0.0**	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**0.5**	**0.8**	**0.0**	**0.8**

Table 7A-46. Uninc. LA County, Browns Canyon Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
695883	0.75	---	89%	0.01	---	---	0.05	---	---	---	---	0.66	**0.7**	---	**0.7**
695983	0.82	---	92%	0.01	---	---	---	---	---	---	---	0.77	**0.8**	---	**0.8**
696183	0.00	0.01	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.01	**0.0**
696283	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
696383	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
696483	0.00	0.00	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
696583	0.98	---	100%	0.02	---	---	---	---	---	---	---	1.79	**1.8**	---	**1.8**
696683	1.00	---	100%	0.03	---	---	---	---	---	---	---	1.35	**1.4**	---	**1.4**
696783	1.25	---	79%	0.02	---	---	0.01	0.02	---	---	---	1.15	**1.2**	---	**1.2**
696883	0.88	---	100%	0.01	0.00	---	---	---	---	---	---	0.87	**0.9**	---	**0.9**
696983	0.00	0.02	7%	0.00	0.00	---	---	---	---	---	---	---	**0.0**	0.02	**0.0**
697083	0.80	---	100%	0.01	---	---	---	---	---	---	---	1.26	**1.3**	---	**1.3**
697183	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
697283	0.00	0.05	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.05	**0.1**
697383	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**6.5**	**0.1**	**89%**	**0.1**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**7.8**	**8.0**	**0.1**	**8.1**

Table 7A-47. Uninc. LA County, Bull Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
689883	14.71	0.21	86%	0.08	---	---	---	---	---	13.88	---	---	**14.0**	0.21	**14.2**
689983	4.93	0.07	82%	0.00	---	---	---	---	---	4.66	---	---	**4.7**	0.07	**4.7**
690083	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
690183	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
690583	0.04	---	96%	0.00	---	---	---	---	---	---	---	0.03	**0.0**	---	**0.0**
690683	0.50	---	97%	0.01	---	---	---	---	---	---	---	0.37	**0.4**	---	**0.4**
690783	0.00	0.01	9%	0.00	---	---	---	---	---	0.00	---	---	**0.0**	0.01	**0.0**
690883	0.01	0.05	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.05	**0.1**
691083	---	0.00	4%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**20.2**	**0.3**	**67%**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**18.5**	**0.0**	**0.4**	**19.0**	**0.3**	**19.4**

Table 7A-48. Uninc. LA County, Compton Creek: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
601783	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
601883	39.04	0.55	90%	1.37	0.32	0.47	0.00	---	30.10	---	---	---	**32.3**	0.55	**32.8**
601983	0.69	3.08	8%	0.55	---	---	---	---	0.00	---	---	---	**0.6**	3.08	**3.6**
602183	0.00	0.01	6%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.01	**0.0**
602383	20.15	0.00	89%	0.37	---	0.04	0.61	7.51	---	0.35	0.47	4.82	**14.2**	0.00	**14.2**
602483	6.74	0.00	90%	0.18	---	---	0.01	1.92	---	0.01	---	2.56	**4.7**	0.00	**4.7**
602583	15.00	0.00	90%	0.33	0.00	0.43	0.29	5.09	0.01	4.23	1.10	1.70	**13.2**	0.00	**13.2**
602683	10.54	0.00	81%	0.22	---	0.17	0.14	5.06	8.40	0.02	0.82	0.19	**8.6**	0.00	**8.6**
602783	0.00	0.02	8%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.02	**0.0**
602883	14.82	---	90%	0.16	0.02	0.00	0.41	7.51	---	0.54	---	2.97	**11.6**	---	**11.6**
603083	0.05	0.04	10%	0.01	---	---	0.02	---	---	0.01	---	0.00	**0.0**	0.04	**0.1**
603283	0.02	0.02	11%	---	---	---	---	0.02	---	---	---	---	**0.0**	0.02	**0.0**
603383	0.02	0.00	29%	0.00	---	---	---	0.01	---	---	---	---	**0.0**	0.00	**0.0**
603483	0.30	0.30	8%	0.12	---	---	0.13	---	---	0.00	0.00	0.00	**0.3**	0.30	**0.6**
603583	0.06	0.00	86%	0.00	---	---	0.00	0.04	---	---	---	---	**0.0**	0.00	**0.0**
603683	3.74	0.17	49%	0.11	---	2.02	0.09	---	---	---	0.68	---	**2.9**	0.17	**3.1**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
603783	2.55	0.10	64%	0.05	---	---	0.18	1.62	---	---	0.00	---	**1.9**	0.10	**1.9**
603883	0.31	0.23	8%	0.07	---	---	0.18	---	---	0.03	---	---	**0.3**	0.23	**0.5**
603983	13.73	0.05	79%	0.27	---	1.53	0.66	0.43	---	7.25	0.05	---	**10.2**	0.05	**10.2**
604083	2.67	0.01	89%	0.04	---	0.37	0.06	0.65	---	---	0.34	---	**1.5**	0.01	**1.5**
604183	18.03	0.00	95%	0.31	---	1.58	0.46	3.14	0.01	2.59	1.63	0.00	**9.7**	0.00	**9.7**
604283	24.53	0.00	84%	0.52	0.01	1.76	0.33	13.83		1.48	4.17	6.19	**28.5**	0.00	**28.5**
604383	1.28	---	31%	0.06	---	0.04	0.01	0.78	---	0.14	0.00	0.20	**1.2**	---	**1.2**
604483	0.36	0.14	8%	0.04	---	0.00	0.11	---	---	0.21	0.04	---	**0.4**	0.14	**0.5**
604583	0.00	0.01	6%	0.00	---	---	0.00	---	---	0.00	---	---	**0.0**	0.01	**0.0**
604683	0.61	0.01	57%	0.01	---	---	0.03	0.35	---	---	0.01	---	**0.4**	0.01	**0.4**
604783	0.06	0.04	7%	0.01	---	---	0.02	---	---	---	0.01	---	**0.0**	0.04	**0.1**
605083	19.29	---	90%	0.32	---	0.48	0.13	9.69	---	0.98	0.79	3.86	**16.3**	---	**16.3**
605783	8.69	---	89%	0.16	0.01	0.15	0.01	4.42	---	0.18	0.16	1.70	**6.8**	---	**6.8**
Total	**203.3**	**4.8**	**77%**	**5.3**	**0.4**	**9.1**	**3.9**	**62.1**	**32.3**	**18.0**	**10.3**	**24.2**	**165.5**	**4.8**	**170.2**

Table 7A-49. Uninc. LA County, LA River—above Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)		Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
694283	0.00	0.00	9%	0.00	---	---	---	---	---	---	---	---	**0.0**		0.00	**0.0**
700583	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**		0.00	**0.0**
700783	0.00	0.08	8%	0.00	---	---	0.00	---	---	---	---	---	**0.0**		0.08	**0.1**
700983	2.81	---	89%	0.04	---	---	0.20	0.03	---	---	---	2.25	**2.5**		---	**2.5**
701083	0.06	0.36	10%	0.02	---	---	0.05	---	---	---	---	---	**0.1**		0.36	**0.4**
701183	5.84	---	97%	0.07	---	---	0.00	---	---	---	---	5.42	**5.5**		---	**5.5**
Total	**8.7**	**0.4**	**84%**	**0.1**	**0.0**	**0.0**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**7.7**	**8.1**		**0.4**	**8.5**

Table 7A-50. Uninc. LA County, LA River—below Sepulveda Basin: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
601383	0.00	0.09	5%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.09	**0.1**
606583	0.00	0.07	5%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.07	**0.1**
607083	0.11	0.31	10%	0.02	---	---	0.08	---	---	---	---	---	**0.1**	0.31	**0.4**
607383	0.37	1.30	10%	0.06	---	---	0.23	---	---	0.00	---	0.00	**0.3**	1.30	**1.6**
607483	0.05	0.21	9%	0.01	---	---	0.03	---	---	---	---	---	**0.0**	0.21	**0.2**
607883	0.07	0.40	9%	0.04	---	---	0.00	---	---	---	---	---	**0.0**	0.40	**0.5**
607983	0.01	0.09	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.09	**0.1**
608083	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
608283	0.12	0.90	8%	0.11	---	---	---	---	---	---	---	---	**0.1**	0.90	**1.0**
608883	0.73	5.94	7%	0.24	---	---	0.31	---	---	---	0.03	0.00	**0.6**	5.94	**6.5**
609383	0.04	0.05	11%	0.01	---	---	0.03	---	---	---	---	---	**0.0**	0.05	**0.1**
609483	0.00	0.15	5%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.15	**0.2**
609683	0.40	0.56	11%	0.06	---	---	0.27	---	---	---	---	---	**0.3**	0.56	**0.9**
609783	0.37	0.87	9%	0.08	---	0.03	0.20	---	---	---	0.01	---	**0.3**	0.87	**1.2**
609883	0.46	1.01	9%	0.13	---	0.01	0.14	---	---	---	0.10	0.00	**0.4**	1.01	**1.4**
635483	0.18	1.14	7%	0.09	---	---	0.06	---	---	---	---	---	**0.2**	1.14	**1.3**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)		Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
635583	19.20	7.98	31%	0.90	0.01	2.25	0.76	7.29	---	0.01	7.22	0.02	**18.4**		7.98	**26.4**
635683	0.93	0.01	58%	0.03	---	0.16	---	---	---	0.65	0.02	---	**0.9**		0.01	**0.9**
635783	0.00	0.00	11%	---	---	---	---	0.00	---	---	0.00	---	**0.0**		0.00	**0.0**
635883	0.01	0.09	6%	0.00	---	---	---	---	---	0.00	0.01	---	**0.0**		0.09	**0.1**
636583	0.00	0.09	5%	0.00	---	---	---	---	---	---	---	---	**0.0**		0.09	**0.1**
636683	0.00	0.13	5%	0.00	---	---	---	---	---	---	---	---	**0.0**		0.13	**0.1**
636983	0.49	1.90	7%	0.12	0.01	0.01	0.12	---	---	0.00	0.14	0.04	**0.4**		1.90	**2.3**
637083	0.00	0.00	7%	0.00	---	---	---	---	---	---	---	---	**0.0**		0.00	**0.0**
637183	1.11	0.28	43%	0.03	---	---	0.00	0.85	---	---	---	---	**0.9**		0.28	**1.2**
637283	0.53	2.11	8%	0.13	0.02	0.02	0.05	---	---	---	0.16	0.05	**0.4**		2.11	**2.5**
637383	12.96	0.13	90%	0.21	0.04	0.95	0.17	4.10	---	---	1.57	3.86	**10.9**		0.13	**11.0**
637483	19.33	0.00	79%	0.40	---	1.65	0.25	0.01	---	7.38	7.02	---	**16.7**		0.00	**16.7**
637583	0.18	0.04	49%	0.01	---	---	---	0.10	---	0.01	0.00	---	**0.1**		0.04	**0.2**
637683	0.04	0.17	9%	0.03	---	---	---	---	---	---	---	---	**0.0**		0.17	**0.2**
638483	0.48	0.74	8%	0.05	---	---	0.02	---	---	0.71	0.00	---	**0.8**		0.74	**1.5**
639483	0.22	0.06	21%	0.04	---	---	---	0.01	---	0.24	---	---	**0.3**		0.06	**0.4**
639783	7.50	0.12	47%	0.37	---	0.33	0.08	2.39	---	3.89	0.97	---	**8.0**		0.12	**8.2**
639883	0.98	0.01	85%	0.04	---	0.02	---	0.19	---	0.34	---	---	**0.6**		0.01	**0.6**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
663783	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
663883	0.54	2.88	29%	0.21	---	0.14	0.00	---	---	---	---	---	**0.4**	2.88	**3.2**
664483	0.20	3.22	7%	0.22	---	0.06	---	---	---	---	---	---	**0.3**	3.22	**3.5**
664683	0.02	0.85	7%	0.03	---	---	---	---	---	---	---	---	**0.0**	0.85	**0.9**
Total	**67.6**	**33.9**	**32%**	**3.7**	**0.1**	**5.6**	**2.8**	**14.9**	**0.0**	**13.2**	**17.3**	**4.0**	**61.6**	**33.9**	**95.5**

Table 7A-51. Uninc. LA County, McCoy-Dry Canyon Creek: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
698383	1.38	---	90%	0.02	---	---	0.00	---	---	---	---	1.28	**1.3**	---	**1.3**
698483	1.88	---	54%	0.03	---	---	0.08	---	---	---	---	1.57	**1.7**	---	**1.7**
698883	5.08	---	92%	0.10	---	---	0.00	---	---	0.00	---	3.92	**4.0**	---	**4.0**
699283	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
699383	0.00	0.01	7%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**
Total	**8.4**	**0.0**	**84%**	**0.1**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**6.8**	**7.0**	**0.0**	**7.0**

Table 7A-52. Uninc. LA County, Rio Hondo: RAA Output and EWMP Implementation Plan for Final Compliance

	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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
Subwatershed ID	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
610983	13.87	0.03	95%	0.15	---	0.21	0.33	6.86	---	1.67	1.06	0.00	**10.3**	0.03	**10.3**
611983	0.87	0.02	58%	0.01	---	0.01	0.02	0.73	---	0.01	0.06	---	**0.8**	0.02	**0.9**
612183	0.73	0.05	68%	0.01	---	---	0.03	0.48	---	---	0.06	0.01	**0.6**	0.05	**0.6**
612283	5.58	0.01	95%	0.07	---	---	0.12	2.29	---	0.00	0.72	1.42	**4.6**	0.01	**4.6**
612983	0.09	0.58	9%	0.06	---	---	0.00	---	---	---	---	---	**0.1**	0.58	**0.6**
613283	3.17	3.04	21%	0.25	---	0.08	0.02	0.91	---	0.72	---	---	**2.0**	3.04	**5.0**
613483	0.48	0.15	38%	0.01	---	0.03	0.00	0.15	---	0.16	---	---	**0.4**	0.15	**0.5**
613583	2.02	0.40	32%	0.06	---	---	0.19	1.22	---	---	---	---	**1.5**	0.40	**1.9**
613683	2.31	1.05	27%	0.09	---	---	0.26	1.50	---	---	---	---	**1.8**	1.05	**2.9**
613883	0.00	0.07	5%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.07	**0.1**
613983	11.22	---	84%	0.11	0.01	---	0.41	3.21	---	---	---	4.67	**8.4**	---	**8.4**
614183	0.02	0.01	50%	---	---	---	0.00	0.02	---	---	---	---	**0.0**	0.01	**0.0**
614683	0.02	0.01	50%	---	---	---	0.00	0.02	---	---	---	---	**0.0**	0.01	**0.0**
617083	0.69	0.29	38%	0.03	---	---	---	0.49	---	---	---	---	**0.5**	0.29	**0.8**
617183	0.00	0.01	18%	0.00	---	---	0.00	0.00	---	---	---	---	**0.0**	0.01	**0.0**
617283	0.00	0.01	7%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.01	**0.0**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
617383	0.02	0.12	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.12	**0.1**
618683	0.83	0.03	37%	0.02	---	0.02	0.05	0.44	---	0.25	---	0.10	**0.9**	0.03	**0.9**
618783	4.87	0.33	58%	0.11	---	---	0.41	2.90	---	0.13	---	0.00	**3.6**	0.33	**3.9**
619083	0.16	0.04	49%	0.00	---	---	0.01	0.11	---	---	---	---	**0.1**	0.04	**0.2**
619583	1.63	0.11	53%	0.03	---	---	0.11	1.07	---	0.00	---	---	**1.2**	0.11	**1.3**
619683	2.71	0.24	53%	0.06	0.01	---	0.14	1.80	---	0.23	0.02	---	**2.3**	0.24	**2.5**
619783	1.63	0.17	53%	0.03	---	---	0.08	0.92	---	---	---	---	**1.0**	0.17	**1.2**
620083	0.48	0.04	55%	0.01	---	---	0.03	0.27	---	0.15	---	---	**0.5**	0.04	**0.5**
620283	11.41	0.88	69%	0.18	---	---	0.51	5.99	---	2.17	---	---	**8.8**	0.88	**9.7**
620383	8.44	0.11	95%	0.10	---	0.14	0.40	---	---	5.08	0.00	---	**5.7**	0.11	**5.8**
620483	1.23	0.13	69%	0.02	---	---	0.07	0.66	---	0.45	---	---	**1.2**	0.13	**1.3**
620583	1.70	0.24	49%	0.04	---	---	0.11	1.00	---	0.02	---	---	**1.2**	0.24	**1.4**
620683	0.04	0.09	16%	0.00	---	---	0.00	0.02	---	---	---	---	**0.0**	0.09	**0.1**
620783	0.24	0.06	42%	0.00	---	---	0.02	0.14	---	---	---	---	**0.2**	0.06	**0.2**
620883	0.09	0.09	21%	0.00	---	---	0.01	0.03	---	0.01	---	---	**0.1**	0.09	**0.1**
620983	0.55	0.09	26%	0.03	---	0.02	0.07	0.12	---	0.23	---	---	**0.5**	0.09	**0.6**
621083	0.33	0.29	16%	0.02	---	0.00	0.03	0.04	---	0.12	---	---	**0.2**	0.29	**0.5**
621183	0.40	0.00	95%	0.01	---	0.05	0.01	0.00	---	0.22	---	---	**0.3**	0.00	**0.3**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
621383	3.34	---	96%	0.06	0.01	---	0.14	0.93	---	---	---	1.56	**2.7**	---	**2.7**
621783	0.00	0.00	---	---	---	---	---	---	---	---	0.00	---	**0.0**	0.00	**0.0**
621883	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
622183	0.16	0.92	9%	0.05	---	---	0.09	---	---	---	---	---	**0.1**	0.92	**1.1**
622283	0.75	0.13	38%	0.02	---	---	0.04	0.48	---	0.00	---	---	**0.5**	0.13	**0.7**
622483	0.08	0.00	37%	0.00	---	---	0.00	0.05	---	0.00	0.01	---	**0.1**	0.00	**0.1**
622683	0.01	0.00	60%	0.00	---	---	---	0.00	---	---	0.00	---	**0.0**	0.00	**0.0**
622783	2.48	0.16	42%	0.05	---	---	0.07	0.62	---	0.01	1.40	---	**2.2**	0.16	**2.3**
622883	0.00	0.00	---	---	---	---	---	---	---	---	0.00	---	**0.0**	0.00	**0.0**
623083	0.00	0.00	---	---	---	---	---	---	---	---	0.00	---	**0.0**	0.00	**0.0**
623183	0.00	0.00	---	---	---	---	---	---	---	---	0.00	---	**0.0**	0.00	**0.0**
623283	0.00	0.00	16%	---	---	---	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
623483	0.03	0.01	27%	0.00	---	---	0.00	0.01	---	0.00	---	---	**0.0**	0.01	**0.0**
623583	0.63	0.77	25%	0.04	---	0.24	0.17	---	---	0.00	0.06	---	**0.5**	0.77	**1.3**
623683	2.79	0.21	54%	0.07	---	---	0.27	1.70	---	0.00	---	---	**2.0**	0.21	**2.3**
623783	0.21	0.54	11%	0.04	---	0.03	0.08	---	---	0.02	0.00	---	**0.2**	0.54	**0.7**
623883	2.27	0.10	47%	0.06	---	0.00	0.18	1.18	---	0.22	0.00	---	**1.6**	0.10	**1.7**
623983	3.55	0.28	60%	0.07	0.01	0.00	0.27	2.08	---	0.00	---	---	**2.4**	0.28	**2.7**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
624083	1.06	0.02	95%	0.05	---	0.85	0.04	0.01	---	0.00	---	---	**1.0**	0.02	**1.0**
624183	7.90	0.43	63%	0.11	---	---	0.24	3.93	---	1.43	0.04	---	**5.7**	0.43	**6.2**
624283	2.49	0.28	47%	0.07	---	0.04	0.09	1.79	---	0.22	---	---	**2.2**	0.28	**2.5**
624383	0.51	0.09	32%	0.01	---	0.00	0.02	0.02	---	0.11	---	---	**0.2**	0.09	**0.3**
624483	1.05	0.10	48%	0.02	---	---	0.07	0.77	---	---	---	---	**0.9**	0.10	**1.0**
624583	1.16	0.07	59%	0.02	---	---	0.06	0.71	---	---	---	---	**0.8**	0.07	**0.9**
624683	0.00	0.01	16%	0.00	---	---	0.00	0.00	---	0.00	---	---	**0.0**	0.01	**0.0**
624783	0.00	0.00	12%	0.00	---	---	---	0.00	---	---	---	---	**0.0**	0.00	**0.0**
624883	0.31	0.01	37%	0.01	---	---	0.03	0.16	---	0.17	0.00	---	**0.4**	0.01	**0.4**
625083	0.92	0.10	48%	0.02	---	0.00	0.02	0.10	---	1.48	---	---	**1.6**	0.10	**1.7**
625183	0.06	0.65	10%	0.03	---	---	0.02	---	---	0.00	---	---	**0.0**	0.65	**0.7**
625283	0.00	0.03	9%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.03	**0.0**
625383	0.08	0.13	7%	0.01	---	---	0.01	---	---	0.12	---	---	**0.1**	0.13	**0.3**
625483	0.66	0.04	59%	0.01	---	---	0.04	0.44	---	0.00	---	---	**0.5**	0.04	**0.5**
625583	1.15	0.11	21%	0.02	---	---	0.01	0.10	---	0.09	---	---	**0.2**	0.11	**0.3**
625683	2.06	0.08	43%	0.01	---	---	0.00	---	---	0.18	---	---	**0.2**	0.08	**0.3**
625783	8.09	0.54	65%	0.11	---	---	0.42	4.67	---	---	---	---	**5.2**	0.54	**5.7**
625883	4.33	0.28	74%	0.05	0.00	---	0.18	2.43	---	---	---	---	**2.7**	0.28	**2.9**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
625983	6.45	0.26	69%	0.13	0.04	0.23	0.38	4.03	---	0.00	0.13	---	**4.9**	0.26	**5.2**
626083	0.03	0.41	8%	0.01	---	---	0.00	---	---	0.00	---	---	**0.0**	0.41	**0.4**
626183	0.40	0.12	48%	0.01	---	---	0.02	0.26	---	---	---	---	**0.3**	0.12	**0.4**
629183	0.00	0.00	12%	---	---	---	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
629783	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
629883	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
Total	**132.8**	**15.6**	**59%**	**2.7**	**0.1**	**2.0**	**6.4**	**59.9**	**0.0**	**15.7**	**3.6**	**7.8**	**98.1**	**15.6**	**113.7**

Table 7A-53. Uninc. LA County, Tujunga Wash: RAA Output and EWMP Implementation Plan for Final Compliance

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028												For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs							
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
668683	3.13	0.08	47%	0.10	---	---	---	0.02	---	2.02	---	0.08	**2.2**	0.08	**2.3**
670283	0.00	0.01	12%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**
670483	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
670583	0.29	0.00	96%	0.01	---	---	---	---	---	0.25	---	---	**0.3**	0.00	**0.3**
670683	0.07	0.00	51%	0.00	---	---	---	---	---	0.06	---	---	**0.1**	0.00	**0.1**
670883	0.04	0.00	---	---	---	---	---	---	---	0.03	---	---	**0.0**	0.00	**0.0**
670983	0.10	0.00	94%	0.00	---	---	---	---	---	0.09	---	---	**0.1**	0.00	**0.1**
671083	0.00	0.01	7%	0.00	---	---	---	---	---	0.00	---	0.00	**0.0**	0.01	**0.0**
671183	0.00	0.04	8%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.04	**0.0**
671283	0.01	0.08	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.08	**0.1**
671383	0.01	0.07	9%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.07	**0.1**
671483	0.01	0.07	7%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.07	**0.1**
671583	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
671783	0.00	0.00	7%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
671883	0.00	0.00	8%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
671983	0.00	0.01	10%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**

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 Metals by 2028	For Bacteria by 2037	For Metals Attainment by 2028											For Bacteria Attainment by 2037	
				Low-Impact Development				Streets	Regional BMPs						
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
672083	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
672583	---	---	---	---	---	---	---	---	---	---	---	---	**0.0**	---	**0.0**
672783	0.00	0.00	7%	0.00	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
672983	0.00	0.00	18%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
673083	0.00	0.00	18%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.00	**0.0**
673583	0.83	0.00	42%	0.06	---	0.03	0.00	---	---	0.07	---	0.65	**0.8**	0.00	**0.8**
673683	0.58	0.00	66%	0.02	---	---	---	---	---	0.05	---	0.45	**0.5**	0.00	**0.5**
673783	0.17	0.00	91%	0.01	---	---	---	---	---	0.01	---	0.13	**0.2**	0.00	**0.2**
673883	0.00	0.01	11%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.01	**0.0**
673983	0.28	0.28	26%	0.02	---	---	0.10	0.28	---	---	---	---	**0.4**	0.28	**0.7**
674083	0.00	0.02	8%	0.00	---	---	0.00	---	---	---	---	---	**0.0**	0.02	**0.0**
674183	0.02	0.20	7%	0.01	---	---	---	---	---	---	---	---	**0.0**	0.20	**0.2**
674283	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
674383	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
Total	**5.5**	**0.9**	**32%**	**0.3**	**0.0**	**0.0**	**0.1**	**0.3**	**0.0**	**2.6**	**0.0**	**1.3**	**4.6**	**0.9**	**5.5**

Table 7A-54. Uninc. LA County, Verdugo Wash: RAA Output and EWMP Implementation Plan for Final Compliance

Subwatershed ID	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL — For Metals by 2028: 24-hour Volume Managed (acre-ft)	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL — For Bacteria by 2037: Additional 24-hour Volume Managed (acre-ft)	EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet) — For Metals Attainment by 2028: % Load Reduction Critical Condition	Low-Impact Development: Ordinance	Low-Impact Development: Planned LID	Low-Impact Development: Public LID	Low-Impact Development: Residential LID	Streets: Green Streets	Regional BMPs: Very High (public, owned)	Regional BMPs: High (public, owned)	Regional BMPs: Medium (public, non-owned)	Regional BMPs: Private	Total BMP Capacity (acre-ft)	For Bacteria Attainment by 2037: Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
653383	2.34	2.13	32%	0.07	0.01	---	0.07	0.88	---	0.30	---	---	**1.3**	2.13	**3.5**
653683	0.08	0.08	21%	0.00	---	---	0.02	0.03	---	---	---	---	**0.1**	0.08	**0.1**
654283	0.33	3.99	8%	0.08	0.01	0.02	0.13	---	---	0.00	---	---	**0.2**	3.99	**4.2**
654483	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
654683	17.57	1.83	53%	0.32	0.03	2.88	0.78	0.84	---	5.83	1.70	---	**12.4**	1.83	**14.2**
654783	---	0.00	---	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
654883	0.09	0.43	12%	0.01	---	---	0.05	---	---	0.00	---	---	**0.1**	0.43	**0.5**
654983	0.02	0.11	12%	0.00	---	---	0.01	---	---	---	---	---	**0.0**	0.11	**0.1**
655183	---	0.00	5%	---	---	---	---	---	---	---	---	---	**0.0**	0.00	**0.0**
655283	0.25	0.03	63%	0.00	---	0.07	0.01	0.09	---	0.01	0.01	---	**0.2**	0.03	**0.2**
655583	11.73	1.16	74%	0.14	---	0.27	0.51	0.32	---	5.21	1.71	---	**8.2**	1.16	**9.3**
655683	0.97	0.63	26%	0.06	---	0.04	0.08	0.21	---	0.31	0.00	---	**0.7**	0.63	**1.3**
655783	0.50	1.18	16%	0.04	---	---	0.15	0.09	---	0.06	0.00	---	**0.3**	1.18	**1.5**
655983	4.47	1.74	31%	0.15	0.00	0.08	0.52	2.11	---	0.23	0.40	---	**3.5**	1.74	**5.2**
Total	**38.3**	**13.3**	**41%**	**0.9**	**0.1**	**3.4**	**2.3**	**4.6**	**0.0**	**11.9**	**3.8**	**0.0**	**27.0**	**13.3**	**40.3**

Appendix 7.B
Subwatershed Index Maps with Control Measure Capacity

This appendix presents the jurished index maps that relate the subwatersheds and jurisdictions to the implementation plan quantities specified in Appendix 7.A. The maps are presented as follows:

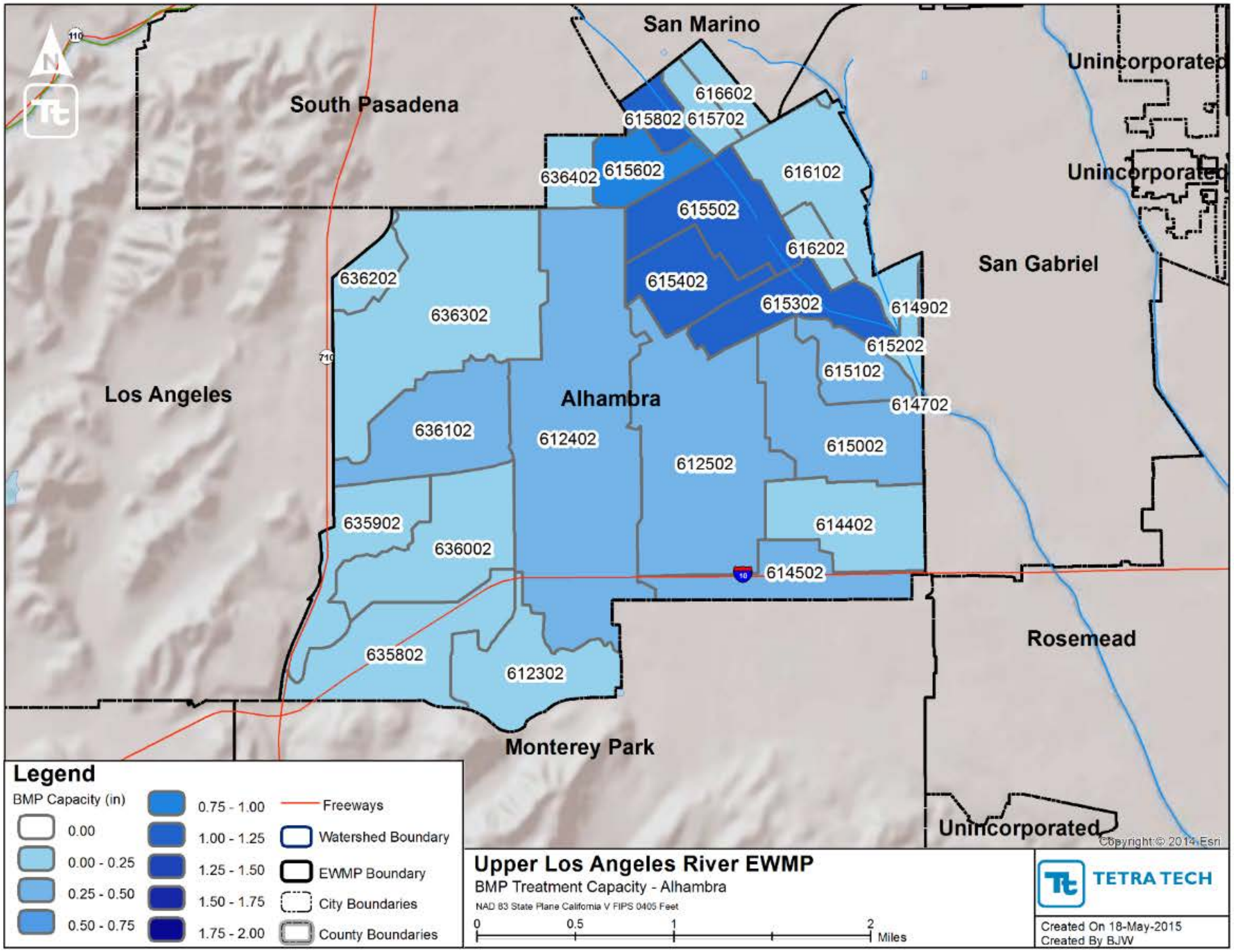


Figure 7.B-1. Alhambra Subwatershed Index Map

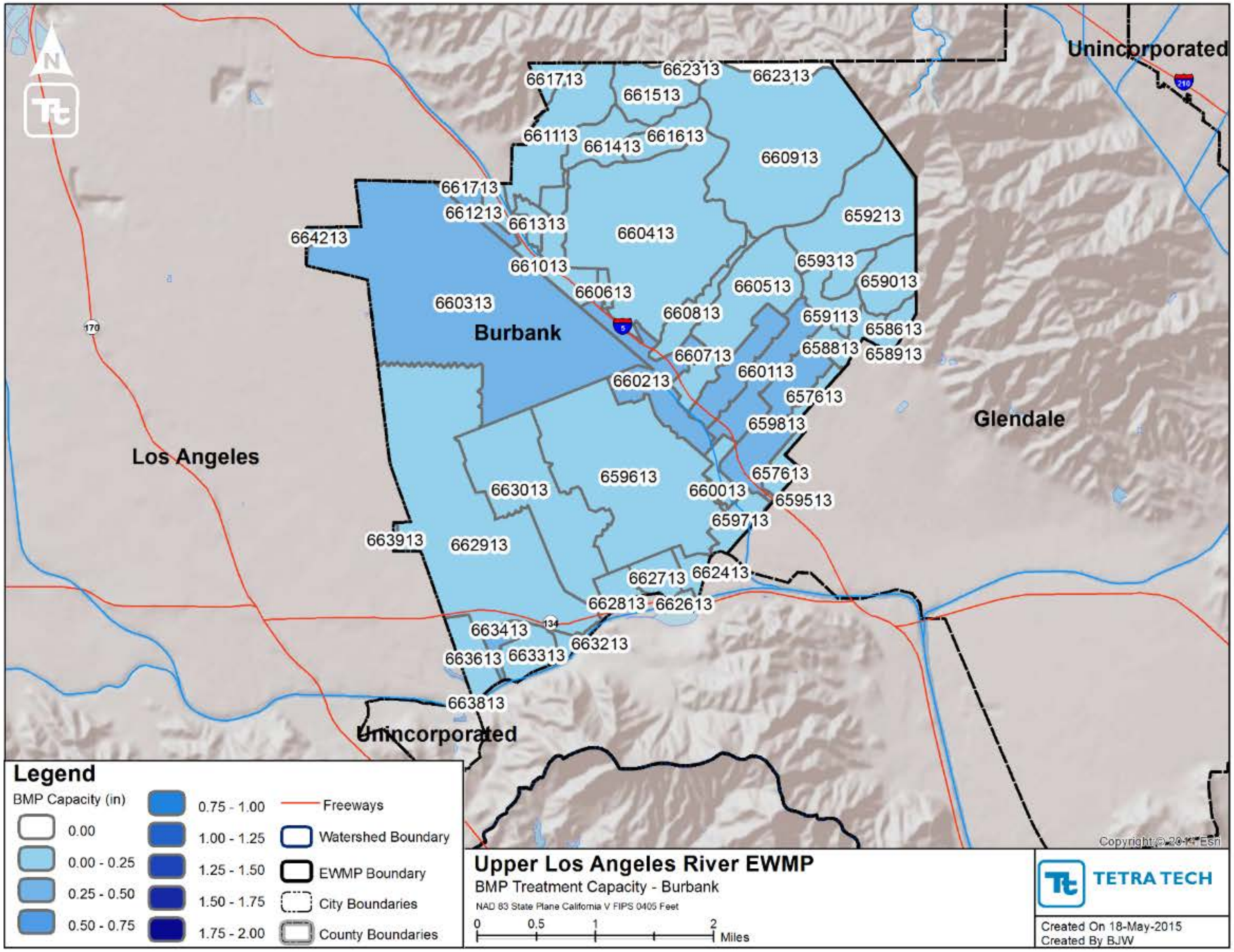


Figure 7.B-2. Burbank Subwatershed Index Map

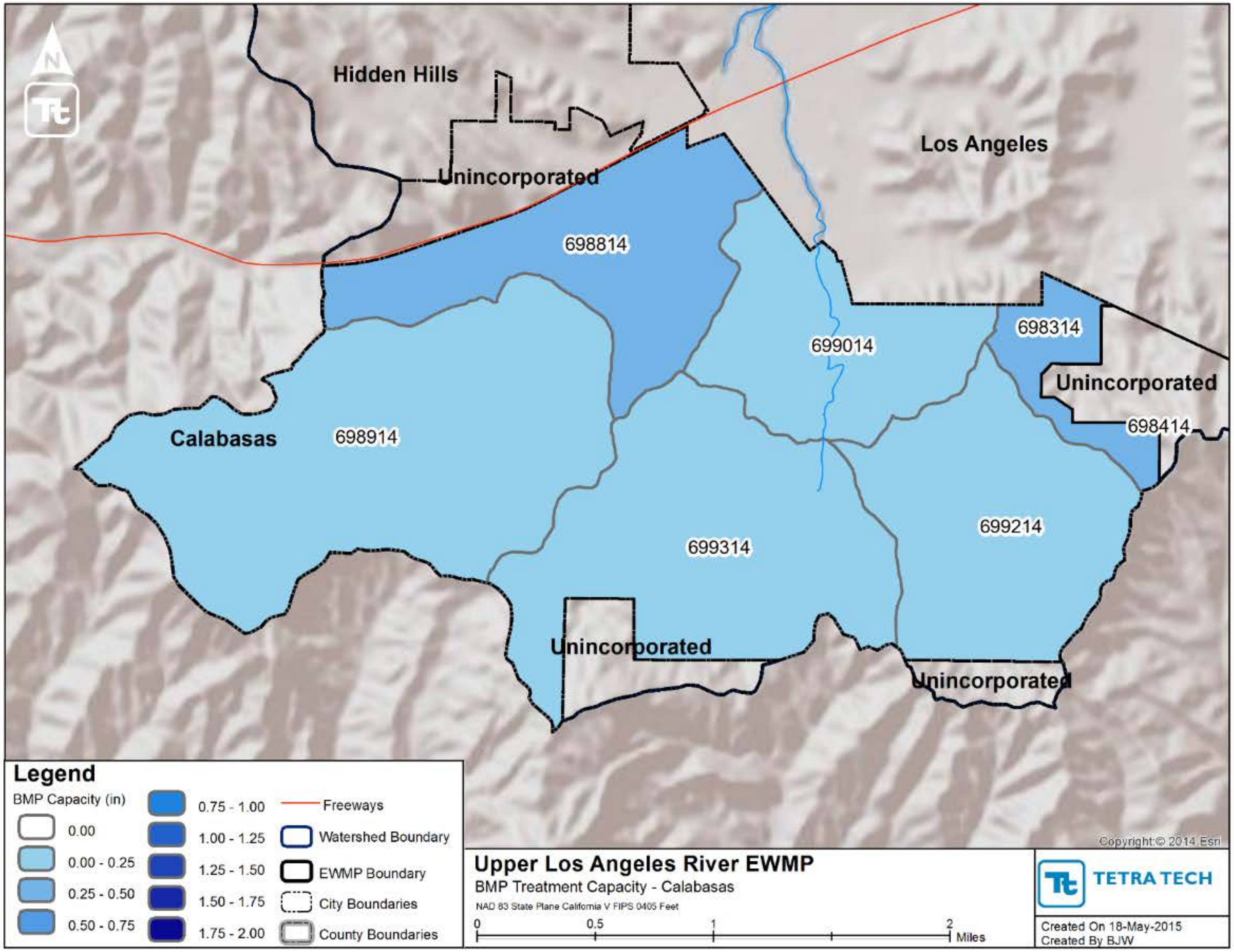


Figure 7.B-3. Calabasas Subwatershed Index Map

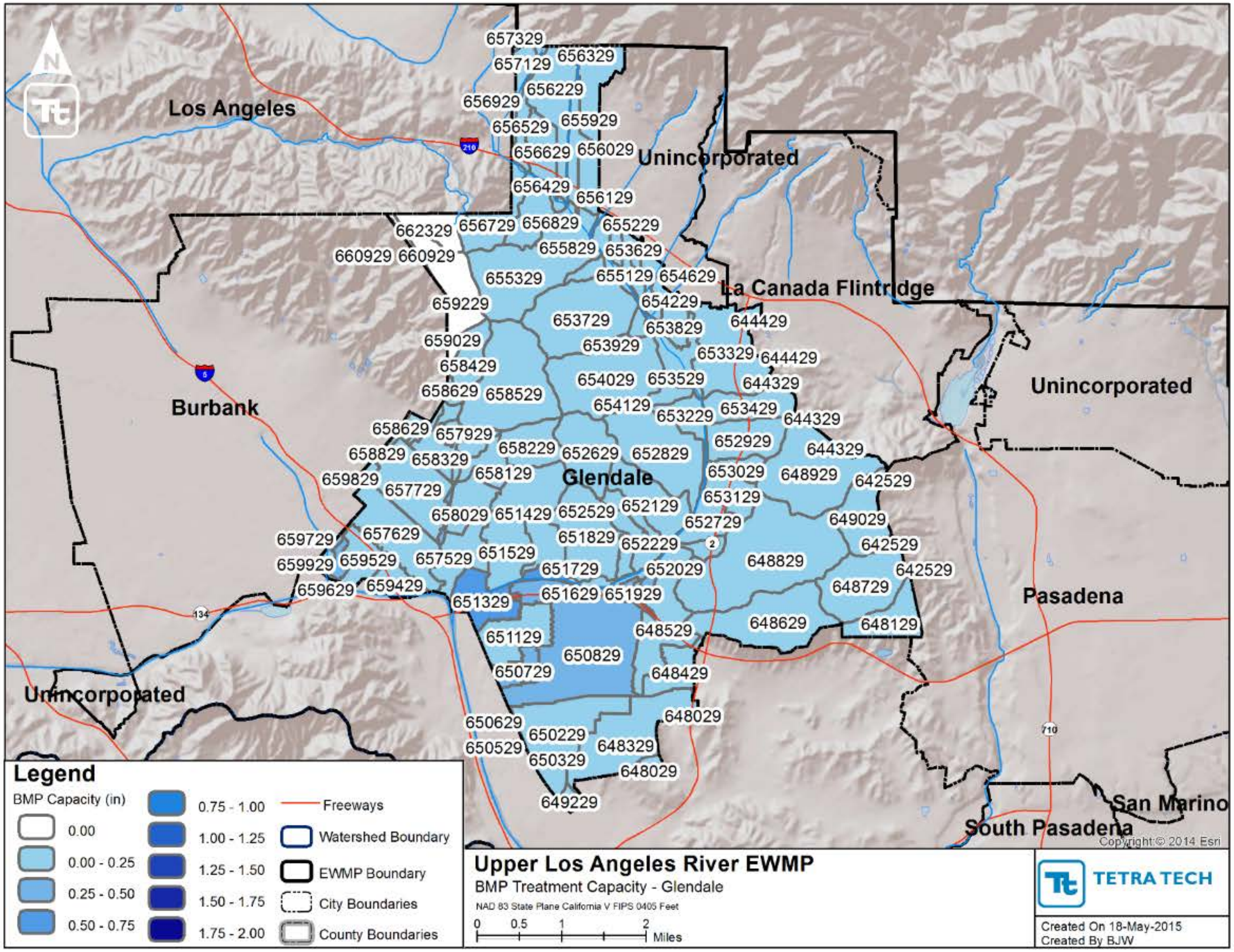


Figure 7.B-4. Glendale Subwatershed Index Map

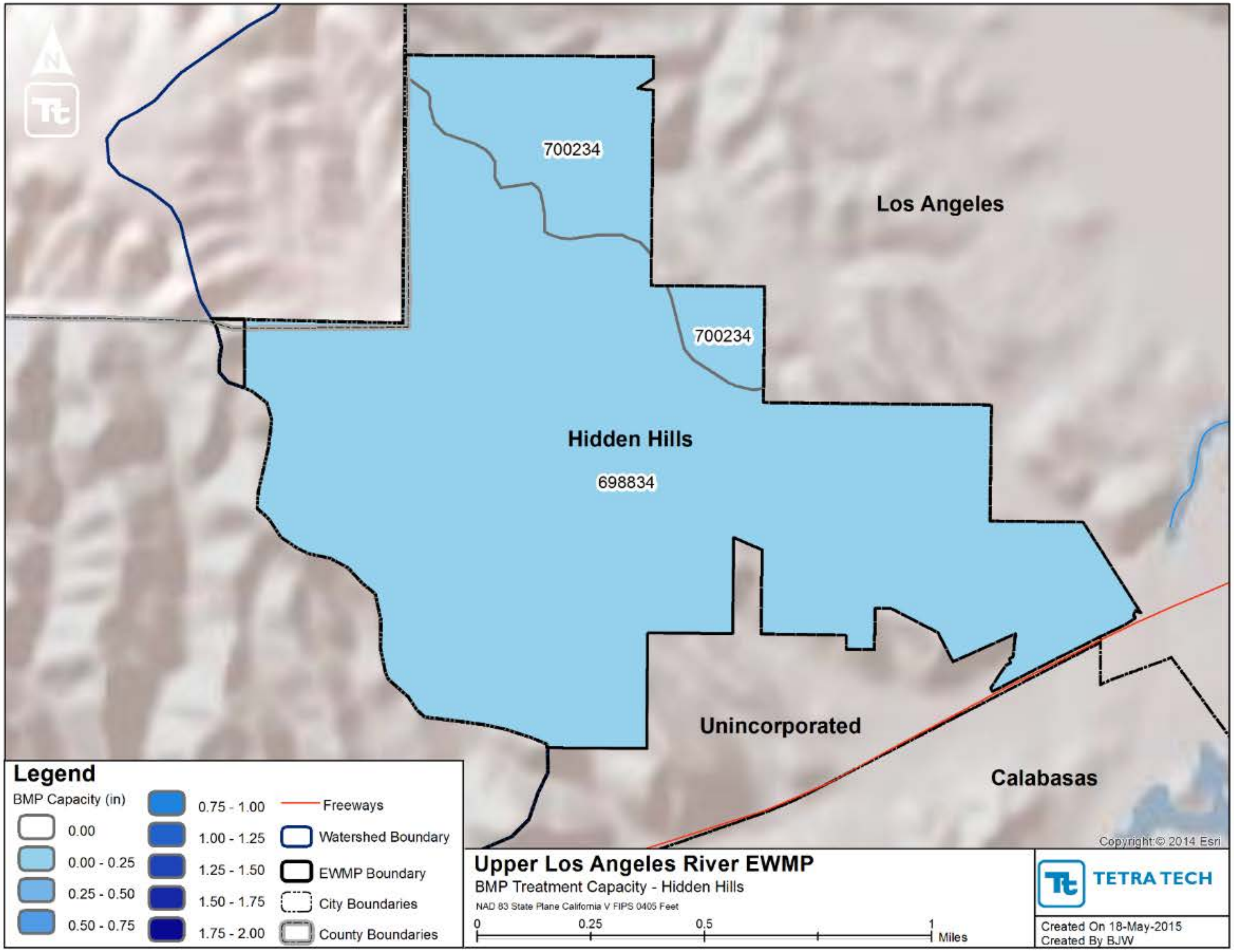


Figure 7.B-5. Hidden Hills Subwatershed Index Map

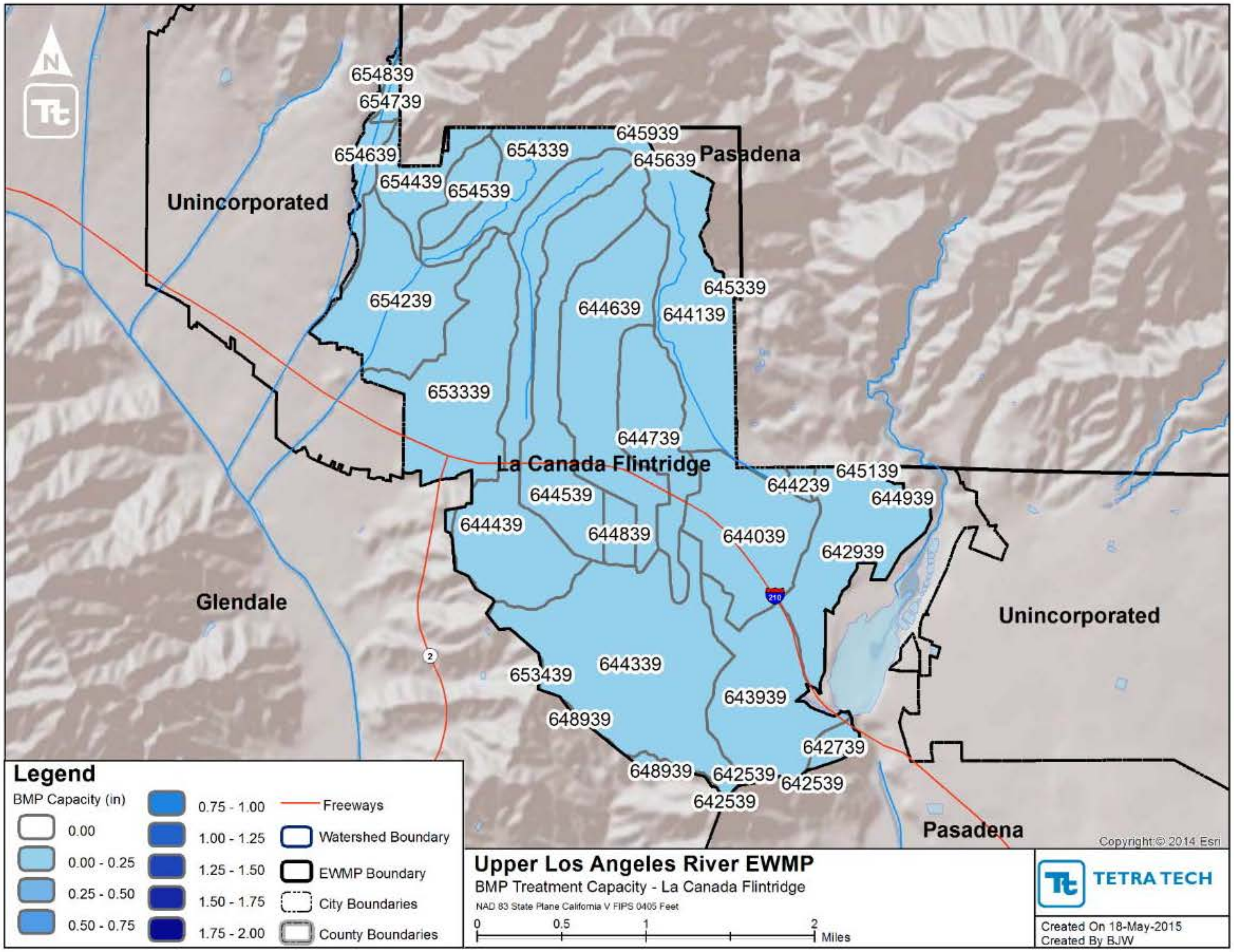


Figure 7.B-6. La Cañada Flintridge Subwatershed Index Map

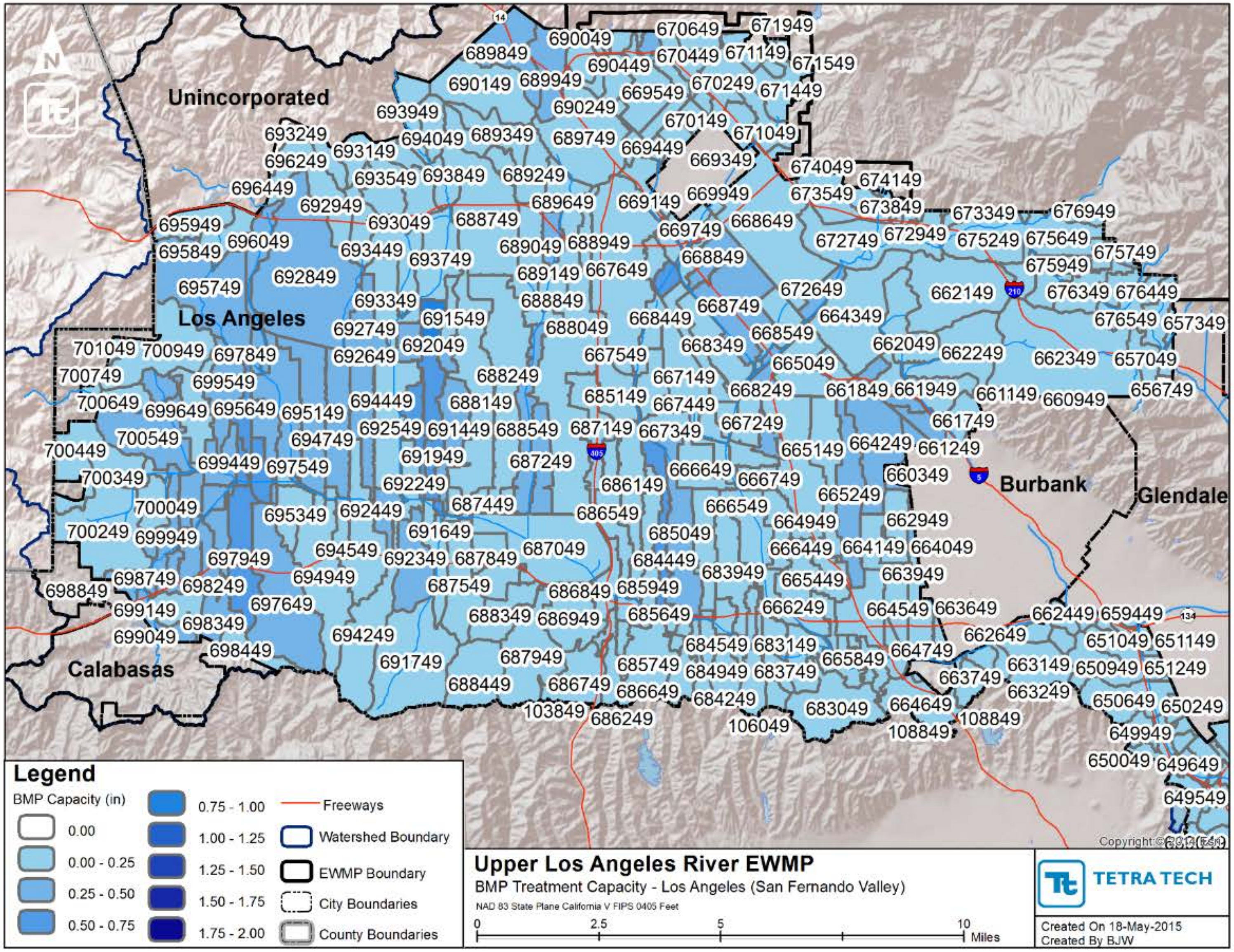


Figure 7.B-7. Los Angeles (San Fernando Valley) Subwatershed Index Map

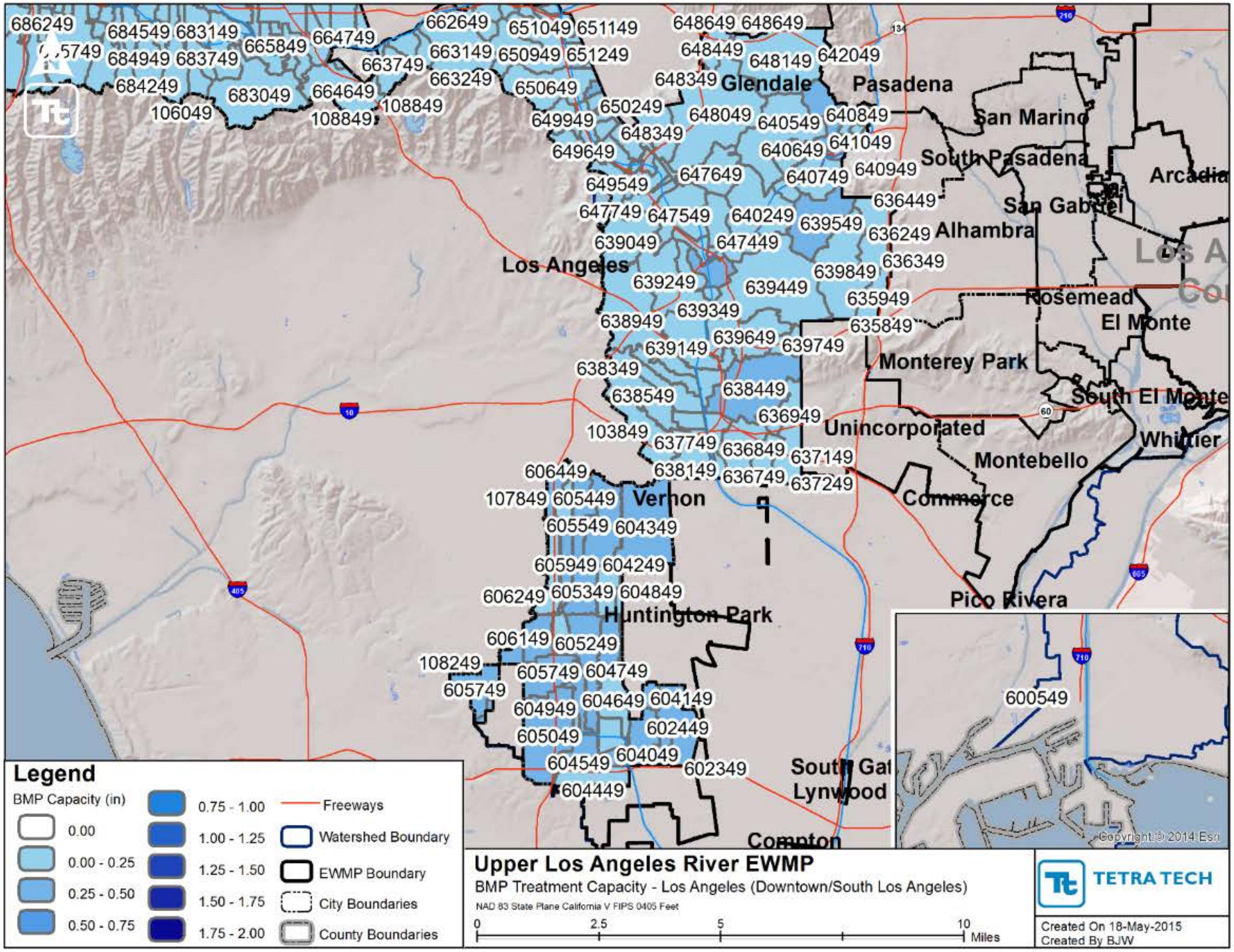


Figure 7.B-8. Los Angeles (Downtown/South LA) Subwatershed Index Map

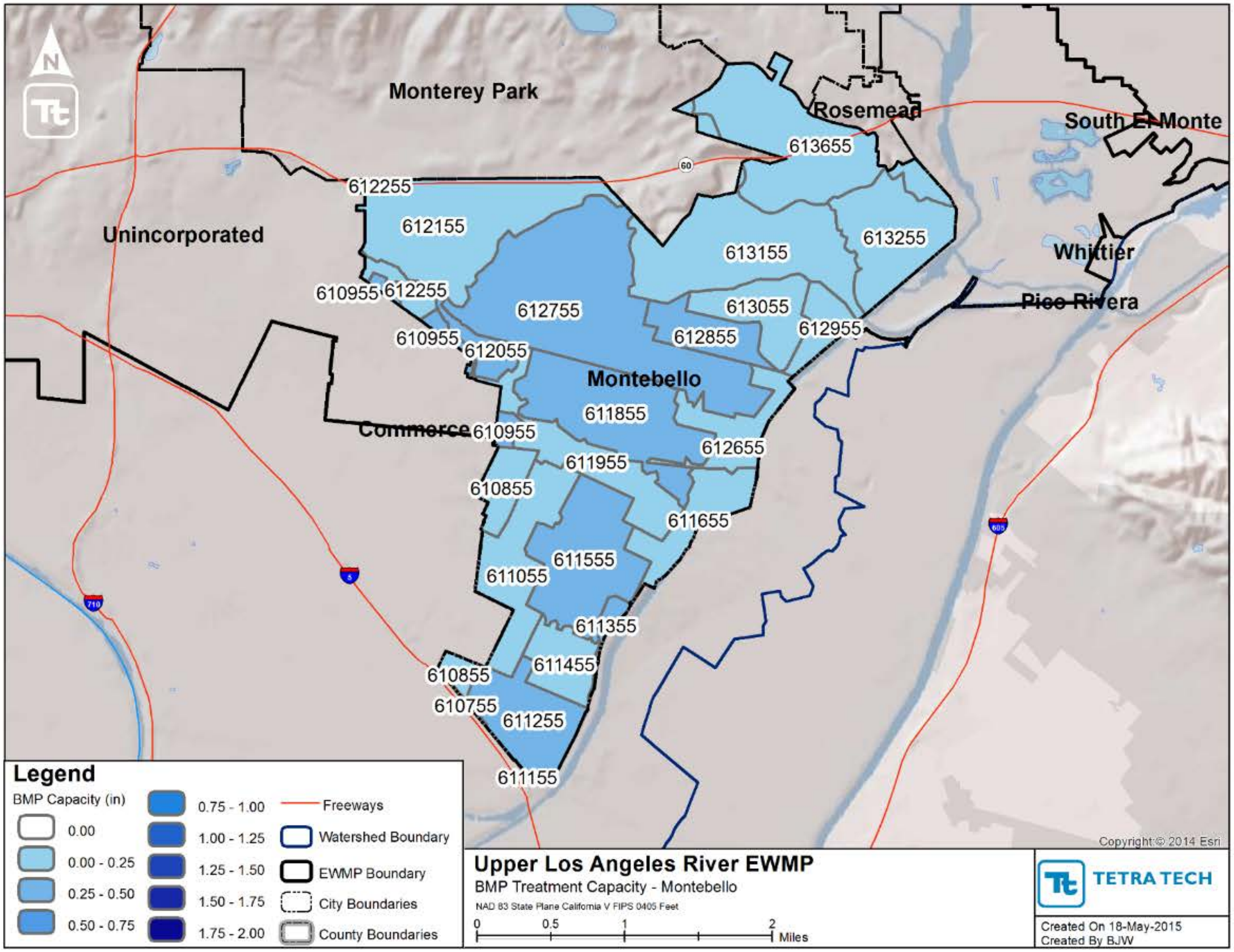


Figure 7.B-9. Montebello Subwatershed Index Map

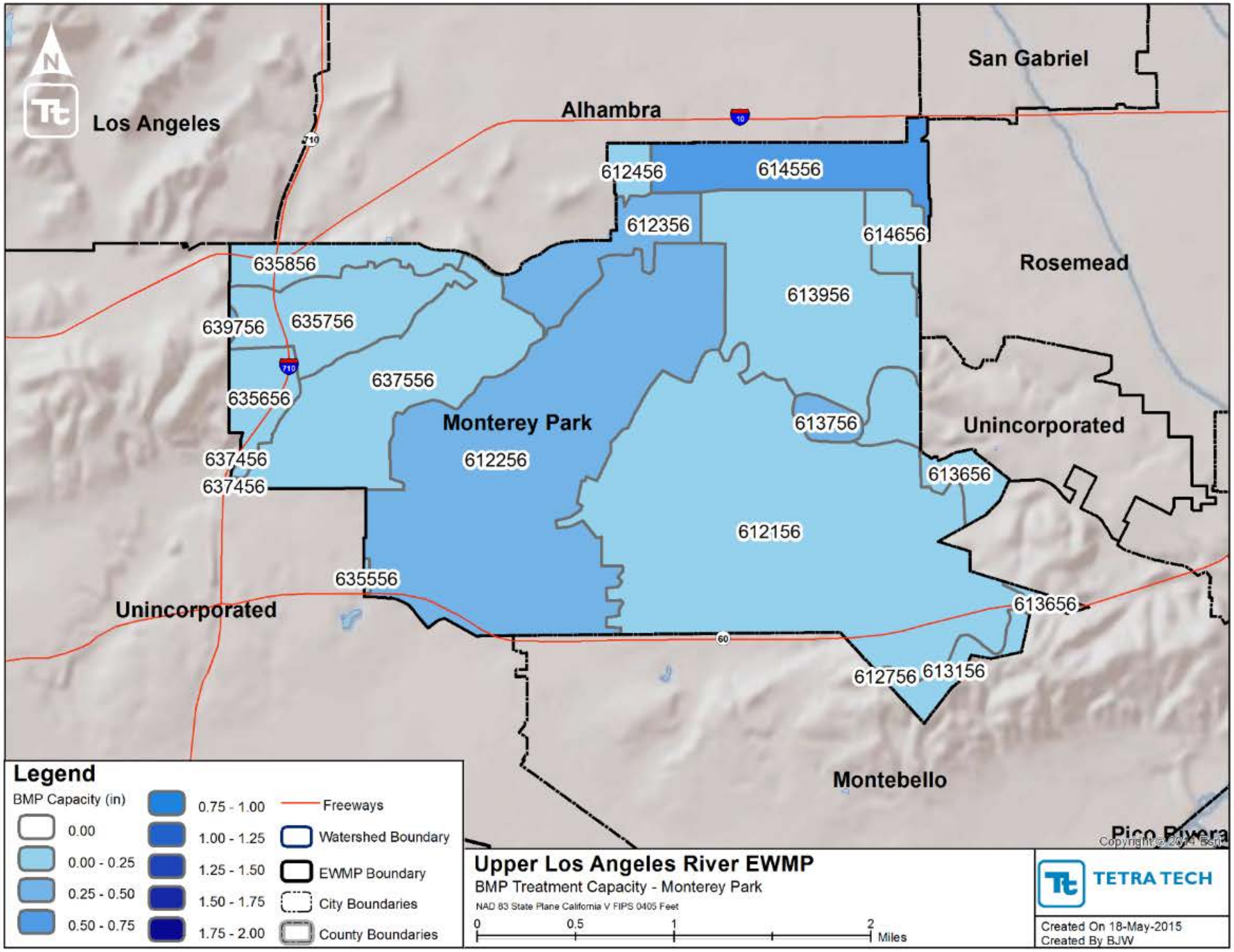


Figure 7.B-10. Monterey Park Subwatershed Index Map

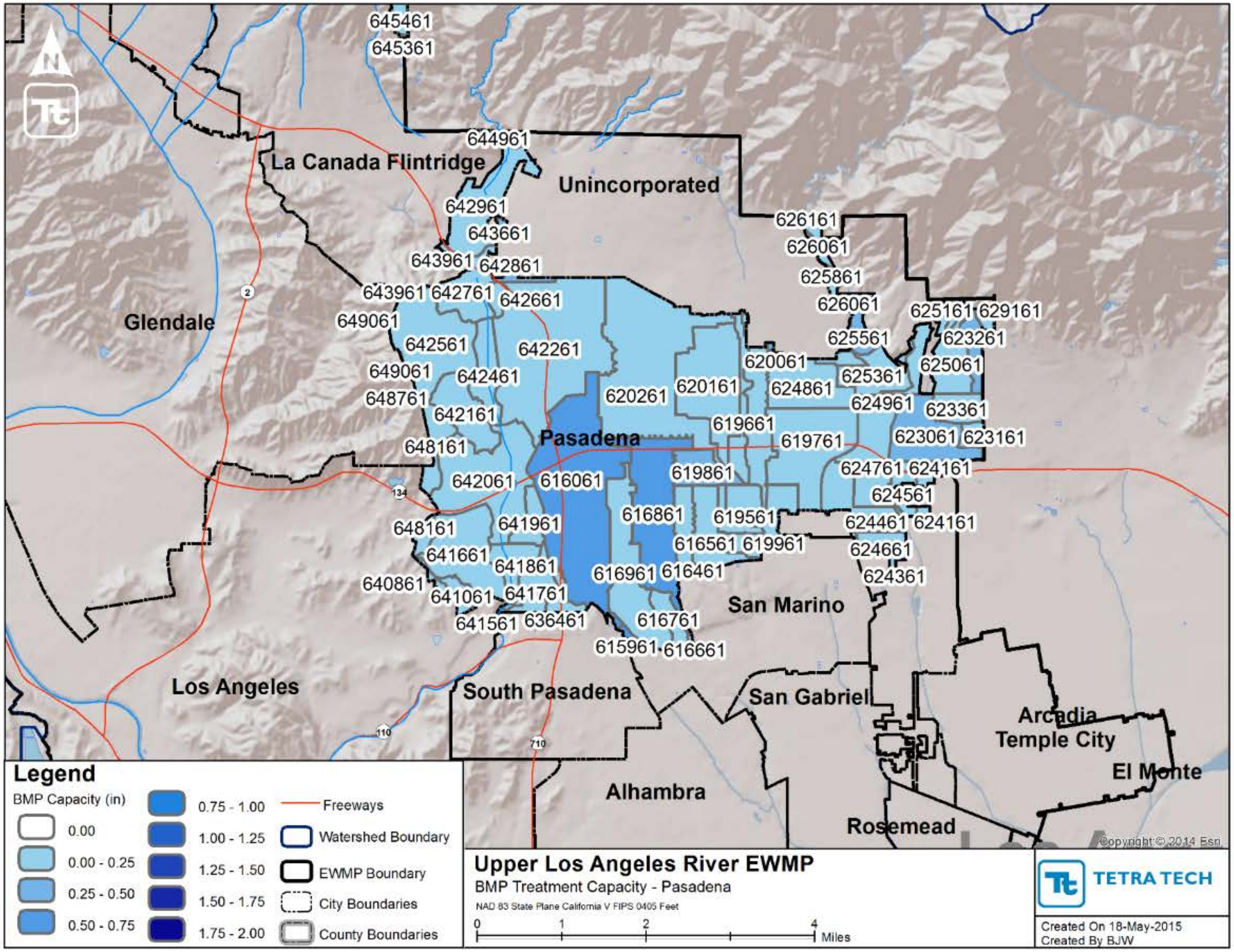


Figure 7.B-11. Pasadena Subwatershed Index Map

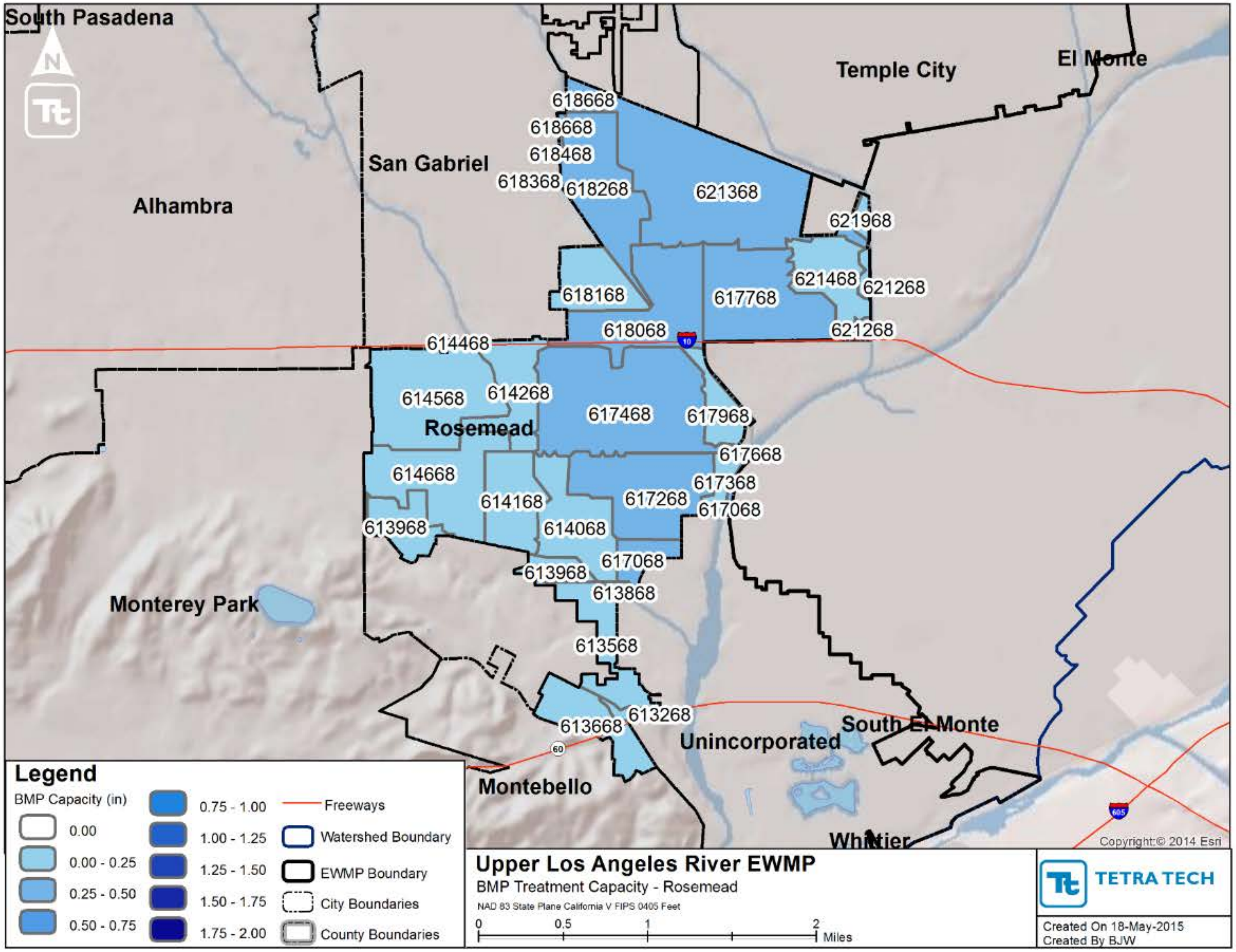


Figure 7.B-12. Rosemead Subwatershed Index Map

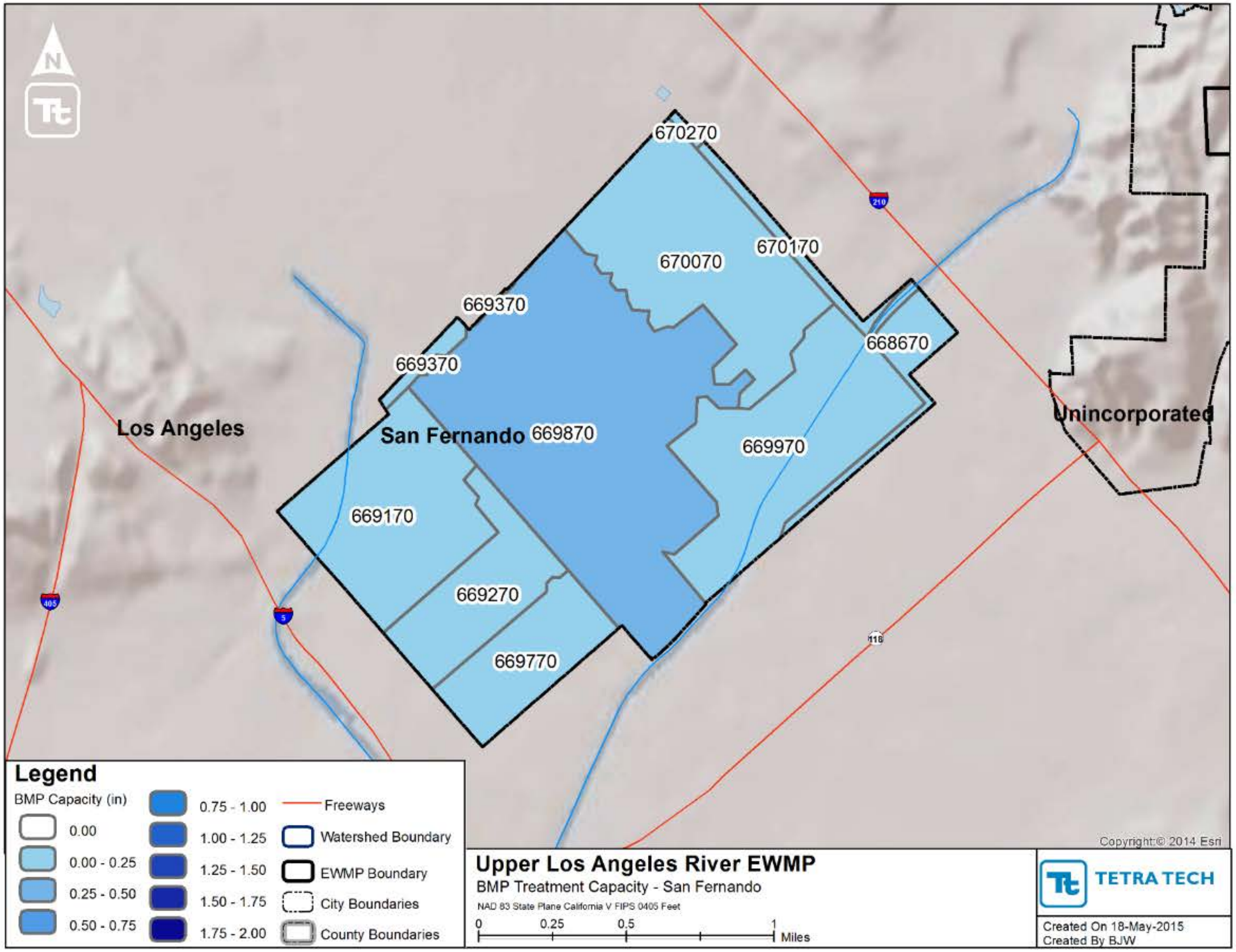


Figure 7.B-13. San Fernando Subwatershed Index Map

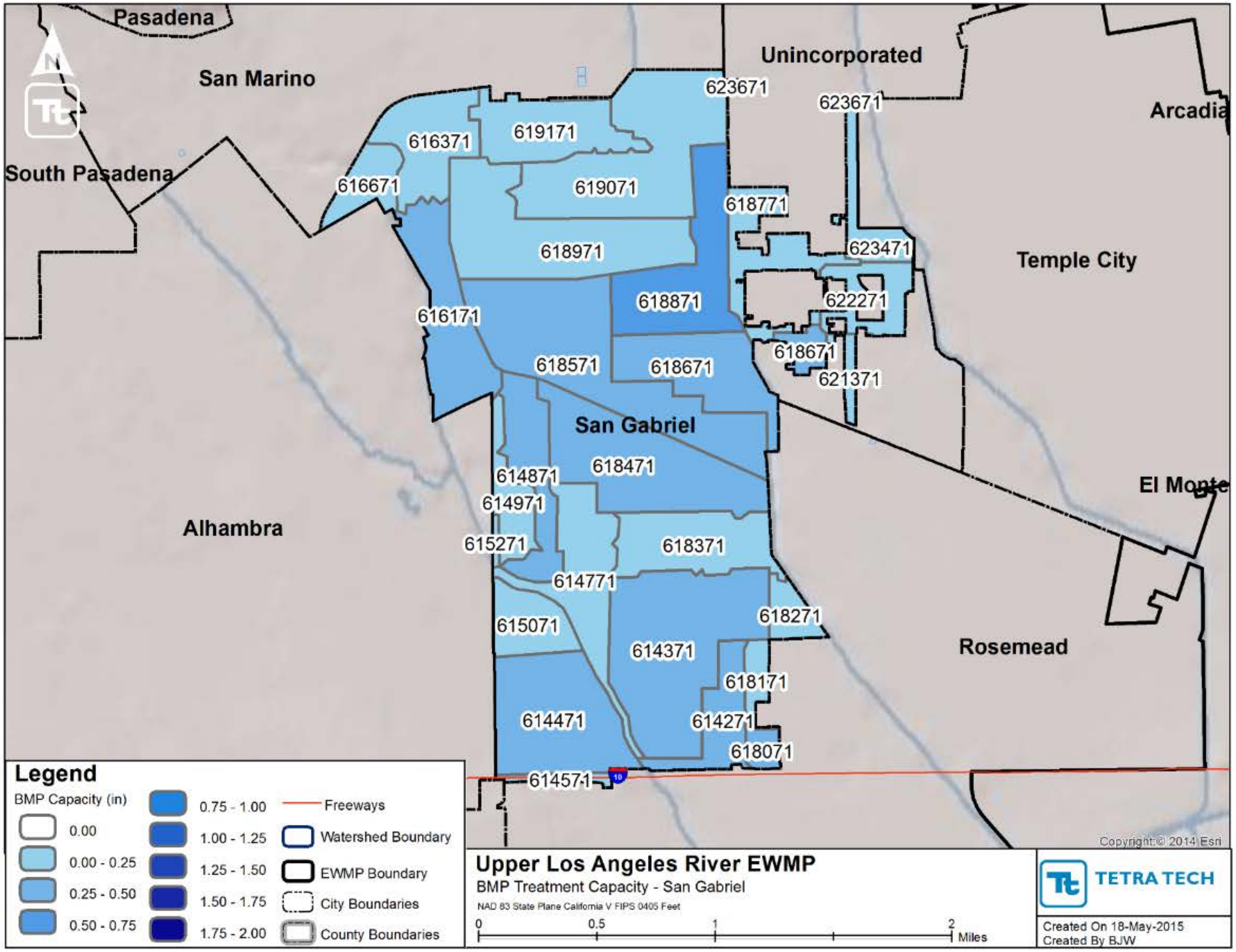


Figure 7.B-14. San Gabriel Subwatershed Index Map

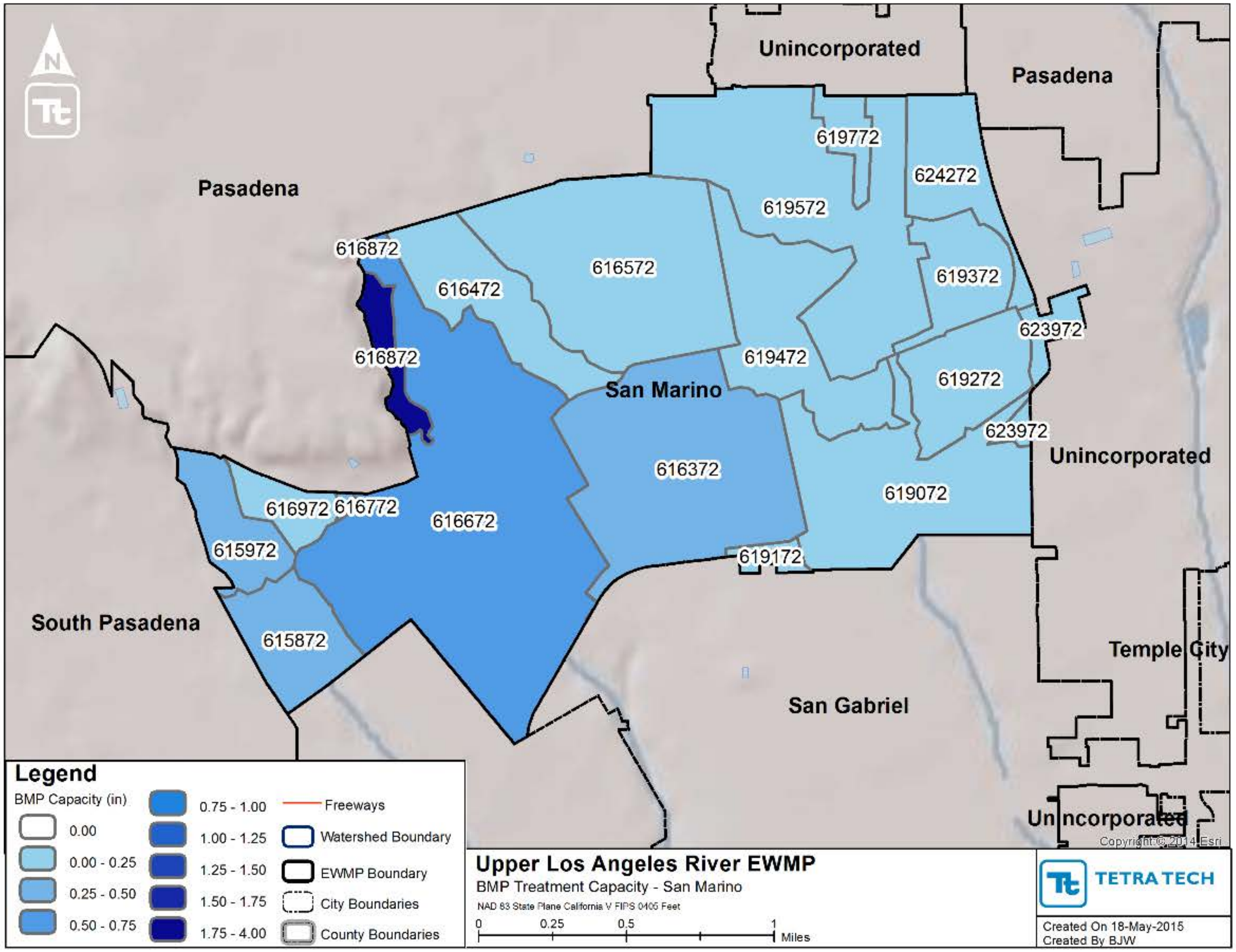


Figure 7.B-15. San Marino Subwatershed Index Map

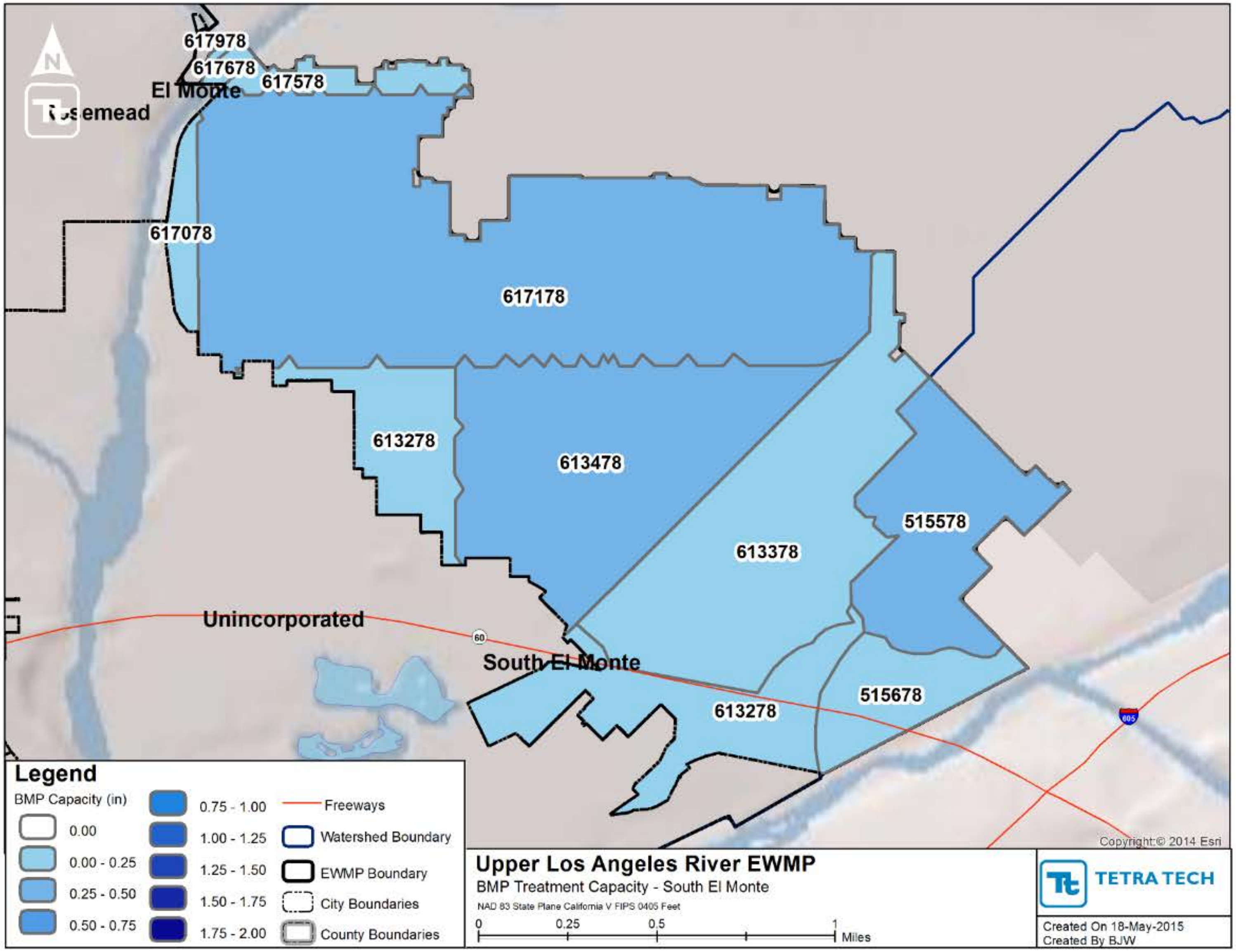


Figure 7.B-16. South El Monte Subwatershed Index Map

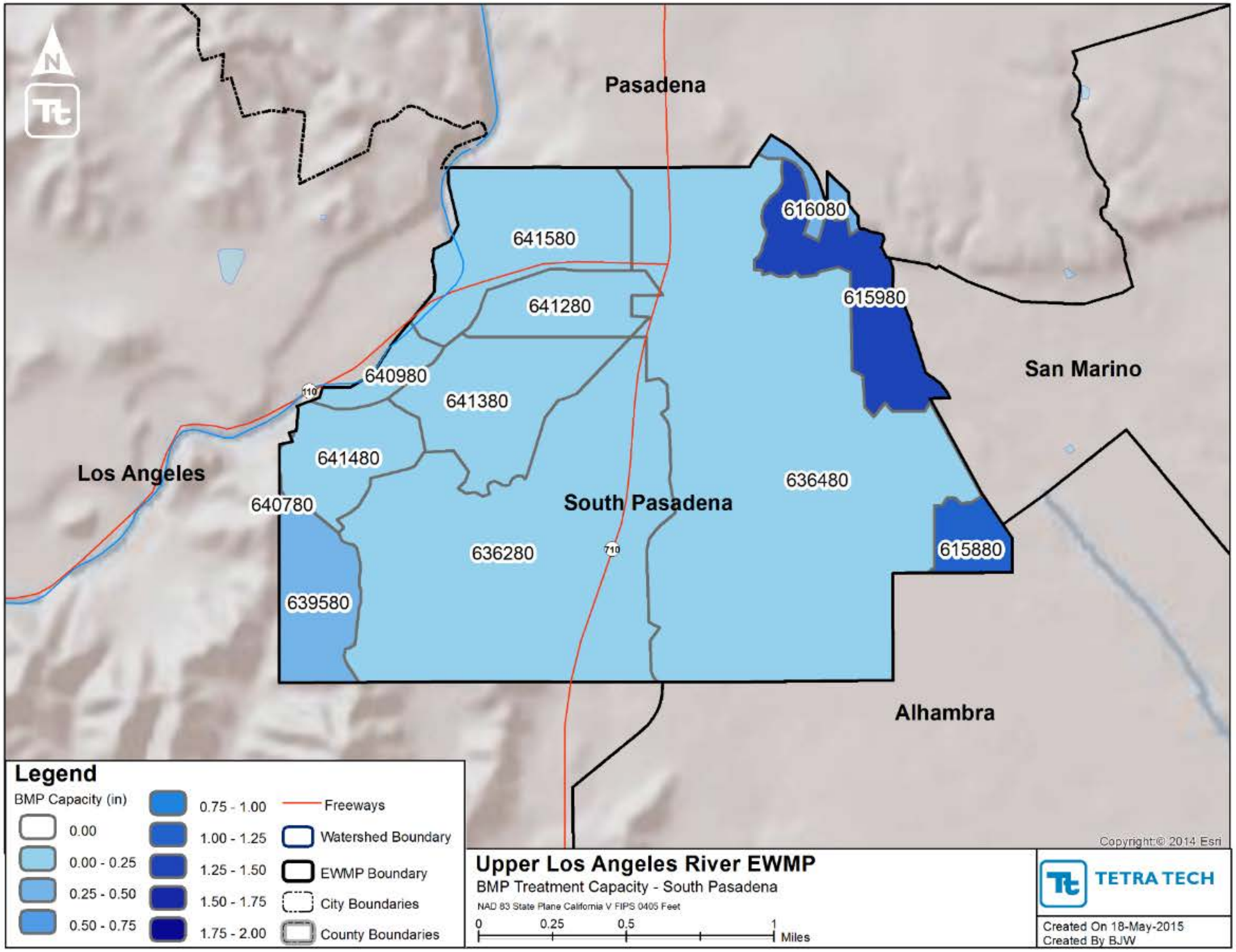


Figure 7.B-17. South Pasadena Subwatershed Index Map

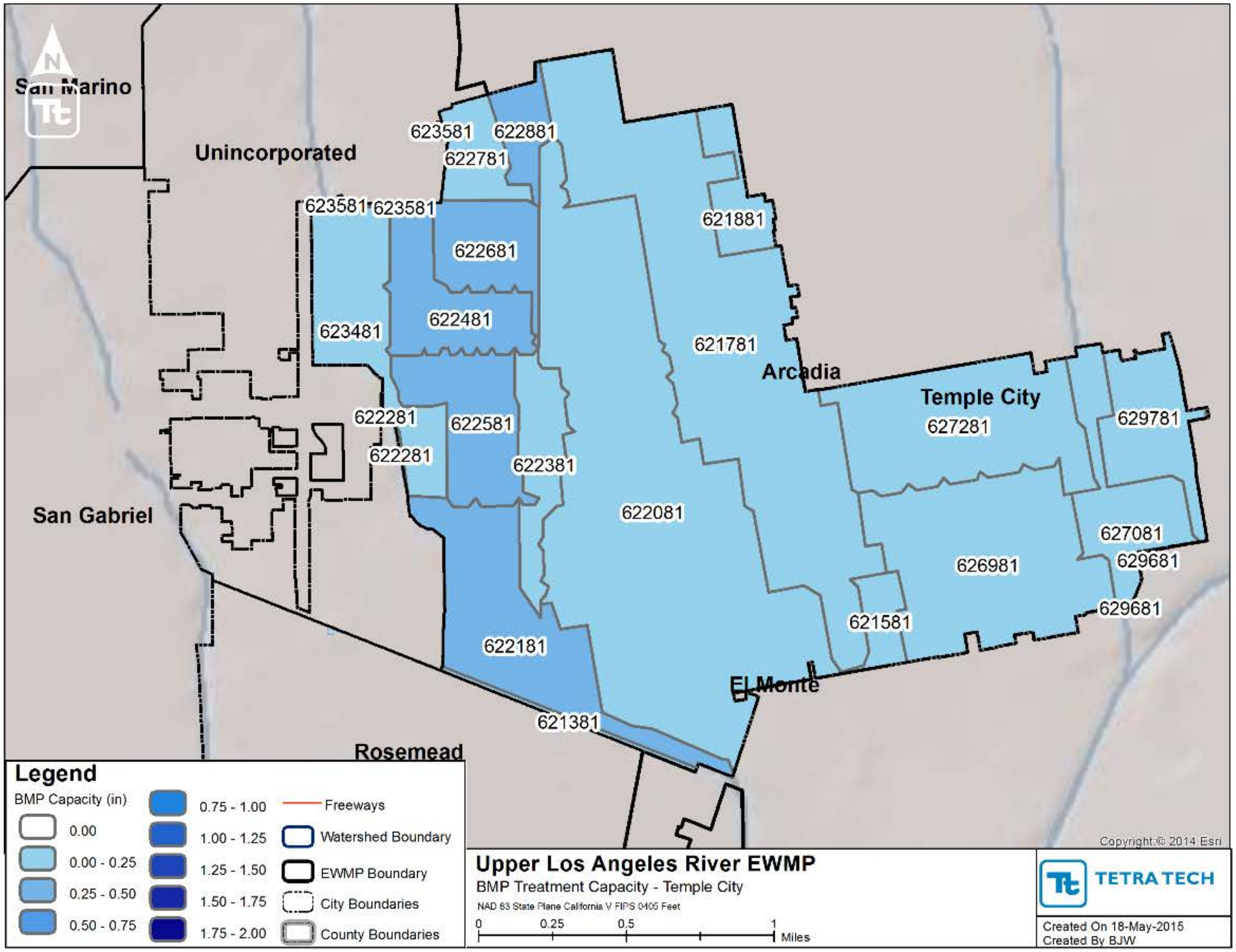


Figure 7.B-18. Temple City Subwatershed Index Map

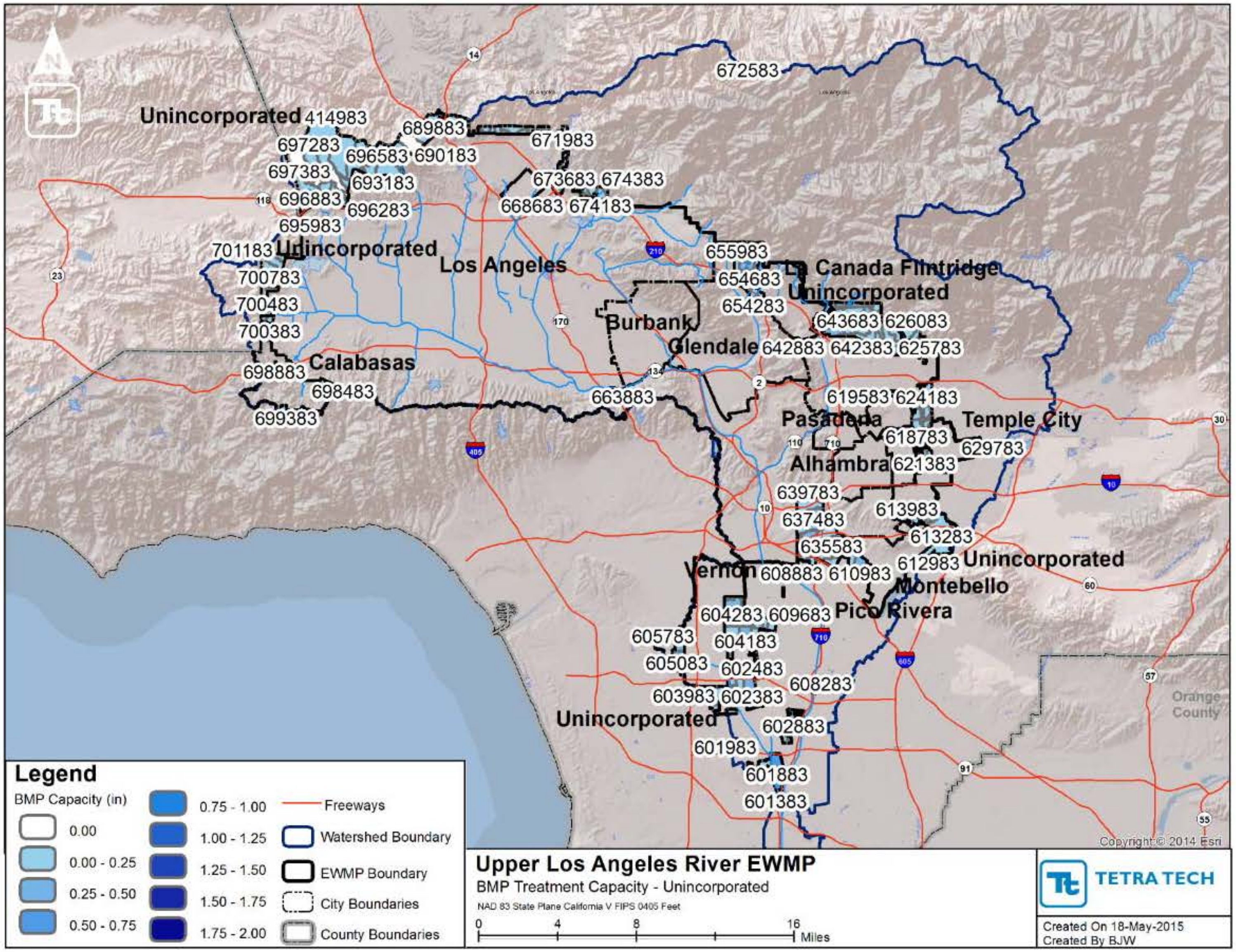


Figure 7.B-19. Unincorporated LA County Subwatershed Index Map

Appendix 7.C
Scheduling of Control Measures for TMDL and EWMP Milestones

These tables present the scheduling of control measures to achieve applicable TMDL and EWMP Milestones. For each milestone, Compliance Targets and an EWMP Implementation Strategy are presented.

The following color-gradients and symbol legend applies to all tables in this appendix.

RED = Relative magnitude of volume to be managed by milestone
BLUE = Relative magnitude of BMP capacities by BMP category and milestone
--- = BMP opportunity was either not available or not selected for the milestone
(a value of 0.0 means that BMP capacity is non-zero but less than 0.04).

LIST OF TABLES:

Table 7C-1. Alhambra: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	3.94	0.2	---	0.0	0.2	0.3	0.0	0.3	---	---	**1.0**
	50% Milestone (2024)	10.61	0.8	---	0.1	1.0	1.4	0.0	0.7	---	---	**4.1**
	Final Metals (2028)	24.86	1.2	---	0.2	1.5	2.9	0.0	0.7	---	9.2	**15.7**
	Final Bacteria (2037)	32.70	1.2	---	0.2	1.5	2.9	0.0	0.7	---	17.0	**23.5**
Rio Hondo	31% Milestone (2017)	12.47	0.2	---	0.1	---	3.6	29.3	0.8	---	---	**34.0**
	50% Milestone (2024)	32.54	1.0	---	0.2	1.0	13.3	64.2	2.7	---	---	**82.5**
	Final Metals (2028)	103.34	2.1	---	0.9	2.6	40.3	64.2	3.4	---	20.5	**133.9**
	Final Bacteria (2037)	119.03	2.1	---	0.9	2.6	40.3	64.2	3.4	---	36.2	**149.6**
Total	**---**	**151.7**	**3.3**	**0.0**	**1.1**	**4.1**	**43.1**	**64.2**	**4.1**	**0.0**	**53.2**	**173.1**

Table 7C-2. Burbank: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Burbank Western Channel	31% Milestone (2017)	8.74	0.2	0.0	0.3	---	2.1	---	3.4	---	---	**6.0**
	50% Milestone (2024)	45.78	1.9	0.0	1.6	1.9	11.5	---	14.5	1.0	---	**32.4**
	Final Metals (2028)	155.18	3.5	0.0	3.8	3.8	31.7	---	15.1	3.1	49.3	**110.3**
	Final Bacteria (2037)	163.14	3.5	0.0	3.8	3.8	31.7	---	15.1	3.1	57.2	**118.2**
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	0.08	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	6.57	0.5	0.0	0.5	0.3	1.4	---	1.1	---	---	**3.9**
	Final Metals (2028)	49.58	2.5	0.0	4.0	4.6	13.4	---	3.5	3.2	0.0	**31.2**
	Final Bacteria (2037)	88.17	2.5	0.0	4.0	4.6	13.4	---	3.5	3.2	38.6	**69.8**
Total	**---**	**251.3**	**6.1**	**0.0**	**7.8**	**8.4**	**45.1**	**0.0**	**18.6**	**6.3**	**95.8**	**188.1**

Table 7C-3. Calabasas: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
McCoy-Dry Canyon Creek	31% Milestone (2017)	6.35	0.4	---	0.3	0.9	0.5	---	2.9	---	---	**5.1**
	50% Milestone (2024)	18.79	0.5	---	0.4	1.4	0.9	---	3.0	---	9.4	**15.6**
	Final Metals (2028)	68.55	0.8	---	0.6	2.0	1.4	---	3.0	---	49.4	**57.1**
	Final Bacteria (2037)	71.65	0.8	---	0.6	2.0	1.4	---	3.0	---	52.5	**60.2**
Total	**---**	**71.6**	**0.8**	**0.0**	**0.6**	**2.0**	**1.4**	**0.0**	**3.0**	**0.0**	**52.5**	**60.2**

Table 7C-4. Glendale: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Arroyo Seco	31% Milestone (2017)	0.00	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	0.03	0.0	---	---	0.0	---	---	0.0	---	0.0	**0.0**
	Final Metals (2028)	0.09	0.0	---	---	0.0	---	---	0.0	---	0.1	**0.1**
	Final Bacteria (2037)	0.14	0.0	---	---	0.0	---	---	0.0	---	0.1	**0.1**
Burbank Western Channel	31% Milestone (2017)	0.17	0.0	---	---	---	0.1	---	---	---	---	**0.1**
	50% Milestone (2024)	1.00	0.0	---	---	0.0	0.5	---	---	---	---	**0.5**
	Final Metals (2028)	3.69	0.1	---	---	0.0	1.1	---	---	---	1.0	**2.3**
	Final Bacteria (2037)	3.82	0.1	---	---	0.0	1.1	---	---	---	1.1	**2.4**
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	0.03	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	11.78	0.4	---	0.1	---	4.2	---	3.1	---	---	**7.8**
	Final Metals (2028)	93.64	4.2	---	1.2	4.5	46.1	---	16.6	---	0.0	**72.6**
	Final Bacteria (2037)	143.31	4.2	---	1.2	4.5	46.1	---	16.6	---	49.7	**122.3**
Verdugo Wash	31% Milestone (2017)	0.06	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	12.46	0.3	0.0	0.1	---	2.9	3.6	2.5	---	---	**9.5**
	Final Metals (2028)	93.60	2.6	0.0	1.5	6.2	32.0	5.3	11.4	---	12.6	**71.7**
	Final Bacteria (2037)	137.34	2.6	0.0	1.5	6.2	32.0	5.3	11.4	---	56.3	**115.4**
Total	**---**	**284.6**	**6.9**	**0.0**	**2.7**	**10.7**	**79.3**	**5.3**	**28.0**	**0.0**	**107.3**	**240.2**

Table 7C-5. Hidden Hills: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Bell Creek	31% Milestone (2017)	0.00	---	---	---	---	0.0	---	---	---	---	**0.0**
	50% Milestone (2024)	0.09	0.0	---	---	0.0	0.1	---	---	---	0.1	**0.1**
	Final Metals (2028)	0.24	0.0	---	---	0.0	0.1	---	---	---	0.2	**0.3**
	Final Bacteria (2037)	0.24	0.0	---	---	0.0	0.1	---	---	---	0.2	**0.3**
McCoy-Dry Canyon Creek	31% Milestone (2017)	2.14	0.0	---	---	0.0	---	---	0.0	---	1.7	**1.7**
	50% Milestone (2024)	4.30	0.0	---	---	0.0	---	---	0.0	---	3.4	**3.4**
	Final Metals (2028)	6.39	0.0	---	---	0.0	---	---	0.0	---	5.0	**5.1**
	Final Bacteria (2037)	6.39	0.0	---	---	0.0	---	---	0.0	---	5.0	**5.1**
Total	**---**	**6.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**5.2**	**5.4**

Table 7C-6. La Canada Flintridge: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Arroyo Seco	31% Milestone (2017)	0.94	0.1	---	0.0	---	0.5	---	0.0	---	---	**0.6**
	50% Milestone (2024)	5.73	0.5	---	0.0	0.7	2.8	---	0.0	---	---	**4.0**
	Final Metals (2028)	24.35	0.9	---	0.0	1.4	6.7	---	0.0	---	8.8	**17.9**
	Final Bacteria (2037)	37.96	0.9	---	0.0	1.4	6.7	---	0.0	---	22.4	**31.5**
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	0.01	0.0	---	---	0.0	0.0	---	---	---	---	**0.0**
	50% Milestone (2024)	0.04	0.0	---	---	0.0	0.0	---	---	---	0.0	**0.0**
	Final Metals (2028)	0.11	0.0	---	---	0.0	0.0	---	---	---	0.1	**0.1**
	Final Bacteria (2037)	0.11	0.0	---	---	0.0	0.0	---	---	---	0.1	**0.1**
Verdugo Wash	31% Milestone (2017)	0.00	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	2.10	0.1	---	0.0	0.3	0.4	---	0.5	---	---	**1.3**
	Final Metals (2028)	9.88	0.2	---	0.0	0.5	1.1	---	0.5	---	4.1	**6.5**
	Final Bacteria (2037)	15.87	0.2	---	0.0	0.5	1.1	---	0.5	---	10.1	**12.4**
Total	**---**	**53.9**	**1.2**	**0.0**	**0.1**	**2.0**	**7.8**	**0.0**	**0.5**	**0.0**	**32.6**	**44.1**

Table 7C-7. Los Angeles: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Aliso Wash	31% Milestone (2017)	30.14	1.2	1.5	0.3	1.3	6.7	0.0	5.2	---	---	**16.2**
	50% Milestone (2024)	79.97	3.2	1.5	1.1	5.5	22.3	0.0	13.9	---	---	**47.5**
	Final Metals (2028)	216.36	5.2	1.5	2.2	9.7	46.6	0.0	15.1	---	73.7	**154.2**
	Final Bacteria (2037)	238.80	5.2	1.5	2.2	9.7	46.6	0.0	15.1	---	96.2	**176.6**
Arroyo Seco	31% Milestone (2017)	3.55	---	0.0	0.0	---	0.2	1.0	---	---	---	**1.2**
	50% Milestone (2024)	13.48	0.2	0.0	0.1	---	1.0	11.3	0.0	---	---	**12.6**
	Final Metals (2028)	51.61	2.0	0.0	1.2	3.3	16.4	17.0	8.8	---	---	**48.8**
	Final Bacteria (2037)	52.92	2.0	0.0	1.2	3.3	16.4	17.0	8.8	---	1.3	**50.1**
Bell Creek	31% Milestone (2017)	0.00	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	6.98	0.7	0.5	0.0	1.9	1.7	---	1.2	---	---	**5.9**
	Final Metals (2028)	25.72	1.4	0.5	0.0	4.7	6.1	---	1.4	---	7.9	**22.0**
	Final Bacteria (2037)	49.82	1.4	0.5	0.0	4.7	6.1	---	1.4	---	32.0	**46.1**
Browns Canyon Wash	31% Milestone (2017)	17.89	1.2	2.1	0.0	1.2	7.4	---	---	---	---	**12.1**
	50% Milestone (2024)	56.09	1.7	2.1	0.0	1.7	12.1	---	---	---	22.6	**40.3**
	Final Metals (2028)	133.54	2.3	2.1	0.1	2.4	18.2	---	---	---	73.2	**98.3**
	Final Bacteria (2037)	134.37	2.3	2.1	0.1	2.4	18.2	---	---	---	74.0	**99.1**

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Bull Creek	31% Milestone (2017)	44.17	1.3	0.1	3.3	0.9	1.8	---	25.6	---	---	**33.1**
	50% Milestone (2024)	85.17	2.5	0.1	7.9	2.9	3.8	---	46.7	---	---	**63.9**
	Final Metals (2028)	239.70	5.9	0.1	25.0	8.3	15.1	---	65.3	---	59.4	**179.1**
	Final Bacteria (2037)	266.37	5.9	0.1	25.0	8.3	15.1	---	65.3	---	86.1	**205.8**
Burbank Western Channel	31% Milestone (2017)	10.12	0.5	1.1	0.0	0.4	2.9	---	0.9	0.2	---	**6.0**
	50% Milestone (2024)	23.73	1.0	1.1	0.0	1.1	8.2	---	1.7	0.8	2.9	**16.8**
	Final Metals (2028)	69.54	1.5	1.1	0.0	1.7	14.1	---	1.7	1.6	28.5	**50.2**
	Final Bacteria (2037)	75.44	1.5	1.1	0.0	1.7	14.1	---	1.7	1.6	34.4	**56.1**
Compton Creek	31% Milestone (2017)	53.03	2.2	0.6	0.0	0.7	27.5	---	5.5	0.5	---	**37.0**
	50% Milestone (2024)	136.14	4.6	0.6	0.0	2.2	78.9	---	8.9	3.0	0.0	**98.3**
	Final Metals (2028)	350.19	7.2	0.6	0.0	3.9	157.3	---	8.9	5.4	82.1	**265.4**
	Final Bacteria (2037)	352.71	7.2	0.6	0.0	3.9	157.3	---	8.9	5.4	84.6	**267.9**
Los Angeles River—above Sepulveda Basin	31% Milestone (2017)	92.75	1.6	0.9	1.1	0.5	10.4	43.8	20.8	---	---	**79.2**
	50% Milestone (2024)	227.08	6.4	0.9	4.3	10.0	44.9	44.9	79.0	---	---	**190.4**
	Final Metals (2028)	668.17	10.5	0.9	9.3	18.2	97.1	44.9	81.1	---	263.9	**525.8**
	Final Bacteria (2037)	697.18	10.5	0.9	9.3	18.2	97.1	44.9	81.1	---	292.9	**554.8**

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	49.77	---	18.5	0.2	---	0.1	15.4	---	---	---	**34.1**
	50% Milestone (2024)	245.92	7.8	18.5	3.6	3.1	17.7	68.0	59.3	---	---	**178.1**
	Final Metals (2028)	785.15	40.2	18.5	28.4	41.5	173.6	92.9	191.0	16.4	6.3	**608.8**
	Final Bacteria (2037)	1,253.03	40.2	18.5	28.4	41.5	173.6	92.9	191.0	16.4	474.2	**1,076.7**
McCoy-Dry Canyon Creek	31% Milestone (2017)	18.24	0.9	0.4	---	2.1	4.9	---	0.4	---	6.7	**15.4**
	50% Milestone (2024)	44.52	1.0	0.4	---	2.5	6.1	---	0.4	---	26.7	**37.1**
	Final Metals (2028)	109.51	1.3	0.4	---	3.4	8.9	---	0.4	---	76.3	**90.7**
	Final Bacteria (2037)	113.96	1.3	0.4	---	3.4	8.9	---	0.4	---	80.8	**95.2**
Tujunga Wash	31% Milestone (2017)	7.30	---	2.2	0.4	---	0.0	0.7	---	---	---	**3.3**
	50% Milestone (2024)	80.37	3.9	2.2	4.5	3.1	6.8	2.5	29.1	---	---	**52.3**
	Final Metals (2028)	288.31	16.0	2.2	33.3	24.9	52.7	2.7	64.8	0.0	14.0	**210.6**
	Final Bacteria (2037)	504.71	16.0	2.2	33.3	24.9	52.7	2.7	64.8	0.0	230.4	**427.0**
Verdugo Wash	31% Milestone (2017)	0.49	0.1	0.0	---	0.2	0.1	---	---	---	---	**0.3**
	50% Milestone (2024)	4.35	0.2	0.0	---	0.5	0.4	---	---	---	2.0	**3.1**
	Final Metals (2028)	10.66	0.3	0.0	---	0.7	0.6	---	---	---	6.2	**7.7**
	Final Bacteria (2037)	13.11	0.3	0.0	---	0.7	0.6	---	---	---	8.6	**10.1**
Total	**---**	**3,752.4**	**93.6**	**27.9**	**99.5**	**122.7**	**606.9**	**157.5**	**438.6**	**23.4**	**1,495.3**	**3,065.5**

Table 7C-8. Montebello: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Rio Hondo	31% Milestone (2017)	15.35	0.6	---	0.8	0.0	2.9	---	6.5	---	---	**10.9**
	50% Milestone (2024)	39.31	1.7	---	1.9	1.1	7.4	---	15.7	0.9	---	**28.6**
	Final Metals (2028)	127.04	4.4	---	7.4	3.6	29.5	---	22.9	8.3	19.1	**95.2**
	Final Bacteria (2037)	156.47	4.4	---	7.4	3.6	29.5	---	22.9	8.3	48.5	**124.6**
Total	**---**	**156.5**	**4.4**	**0.0**	**7.4**	**3.6**	**29.5**	**0.0**	**22.9**	**8.3**	**48.5**	**124.6**

Table 7C-9. Monterey Park: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	0.59	0.1	0.0	0.0	---	0.3	---	0.2	---	---	**0.6**
	50% Milestone (2024)	2.76	0.3	0.0	0.0	---	0.9	---	1.0	0.0	---	**2.3**
	Final Metals (2028)	7.22	0.5	0.0	0.0	---	2.7	---	1.2	0.2	---	**4.7**
	Final Bacteria (2037)	11.30	0.5	0.0	0.0	---	2.7	---	1.2	0.2	4.1	**8.7**
Rio Hondo	31% Milestone (2017)	13.70	0.3	0.4	0.0	---	2.3	1.2	4.3	---	---	**8.5**
	50% Milestone (2024)	33.66	0.9	0.4	0.1	---	6.1	1.8	14.4	1.1	---	**24.8**
	Final Metals (2028)	105.39	2.2	0.4	0.3	---	23.7	1.8	17.4	11.2	30.4	**87.3**
	Final Bacteria (2037)	118.33	2.2	0.4	0.3	---	23.7	1.8	17.4	11.2	43.3	**100.3**
Total	**---**	**129.6**	**2.7**	**0.4**	**0.3**	**0.0**	**26.4**	**1.8**	**18.6**	**11.4**	**47.4**	**109.0**

Table 7C-10. Pasadena: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Arroyo Seco	31% Milestone (2017)	6.93	0.1	0.0	0.7	---	0.0	0.0	2.2	---	---	**3.0**
	50% Milestone (2024)	13.85	0.4	0.0	1.2	0.3	0.0	0.0	4.7	---	---	**6.6**
	Final Metals (2028)	47.69	1.7	0.0	10.7	2.7	0.2	0.0	11.7	---	---	**27.0**
	Final Bacteria (2037)	55.26	1.7	0.0	10.7	2.7	0.2	0.0	11.7	---	7.6	**34.6**
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	0.12	0.0	---	---	---	0.1	0.0	0.0	---	---	**0.1**
	50% Milestone (2024)	0.39	0.0	---	---	0.1	0.2	0.0	0.0	---	---	**0.3**
	Final Metals (2028)	1.37	0.1	---	---	0.2	0.7	0.0	0.0	---	---	**0.9**
	Final Bacteria (2037)	2.31	0.1	---	---	0.2	0.7	0.0	0.0	---	0.9	**1.9**
Rio Hondo	31% Milestone (2017)	35.99	0.7	---	1.0	0.1	8.0	9.6	12.0	---	---	**31.5**
	50% Milestone (2024)	85.15	2.0	---	2.3	2.0	19.8	14.4	30.3	0.3	---	**71.2**
	Final Metals (2028)	261.51	5.2	---	9.2	6.7	79.3	14.4	46.4	3.1	32.6	**196.8**
	Final Bacteria (2037)	290.21	5.2	---	9.2	6.7	79.3	14.4	46.4	3.1	61.3	**225.6**
Total	**---**	**347.8**	**7.0**	**0.0**	**19.9**	**9.5**	**80.2**	**14.4**	**58.1**	**3.1**	**69.8**	**262.0**

Table 7C-11. Rosemead: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	**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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Rio Hondo	31% Milestone (2017)	12.80	0.6	---	0.1	0.6	4.7	---	1.6	---	---	**7.6**
	50% Milestone (2024)	34.21	1.4	---	0.3	1.9	15.5	---	2.7	---	---	**21.9**
	Final Metals (2028)	92.03	2.1	---	0.6	3.1	28.6	---	2.7	---	27.9	**65.1**
	Final Bacteria (2037)	106.10	2.1	---	0.6	3.1	28.6	---	2.7	---	42.0	**79.2**
Total	**---**	**106.1**	**2.1**	**0.0**	**0.6**	**3.1**	**28.6**	**0.0**	**2.7**	**0.0**	**42.0**	**79.2**

Table 7C-12. San Fernando: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Tujunga Wash	31% Milestone (2017)	4.74	---	---	0.0	---	---	4.0	---	---	---	**4.0**
	50% Milestone (2024)	10.20	0.1	---	0.1	---	0.0	8.5	0.1	---	---	**8.7**
	Final Metals (2028)	20.99	1.2	---	0.7	1.5	0.0	13.4	1.4	---	---	**18.2**
	Final Bacteria (2037)	32.98	1.2	---	0.7	1.5	0.0	13.4	1.4	---	12.0	**30.2**
Total	**---**	**33.0**	**1.2**	**0.0**	**0.7**	**1.5**	**0.0**	**13.4**	**1.4**	**0.0**	**12.0**	**30.2**

Table 7C-13. San Gabriel: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Rio Hondo	31% Milestone (2017)	9.79	0.3	---	0.1	0.3	3.4	---	2.5	---	---	**6.6**
	50% Milestone (2024)	26.33	0.9	---	0.2	1.4	10.3	---	5.6	---	---	**18.4**
	Final Metals (2028)	74.07	1.6	---	0.5	2.8	27.0	---	6.1	---	16.2	**54.2**
	Final Bacteria (2037)	85.97	1.6	---	0.5	2.8	27.0	---	6.1	---	28.1	**66.1**
Total	**---**	**86.0**	**1.6**	**0.0**	**0.5**	**2.8**	**27.0**	**0.0**	**6.1**	**0.0**	**28.1**	**66.1**

Table 7C-14. San Marino: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Rio Hondo	31% Milestone (2017)	5.85	---	---	0.0	---	1.1	8.6	---	---	---	**9.6**
	50% Milestone (2024)	14.27	0.3	---	0.0	0.6	5.6	35.6	0.0	---	---	**42.2**
	Final Metals (2028)	45.26	0.8	---	0.1	2.1	21.8	35.6	0.0	---	4.0	**64.4**
	Final Bacteria (2037)	52.42	0.8	---	0.1	2.1	21.8	35.6	0.0	---	11.1	**71.6**
Total	**---**	**52.4**	**0.8**	**0.0**	**0.1**	**2.1**	**21.8**	**35.6**	**0.0**	**0.0**	**11.1**	**71.6**

Table 7C-15. South El Monte: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Rio Hondo	31% Milestone (2017)	9.32	0.5	0.7	0.4	0.1	1.0	---	3.9	---	---	**6.7**
	50% Milestone (2024)	30.03	1.3	0.7	1.3	0.5	3.7	---	6.2	---	7.2	**21.0**
	Final Metals (2028)	55.57	1.7	0.7	1.9	0.7	5.6	---	6.2	---	21.9	**38.7**
	Final Bacteria (2037)	68.55	1.7	0.7	1.9	0.7	5.6	---	6.2	---	34.8	**51.7**
San Gabriel River	10% Milestone (2017)	---	---	---	---	---	---	---	---	---	---	**0.0**
	35% Milestone (2020)	2.24	0.1	---	0.2	0.1	0.6	0.2	---	0.4	---	**1.6**
	65% Milestone (2023)	5.30	0.1	---	0.3	0.1	1.2	0.2	---	1.2	0.5	
	Final Metals (2026)	8.72	0.2	---	0.5	0.2	1.8	0.2	---	1.7	1.4	**6.1**
	Final Bacteria (2040)	9.33	0.2	---	0.5	0.2	1.8	0.2	---	1.7	2.0	**6.7**
Total	**---**	**77.9**	**1.9**	**0.7**	**2.4**	**0.9**	**7.4**	**0.2**	**6.2**	**1.7**	**36.8**	**58.4**

Table 7C-16. South Pasadena: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Arroyo Seco	31% Milestone (2017)	0.00	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	0.73	0.0	0.1	0.0	---	0.4	0.1	0.2	---	---	**0.7**
	Final Metals (2028)	5.29	0.2	0.1	0.2	0.3	3.5	0.1	0.6	---	---	**5.1**
	Final Bacteria (2037)	5.34	0.2	0.1	0.2	0.3	3.5	0.1	0.6	---	0.0	**5.2**
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	0.01	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	4.40	0.2	---	0.0	0.2	1.2	0.0	4.4	---	---	**6.0**
	Final Metals (2028)	19.75	0.6	---	0.0	1.4	8.0	0.0	9.7	---	0.6	**20.5**
	Final Bacteria (2037)	26.37	0.6	---	0.0	1.4	8.0	0.0	9.7	---	7.3	**27.1**
Rio Hondo	31% Milestone (2017)	0.23	---	---	---	---	0.0	0.9	---	---	---	**1.0**
	50% Milestone (2024)	1.75	0.0	---	---	0.0	0.3	15.0	0.2	---	---	**15.6**
	Final Metals (2028)	5.64	0.1	---	---	0.1	2.3	15.0	0.4	---	0.1	**18.1**
	Final Bacteria (2037)	6.03	0.1	---	---	0.1	2.3	15.0	0.4	---	0.5	**18.4**
Total	**---**	**37.7**	**1.0**	**0.1**	**0.3**	**1.9**	**13.8**	**15.2**	**10.8**	**0.0**	**7.8**	**50.8**

Table 7C-17. Temple City: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Rio Hondo	31% Milestone (2017)	0.02	---	---	---	---	---	---	---	---	---	**0.0**
	50% Milestone (2024)	16.86	0.6	---	0.5	---	9.5	---	1.3	1.0	---	**12.9**
	Final Metals (2028)	62.00	1.5	---	1.4	---	33.3	---	1.6	6.0	5.0	**48.7**
	Final Bacteria (2037)	67.35	1.5	---	1.4	---	33.3	---	1.6	6.0	10.3	**54.0**
Total	**---**	**67.4**	**1.5**	**0.0**	**1.4**	**0.0**	**33.3**	**0.0**	**1.6**	**6.0**	**10.3**	**54.0**

Table 7C-18. Uninc. LA County: Targets and EWMP Implementation Plan for Interim and Final Compliance

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Aliso Wash	31% Milestone (2017)	1.28	0.2	---	---	---	---	---	---	---	1.0	**1.2**
	50% Milestone (2024)	1.64	0.2	---	---	---	---	---	---	---	1.3	**1.5**
	Final Metals (2028)	4.20	0.2	---	---	---	---	---	---	---	3.6	**3.8**
	Final Bacteria (2037)	4.65	0.2	---	---	---	---	---	---	---	4.0	**4.2**
Arroyo Seco	31% Milestone (2017)	1.60	0.0	0.0	0.1	---	0.2	---	0.0	---	---	**0.4**
	50% Milestone (2024)	12.68	0.2	0.0	0.2	0.3	0.6	---	8.3	---	---	**9.7**
	Final Metals (2028)	41.51	1.0	0.0	1.5	2.9	4.5	---	22.5	0.4	---	**33.0**
	Final Bacteria (2037)	45.42	1.0	0.0	1.5	2.9	4.5	---	22.5	0.4	3.9	**36.9**
Bell Creek	31% Milestone (2017)	0.04	0.0	---	---	0.0	0.0	---	0.0	---	---	**0.0**
	50% Milestone (2024)	0.39	0.0	---	---	0.1	0.0	---	0.0	---	0.2	**0.3**
	Final Metals (2028)	0.89	0.0	---	---	0.1	0.1	---	0.0	---	0.5	**0.8**
	Final Bacteria (2037)	0.92	0.0	---	---	0.1	0.1	---	0.0	---	0.6	**0.8**
Browns Canyon Wash	31% Milestone (2017)	0.79	0.1	0.0	---	0.0	0.0	---	---	---	0.6	**0.7**
	50% Milestone (2024)	1.79	0.1	0.0	---	0.0	0.0	---	---	---	1.5	**1.6**
	Final Metals (2028)	6.50	0.1	0.0	---	0.1	0.0	---	---	---	7.8	**8.0**
	Final Bacteria (2037)	6.58	0.1	0.0	---	0.1	0.0	---	---	---	7.9	**8.1**

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
Bull Creek	31% Milestone (2017)	4.46	0.0	---	---	---	---	---	4.6	---	---	**4.6**
	50% Milestone (2024)	7.95	0.0	---	---	---	---	---	8.3	---	---	**8.4**
	Final Metals (2028)	20.18	0.1	---	---	---	---	---	18.5	---	0.4	**19.0**
	Final Bacteria (2037)	20.52	0.1	---	---	---	---	---	18.5	---	0.7	**19.4**
Compton Creek	31% Milestone (2017)	30.71	0.3	0.4	0.5	---	3.1	20.9	0.0	---	---	**25.1**
	50% Milestone (2024)	61.21	1.0	0.4	1.1	0.2	6.6	32.2	6.5	---	---	**48.1**
	Final Metals (2028)	203.28	5.3	0.4	9.1	3.9	62.1	32.3	18.0	10.3	24.2	**165.5**
	Final Bacteria (2037)	208.06	5.3	0.4	9.1	3.9	62.1	32.3	18.0	10.3	29.0	**170.2**
Los Angeles River—above Sepulveda Basin	31% Milestone (2017)	2.14	0.1	---	---	0.2	0.0	---	---	---	1.8	**2.1**
	50% Milestone (2024)	3.02	0.1	---	---	0.2	0.0	---	---	---	2.5	**2.8**
	Final Metals (2028)	8.72	0.1	---	---	0.3	0.0	---	---	---	7.7	**8.1**
	Final Bacteria (2037)	9.16	0.1	---	---	0.3	0.0	---	---	---	8.1	**8.5**
Los Angeles River—below Sepulveda Basin	31% Milestone (2017)	6.40	0.4	0.1	0.5	---	1.2	---	3.1	---	---	**5.4**
	50% Milestone (2024)	24.44	1.6	0.1	1.6	1.1	3.8	---	10.2	2.8	---	**21.1**
	Final Metals (2028)	67.63	3.7	0.1	5.6	2.8	14.9	---	13.2	17.3	4.0	**61.6**
	Final Bacteria (2037)	101.58	3.7	0.1	5.6	2.8	14.9	---	13.2	17.3	37.9	**95.5**

Assessment Area	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)									
			Low-Impact Development				Streets	Regional BMPs				
	EWMP Milestone	24-hour Volume Managed (acre-ft)	Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private	Cumulative BMP Capacity (acre-ft)
McCoy-Dry Canyon Creek	31% Milestone (2017)	1.80	0.1	---	---	0.0	---	---	0.0	---	1.3	**1.4**
	50% Milestone (2024)	4.57	0.1	---	---	0.1	---	---	0.0	---	3.6	**3.8**
	Final Metals (2028)	8.35	0.1	---	---	0.1	---	---	0.0	---	6.8	**7.0**
	Final Bacteria (2037)	8.36	0.1	---	---	0.1	---	---	0.0	---	6.8	**7.0**
Rio Hondo	31% Milestone (2017)	15.54	0.4	0.1	0.2	0.0	6.0	---	4.0	---	---	**10.7**
	50% Milestone (2024)	43.24	1.1	0.1	0.5	2.0	15.7	---	10.7	0.5	---	**30.5**
	Final Metals (2028)	132.83	2.7	0.1	2.0	6.4	59.9	---	15.7	3.6	7.8	**98.1**
	Final Bacteria (2037)	148.47	2.7	0.1	2.0	6.4	59.9	---	15.7	3.6	23.4	**113.7**
Tujunga Wash	31% Milestone (2017)	0.72	0.0	---	0.0	---	0.0	---	0.5	---	---	**0.6**
	50% Milestone (2024)	2.11	0.1	---	0.0	0.0	0.0	---	1.6	---	---	**1.7**
	Final Metals (2028)	5.54	0.3	---	0.0	0.1	0.3	---	2.6	---	1.3	**4.6**
	Final Bacteria (2037)	6.43	0.3	---	0.0	0.1	0.3	---	2.6	---	2.2	**5.5**
Verdugo Wash	31% Milestone (2017)	2.93	0.0	0.1	0.2	---	0.2	---	1.3	---	---	**1.8**
	50% Milestone (2024)	12.32	0.2	0.1	0.5	0.4	0.7	---	6.4	0.2	---	**8.6**
	Final Metals (2028)	38.35	0.9	0.1	3.4	2.3	4.6	---	11.9	3.8	---	**27.0**
	Final Bacteria (2037)	51.65	0.9	0.1	3.4	2.3	4.6	---	11.9	3.8	13.3	**40.3**
Total	**---**	**611.8**	**14.6**	**0.6**	**21.6**	**19.0**	**146.4**	**32.3**	**102.6**	**35.4**	**137.9**	**510.2**

Appendix 7.D

Load Reduction Strategy for Segment B of the Los Angeles River

>>Bacteria TMDL<<

Load Reduction Strategy

for Segment B of the Los Angeles River

SUBMITTED BY:

Upper Los Angeles River Enhanced Watershed Management Program Group

(cities of Los Angeles, Alhambra, South Pasadena, Monterey Park, Unincorporated Los Angeles County and the Los Angeles County Flood Control District)

LA SANITATION environment CITY OF LOS ANGELES

City of Alhambra

CITY OF MONTEREY PARK CALIFORNIA

COUNTY OF LOS ANGELES CALIFORNIA

COUNTY OF LOS ANGELES FLOOD CONTROL DISTRICT

CITY OF SOUTH PASADENA CALIFORNIA

PARADIGM ENVIRONMENTAL

ENGINEERING SUPPORT PROVIDED BY TETRA TECH

EXECUTIVE SUMMARY

This document describes the Load Reduction Strategy (LRS) for Segment B of the LA River for the Upper Los Angeles River Enhanced Watershed Management Program Group (ULAR EWMP Group), which addresses portions of the cities of Los Angeles, Alhambra, South Pasadena, Montebello, Monterey Park, Pasadena and Unincorporated Los Angeles County and the Los Angeles County Flood Control District. The Los Angeles River Watershed Bacteria Total Maximum Daily Load (Bacteria TMDL) presents the LRS as an optional dry-weather compliance approach. By developing and implementing the optional LRS approach, the ULAR EWMP Group qualifies for a second phase of Bacteria TMDL implementation, if needed.

A total of 37 outfalls in the proximity of the ULAR EWMP Group were flowing during "snapshot" monitoring by the Bacteria Source Identification Study (BSI Study; CREST, 2008). To simulate the loading of *E. coli* from the ULAR EWMP Group, a Monte Carlo model was developed based on the monitoring data collected during the Bacteria Source Identification Study. The ULAR EWMP Group represents 59.6% of the Segment B drainage area and the proportional final dry-weather wasteload allocation (WLA) for the Group is 285 billion MPN per day.

The LRS process is based around identification of, and implementation actions for, two categories of outfalls, as follows:

- **Priority Outfalls** – the LRS prioritization process highlights the Priority Outfalls because they have the highest loading rates of *E. coli* according to a Monte Carlo model. Generally, Priority Outfalls have relatively consistent, problematic discharges that drive storm drain loading rates above the WLAs. As such, Priority Outfalls are the highest priority for source abatement and are subject to <u>*specific implementation actions*</u> in the LRS.
    - Four Priority Outfalls were identified, R2-A, R2-K, R2-02 and R2-04, and conceptual reports are presented herein for structural actions to address these outfalls. In fact, R2-A and R2-K have already been addressed by actions that are currently operational. Some of the projects include innovative green infrastructure and re-use elements.
- **Outlier Outfalls** – as a validation step, Outlier Outfalls are identified by retrospectively comparing the results of the Monte Carlo simulations to the "raw" monitoring data. Due to episodic, high loading-rate *E. coli* discharges from these outfalls, there may be instances where the Outlier Outfalls could drive the storm drain *E. coli* loading above the WLA. Outlier Outfalls, which generally exhibit infrequently high loading rates, are subject to <u>*follow-up investigations*</u> during LRS implementation.
    - A total of <u>four</u> outfalls – R2-E, R2-G, R2-T and R2-NEW-14 – are categorized as Outlier Outfalls for the ULAR EWMP Group because they caused loading from the ULAR EWMP Group to be above the WLA during three (3) of the snapshot events even if Priority Outfalls would have been addressed at the time of monitoring. None of the Outlier Outfalls was problematic during more than one event.

The structural LRS actions for the four (4) Priority Outfalls and source investigation efforts for the four (4) Outlier Outfalls will be completed by March 2019. By March 2022, the outfalls that discharge runoff from the ULAR EWMP Group to Segment B will be subject to three (3) post-LRS snapshots that measure flow rate and *E. coli* from each outfall. The results of that monitoring will be used to verify the LRS actions described herein resulted in attainment of the WLA. If the loading from the ULAR EWMP Group is measured to be *above* the WLA, then a revised "second phase" LRS will be submitted to the Regional Board by March 2023.

Contents

Figures

Tables

1 OVERVIEW

This document describes the Load Reduction Strategy (LRS) for Segment B of the LA River for the Upper Los Angeles River Enhanced Watershed Management Group (ULAR EWMP Group)[1], which addresses portions of the cities of Los Angeles, Alhambra, South Pasadena, Montebello, Monterey Park, Pasadena and Unincorporated Los Angeles County and the Los Angeles County Flood Control District. The Los Angeles River Watershed Bacteria Total Maximum Daily Load (Bacteria TMDL) presents the LRS as an optional dry-weather compliance approach. As described in the Basin Plan Amendment for the Bacteria TMDL (Resolution No. R10-007), the LRS quantitatively demonstrates that actions contained within the LRS are sufficient to result in attainment of TMDL WLAs. By developing and implementing the optional LRS approach, the ULAR EWMP Group qualifies for a second phase of Bacteria TMDL implementation, if needed.

This document provides background on the Bacteria TMDL and LRS approach and is then organized by the major parts of the LRS process, as follows:

1. Determine the WLA for the ULAR EWMP Group
2. Develop a Monte Carlo model of baseline dry-weather discharges from the ULAR EWMP Group
3. Quantitatively identify the Priority Outfalls and Outlier Outfalls for the ULAR EWMP Group
4. Detail the TMDL implementation actions to be taken by the ULAR EWMP Group

See **Figure 1-1** for a map of Segment B and the jurisdictional areas of the ULAR EWMP Group.

[1] Not all of the jurisdictions in the ULAR EWMP Group drain to Segment B. It is anticipated that LRSs will be developed by the ULAR EWMP Group for each of the LA River segments and tributaries to which the EWMP Group drains, which is all major segments and tributaries named in the LA River Bacteria TMDL except Segment A. Each LRS will have a specific combination of jurisdictions.

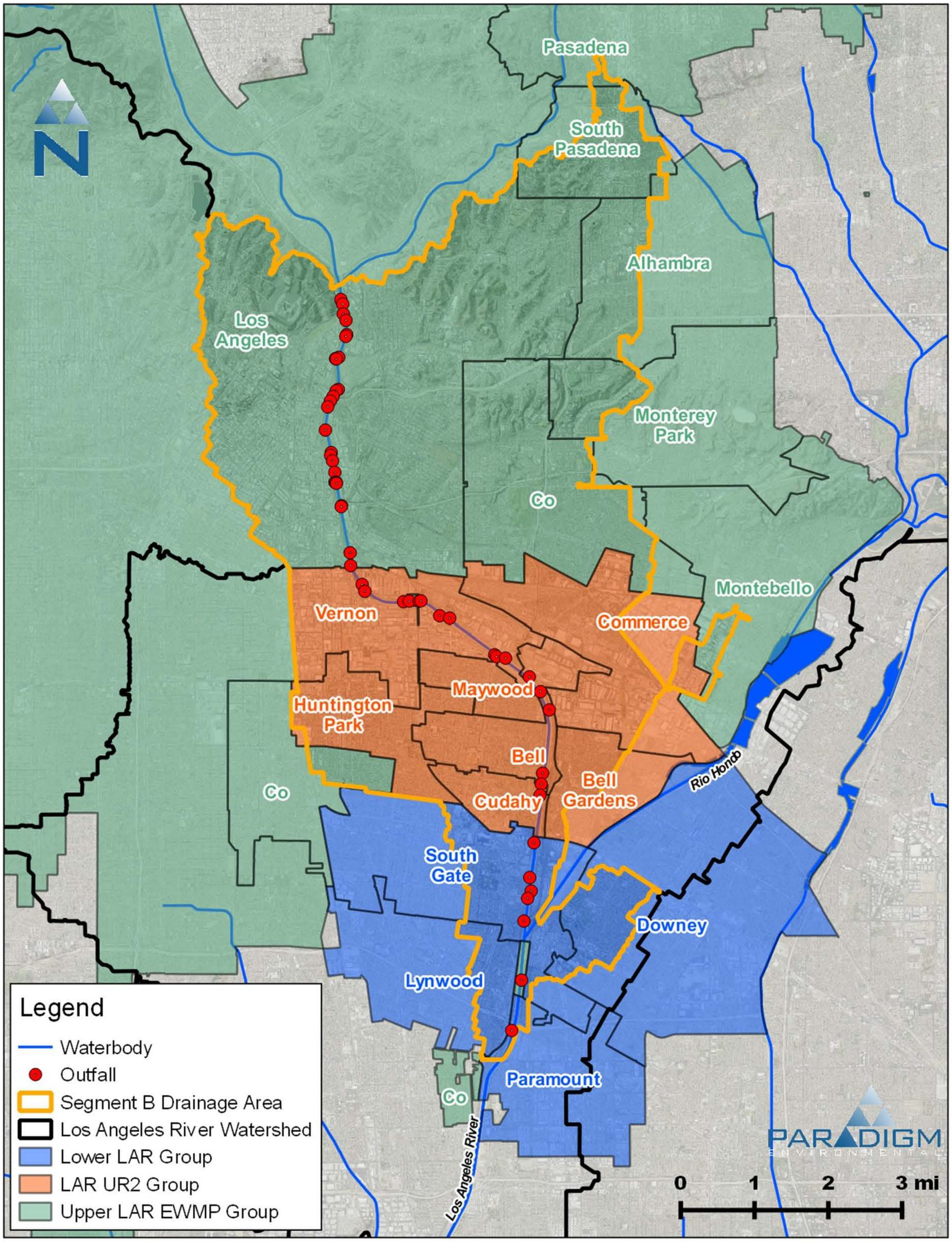


Figure 1-1. Drainage area for Segment B of the LA River and the jurisdictional areas of the ULAR EWMP Group (green) **compared to the other two Groups submitting an LRS for Segment B** (orange and blue)**.**

2 BACKGROUND

This section provides background on the Bacteria TMDL and LRS process.

2.1 Los Angeles River Watershed Bacteria TMDL

The Bacteria TMDL was adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) in 2010 and became effective on March 23, 2012. The Bacteria TMDL was developed to protect recreational uses in the LA River watershed (e.g., swimming) and used the indicator bacterium *E. coli* for targets and WLAs. The requirements of the Bacteria TMDL were incorporated into the MS4 Permit adopted by the Regional Board in December 2012 (see Attachment O, Section D of Order No. R4-2012-0175).

The Bacteria TMDL was developed through a stakeholder process led by the Cleaner Rivers through Stakeholder-led TMDL (CREST) group, which was funded by the City of Los Angeles and included most cities in the watershed, LA County, LACFCD and several environmental non-governmental organizations. One of the innovative elements developed through the CREST process was the LRS approach for dry-weather Bacteria TMDL implementation. To incentivize the LRS approach, the Bacteria TMDL compliance schedule is extended for agencies who develop and implement an LRS, allowing a second phase of implementation, if needed, for the targeted segment/tributary.

Each segment and tributary identified in the TMDL shall be subject to a customized LRS, if elected, per the phased implementation schedule, as shown in **Table 2-1**. The first LRS to be submitted per the phased TMDL implementation schedule is for Segment B, originally due September 2014, and the last LRS is for Segment C and D and their tributaries, due March 2024 (see Attachment O, Section D of the MS4 Permit). The ULAR EWMP Group requested and received approval from the Regional Board to submit the Segment B as an attachment to the ULAR EWMP[2] by June 28, 2015.

For Segment B, the TMDL schedule requires completion of the implementation actions within 4.5 years, by March 23, 2019, in order to qualify for the extended compliance schedule. Follow up monitoring through three (3) "snapshots" that measure storm drain flow rate and *E. coli* concentrations will be analyzed by March 2022 to verify the LRS actions described herein resulted in attainment of the WLA. If the loading from the ULAR EWMP Group is measured to be *above* the WLA, then a revised "second phase" LRS will be submitted to the Regional Board by March 2023.

[2] The LRS process is an important component of the non-stormwater strategy for the ULAR EWMP and has been integrated into the non-stormwater screening program for the Coordinated Integrated Monitoring Program (CIMP) for ULAR.

Table 2-1. Schedule for LRS Submittal and Implementation for Segment B for the ULAR EWMP Group

Implementation Action	Responsible Parties	Deadline
Submit a Load Reduction Strategy (LRS) for Segment B	MS4 Permittees discharging to Segment B	Submit with EWMP (June 2015)
Approve LRS	Regional Board, Executive Officer	6 months after submittal of the LRS (December 2015)
Complete implementation of LRS for Segment B	MS4 Permittees discharging to Segment B	7 years after effective date of the TMDL (March 2019)
Achieve interim or (final) WLA and submit report to Regional Board for Segment B, if using LRS	MS4 Permittees discharging to Segment B, if using LRS	10 years after effective date of the TMDL (March 2022)
Second Phase , If Necessary		
Submit new LRS	MS4 Permittees discharging to Segment B	11 years after effective date of the TMDL (March 2023)
Complete implementation of LRS	MS4 Permittees discharging to Segment B, if using LRS	14.5 years after effective date of the TMDL (Sept. 2026)
Achieve final WLA or demonstrate that non-compliance is only due to upstream contributions and submit report to Regional Board	MS4 Permittees discharging to Segment B, if using LRS	16.5 years after effective date of the TMDL (Sept. 2028)

2.2 Process for the Load Reduction Strategy

As described in the Bacteria TMDL, an LRS is both [1] a suite of actions performed by MS4 Permittees along a Los Angeles River (LA River) segment or tributary and [2] a document submitted to the Regional Board Executive Officer (EO) for approval. The Dry Weather Implementation Plan of the CREST Technical Report describes the requirements for LRSs (CREST, 2010c). Appendix 1 of the CREST Dry Weather Implementation Plan details the LRS methodology including a detailed example and is attached in its entirety to this document as Appendix A.

This LRS was developed using the outfall-based LRS approach[3] outlined in the Bacteria TMDL, which emphasizes reductions of bacteria loading from outfalls that discharge to the LA River. The outfall-based LRS approach is a stepwise, iterative process that includes:

- Monitoring of bacteria discharges from outfalls,
- Identification of implementation actions and modeling of those actions to provide reasonable assurance that WLAs will be achieved,
- Implementation of identified actions to achieve the WLAs,
- Follow-up monitoring/assessment, and

[3] The Bacteria TMDL also envisioned an alternative LRS approach called the Downstream-based LRS which employs "downstream solutions" to comply with receiving water limits. See Appendix A.

- Identification and completion of additional actions, if necessary.

The seven steps associated with the outfall-based approach during implementation are outlined in **Figure 2-1**. This LRS document represents Step 2 for Segment B of the LA River (comparison of *E. coli* loading to the WLA) and Step 3 (development and submittal of an LRS to the Regional Board).

Step 1 of the LRS process, conduct outfall monitoring, was previously completed for Segment B by the CREST group via the BSI Study (CREST, 2008). The BSI Study, which is considered one of the most comprehensive bacteria studies conducted to date, included six "snapshots" that measured dry-weather flow rate and *E. coli* concentration from each flowing outfall along Segment B (see Figure 1-1). The Bacteria TMDL envisioned the BSI Study would be used for the Segment B LRS. For other LRSs, snapshot monitoring data will need to be collected in the future (likely as part of non-stormwater screening programs).

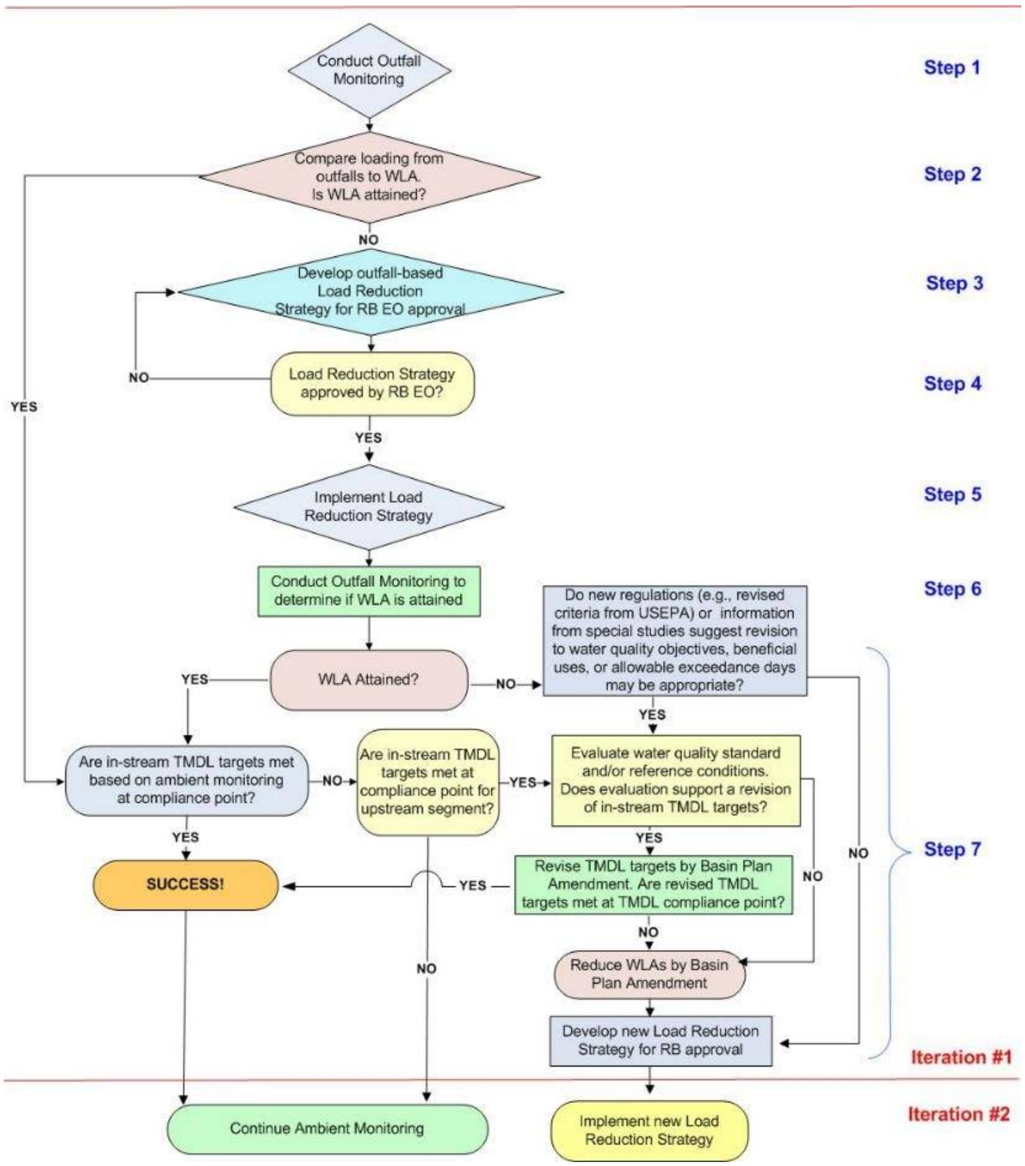


Figure 2-1. Stepwise LRS Process as Described by the Bacteria TMDL.
(reproduced from Figure 9-1 of the 2010 Bacteria TMDL Staff Report)

Per the Bacteria TMDL, the identification of outfalls addressed by the LRS is based on conducting a quantitative analysis (i.e., modeling) to [1] evaluate both the individual and cumulative *E. coli* loading rates from outfalls along Segment B before and after implementation actions, and [2] to prioritize implementation actions based on those *E. coli* loading rates. The primary type of modeling described by the TMDL is Monte Carlo modeling, which was used for this LRS. The LRS process is based around identification of, and implementation actions for, two categories of outfalls, as follows:

- **Priority Outfalls** – the LRS prioritization process highlights the Priority Outfalls because they have the highest loading rates of *E. coli* according to the Monte Carlo model. Generally, Priority Outfalls have relatively consistent, problematic discharges that drive storm drain loading rates above the WLA. As such, Priority Outfalls are the highest priority for source abatement and are subject to specific implementation actions in the LRS.
- **Outlier Outfalls** – as a validation step, Outlier Outfalls are identified by retrospectively comparing the results of the Monte Carlo simulations to the "raw" monitoring data. Due to episodic, high loading rate *E. coli* discharges from these outfalls, there may be instances where the proposed implementation actions for the Priority Outfalls would not have led to the storm drain *E. coli* loading being below the WLA during all of the snapshots. Outlier Outfalls, which are generally outfalls that exhibited infrequently high loading rates, are subject to follow-up investigations during LRS implementation.

Section 5 identifies the Priority and Outlier Outfalls for the ULAR EWMP Group's jurisdiction within Segment B.

3 DETERMINE ALLOWABLE BACTERIA LOADING

In order to identify the required implementation actions for the LRS, the allowable *E. coli* loading from the MS4 must be determined based on the TMDL WLA. As described in this section, the two components of the calculation are [1] calculate the final WLA and [2] proportionally distribute that allocation based on drainage area of the ULAR EWMP Group.

3.1 Calculate the Final WLA for Segment B

The Bacteria TMDL incorporates a load-based approach for dry weather, meaning each segment and tributary of the LA River has an allowable number of *E. coli* to be discharged per day from the MS4 into the receiving water. As stated on page 8 of the Basin Plan Amendment:

> Each LRS must quantitatively demonstrate that the actions contained within the LRS are sufficient to result in attainment of the *final* WLAs. The *interim* WLAs represent a minimum threshold that must be attained after those actions are taken, per the implementation schedule.

The MS4 Permit identifies the load-based interim limits for Segment B, equal to **518 billion MPN per day** (page O-6 of the Permit, Attachment P). The final load-based limits are not specified in the Bacteria TMDL or Permit, instead the following compliance provision is provided for final limits (page O-13 of the Permit, Attachment O):

> Demonstration that the MS4 loading of *E. coli* to the segment or tributary during dry weather is less than or equal to the calculated loading rate that would not cause or contribute to exceedances based on the loading capacity representative of conditions in the River at the time of compliance.

The "calculated loading rate that would not cause or contribute to exceedances" was previously calculated for each segment and tributary in the Dry Weather Linkage Analysis section of the CREST

Technical Report and presented in the Dry Weather WLAs section (CREST, 2010b). The final WLA for Segment B reported by CREST is **471 billion MPN per day** [4]. As demonstrated below, this final WLA is still applicable to Segment B.

As described by the CREST Linkage Analysis (CREST, 2010a), the loading capacities of the LA River are contingent upon instream flow rates. Specifically, the Bacteria TMDL used long-term, median daily flow rates to calculate the WLAs. Thus, to confirm that the CREST-calculated final WLA for Segment B are still valid, recent instream flow rates in the LA River were compared to historic values. As shown in **Table 3-1**, the median LA River flow rate at Wardlow Road[5] for the period from 2008-2012 is even higher than the median used by CREST (meaning the CREST final WLA is conservatively low). As such, CREST-calculated final WLA is still valid and will be used herein to develop the actions for the LRS.

Table 3-1. Recent versus Historical Flow Rates for LA River at Wardlow Road

LA River Flow Rate based on	Median Daily Flow Rate (cfs)
Linkage Analysis within CREST Technical Report (see Table 1 on page 7)	132
Daily average flow rate between 10/1/2008 and 10/1/2012 at Gage F319	140
Percent Difference	**+6.1%**

3.2 Determine the Proportional Allocation based on Drainage Area

The Permit and Bacteria TMDL allow the WLAs to be "distributed based on proportional drainage area" (see page 7 of the Basin Plan Amendment). As shown in **Table 3-2**, the ULAR EWMP Group represents 60.4% of the Segment B drainage area[6] **(also see Figure 1-1).** Thus, the final WLA for the ULAR EWMP Group is **285 billion MPN per day** (60.4% × 471 billion MPN per day).

[4] The interim allocation in the Permit was calculated at 110% of the final allocation (471 x 1.1 = 518).

[5] The flow gage at Wardlow Road was used because it is a component of the mass emission station for the LA River and is considered to have the highest quality rating curve of all the LA River gages.

[6] Drainage areas were based on the subwatersheds delineated in the Watershed Management Modeling System, with minor modifications based on review drainage maps provided by ULAR EWMP cities.

Table 3-2. Segment B Drainage Area for ULAR EWMP Group

Area within Segment B	Square Miles	Percentage of Segment B
All of Segment B	62.69	100%
ULAR EWMP Group Jurisdictions		
Los Angeles	23.54	37.6%
Alhambra	2.46	3.9%
Montebello	0.38	0.6%
Monterey Park	1.49	2.4%
Pasadena	0.10	0.2%
South Pasadena	2.33	3.7%
Uninc. LA County	7.57	12.1%
Sum ULAR EWMP Group	**37.87**	**60.4%**

4 DEVELOP MONTE CARLO MODEL

To simulate the loading of *E. coli* from the ULAR EWMP Group, a Monte Carlo model was developed based on the monitoring data collected during the BSI Study. The outfalls that potentially discharge dry-weather runoff from the ULAR EWMP Group are shown in **Figure 4-1**. A total of 37 outfalls in the proximity of the ULAR EWMP Group were flowing during the BSI Study snapshots. The raw data from the BSI Study snapshots are presented in Appendix B. The delineated drainage areas for the outfalls within the ULAR EWMP Group jurisdictions, where available, are shown in **Figure 4-2**.

The Monte Carlo model was developed just as prescribed by the CREST Technical Report (see Appendix A)[7]. The Monte Carlo statistics are shown in **Table 4-1**. Assumptions for model development include the following:

- For the 11 outfalls whose drainage areas are not entirely within the ULAR EWMP Group jurisdictions, a percent multiplier based on proportional area was incorporated into the Monte Carlo model to reflect the contribution from the ULAR EWMP Group, as shown in **Table 4-1**.
- The Monte Carlo model was based on the log mean and log standard deviation of measured *E. coli* concentrations and flow rates during the six snapshots of the BSI Study. The simulation was based on 50,000 iterations. The following were special cases for handling the monitoring data:
  - For events when an intermittent outfall was not flowing, the zero flow rate was replaced with the minimum flow rate measured during the BSI Study (0.000016 cfs) and the detection limit for *E. coli* (10 MPN per 100ml)[8]. The number of events when each outfall was observed to be flowing is reported in **Table 4-1**.
  - For several outfalls, there was at least one event during the early BSI Study events where flow was measured but *E. coli* concentration was not measured. In those cases, the *E. coli* concentration was conservatively set equal to the 90th percentile concentration measured in ULAR EWMP outfalls over the course of the BSI Study.

[7] The same Monte Carlo engine, RiskAmp®, was used for this LRS as was used for the CREST report.
[8] Zeroes were replaced with minimum values because the Monte Carlo model is based on log-normal distributions, which cannot handle zeroes in the dataset.

The applied 90th percentile value was 99,391 MPN per 100mL. So the approach to handling non-sampled events results in conservatively high loading estimates.

The developed Monte Carlo model is the basis for simulating the cumulative loading from all 37 storm drains that potentially discharge runoff from the ULAR EWMP Group to Segment B, which in turn allows the Priority and Outlier Outfalls to be identified, as described in the next section.

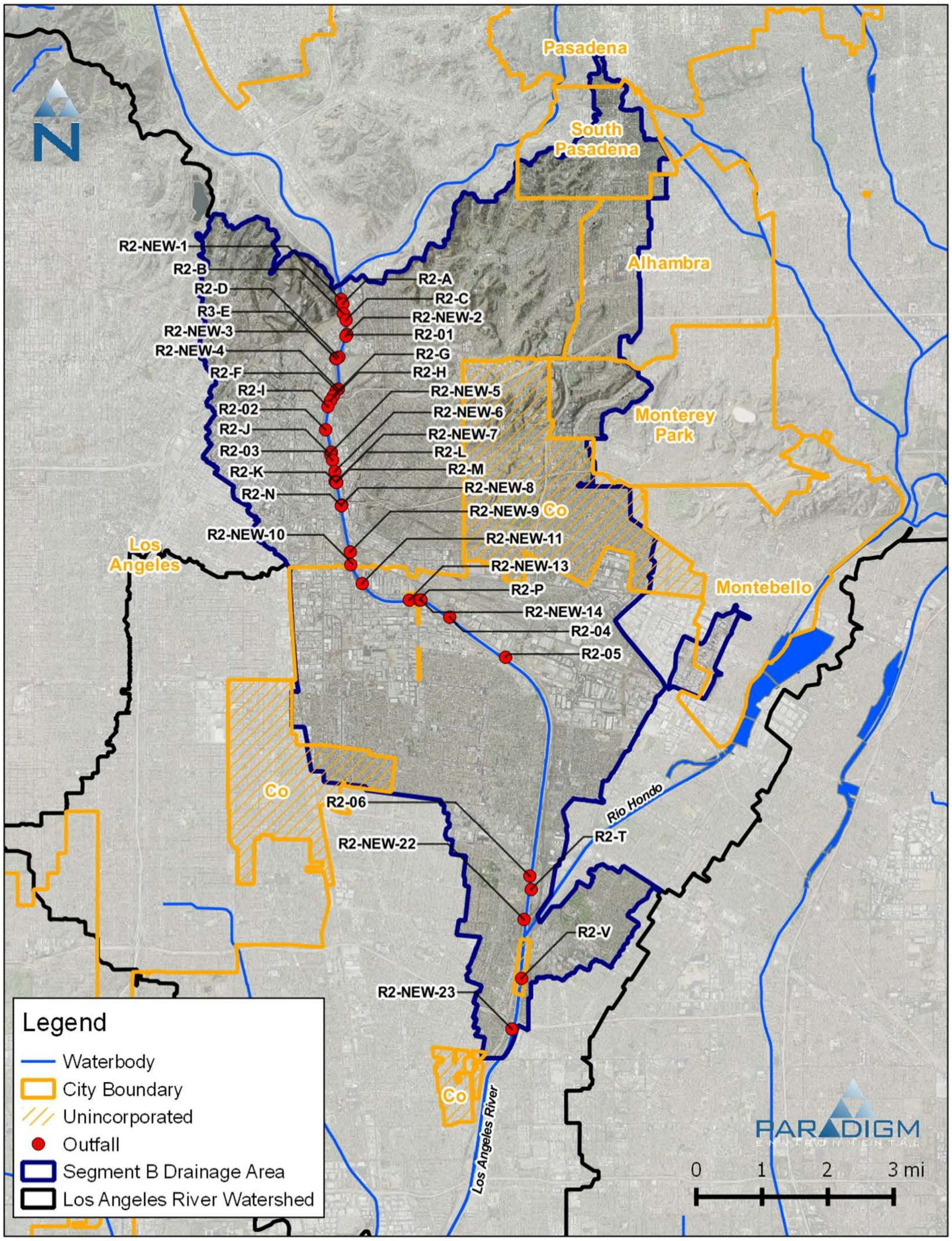


Figure 4-1. Thirty-eight outfalls that potentially discharge non-stormwater from ULAR EWMP Group.

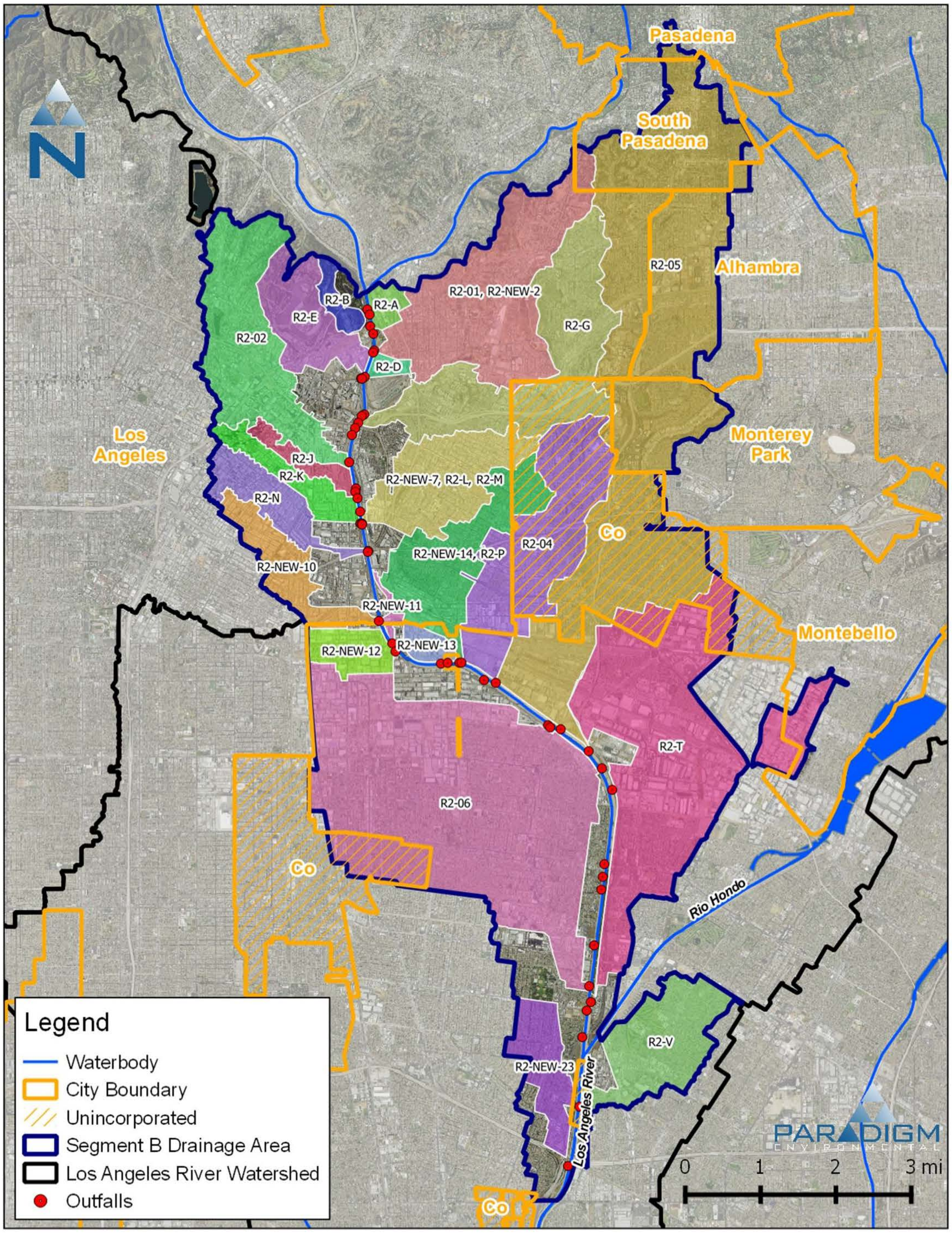


Figure 4-2. Drainage areas for outfalls near ULAR EWMP Group jurisdictional areas.

Note: Several outfalls are from small, localized storm drains and their drainage areas are unknown (non-shaded areas in the map), including most of the outfalls labeled with the prefix "R2-NEW-" For those in proximity to the ULAR EWMP jurisdictions, including all of the "R2-NEW-" outfalls north of R2-NEW-10, loading was assumed to 100% originate from the ULAR EWMP Group.

Table 4-1. Monte Carlo Loading Rank and Statistics for ULAR EWMP Outfalls [1]

Rank based on *E. coli* by Monte Carlo model	Outfall ID	No. Events Outfall Flowing during BSI Study (out of 6 total)	% Area in ULAR EWMP Group	*E. coli* Concentration (MPN per 100mL)		Flow Rate (cfs)	
				Log Mean	Log Standard Deviation	Log Mean	Log Standard Deviation
1	R2-A	6	100%	5.741069	0.923526	-1.978241	0.289686
2	R2-K	6	100%	3.840624	0.359538	-0.330439	0.151432
3	R2-02	6	100%	3.369441	0.614347	-0.257343	0.271922
4	R2-J	6	100%	3.905267	0.728899	-1.015157	0.159629
5	R2-G	6	100%	3.312497	0.660550	-0.562956	0.611723
6	R2-E	6	100%	3.332032	0.722434	-0.642876	0.148722
7 [a]	R2-P	6	95.9%	3.623934	1.089111	-1.218846	0.248203
	R2-NEW-14	1		1.708768	1.736121	-4.192761	1.489032
8	R2-04	6	88.6%	3.212267	1.030199	-0.928540	0.124942
9	R2-F	6	100%	3.092663	0.859203	-0.867584	0.102572
10	R2-03	6	100%	3.499019	0.538846	-1.293094	0.193829
11	R2-01	6	100%	2.728032	0.593710	-0.584333	0.161608
12	R2-06	6	6.8%	3.382792	0.698958	-0.301215	0.188748
13	R2-M	6	100%	3.116076	0.651588	-1.280485	0.186817
14	R2-05	6	89.5%	2.026703	0.324941	-0.178193	0.144914
15	R2-I	6	100%	3.445487	1.188326	-1.660876	0.154114
16	R2-D	6	100%	3.380134	0.588215	-1.740643	0.444463
17	R2-B	6	100%	2.976591	0.304596	-1.713892	0.146503
18	R2-T	6	14.0%	2.220346	1.663591	-0.542511	0.156750
19	R2-C	4	100%	2.982632	1.538107	-3.381615	1.173696
20	R2-V	6	0.1%	3.194583	0.455304	-0.562008	0.311055
21	R2-NEW-2	3	100%	2.892871	2.088777	-3.457537	1.512951
22	R2-NEW-23	5	1.1%	3.049123	1.611144	-2.226971	1.280805
23	R2-H	5	100%	1.528098	0.661975	-2.817059	1.597345
24	R2-L	4	100%	1.615398	0.954913	-2.906829	1.042182
25	R2-NEW-5	2	100%	1.499796	0.802751	-3.884133	1.426418
26	R2-NEW-7	1	100%	1.667887	1.635982	-4.303180	1.218563
27	R2-NEW-4	1	100%	1.530069	1.298398	-4.202338	1.465575
28	R2-NEW-8	1	100%	1.725267	1.776535	-4.420486	0.931223
29	R2-NEW-10	1	96.5%	1.283738	0.695014	-4.223558	1.413597

1 – See Appendix B for monitoring data from BSI Study for outfalls in vicinity of the ULAR EWMP Group.
a – The two outfalls were combined into one estimate because their drainage areas are overlapping.

Table 4-1 (continued). **Monte Carlo Loading Rank and Statistics for ULAR EWMP Outfalls** [1]

Rank based on *E. coli* by Monte Carlo model	Outfall ID	No. Events Outfall Flowing during BSI Study (out of 6 total)	% Area in ULAR EWMP Group	*E. coli* Concentration (MPN per 100mL)		Flow Rate (cfs)	
				Log Mean	Log Standard Deviation	Log Mean	Log Standard Deviation
30	R2-NEW-1	1	100%	1.000000	0.000000	-4.313561	1.193135
31	R2-NEW-11	1	75.8%	1.241451	0.591432	-4.472247	0.804435
32	R2-NEW-9	1	100%	1.000000	0.000000	-4.362475	1.073320
33	R2-NEW-3	1	100%	1.102131	0.250168	-4.485240	0.772608
34	R2-NEW-6	1	100%	1.000000	0.000000	-4.536913	0.646036
35	R2-NEW-22	1	6.2%	1.662181	1.622006	-4.233664	1.388841
36	R2-NEW-13	1	4.9%	1.365195	0.894542	-4.336454	1.137058

1 – See Appendix B for monitoring data from BSI Study for outfalls in vicinity of the ULAR EWMP Group.

5 PRIORITY AND OUTLIER OUTFALL ANALYSIS

This section describes the analysis to identify Priority Outfalls and Outlier Outfalls using the process detailed by the Bacteria TMDL.

5.1 Priority Outfalls

Identification of Priority Outfalls is based on the comparison of the Monte Carlo loading from all ULAR EWMP Group outfalls to the final WLA. As shown in **Table 5-1**, the expected loading from the ULAR EWMP Group is 929 billion MPN per day, which is above the WLA of 285 billion MPN per day. As such, the LRS process specifies that Priority Outfalls should be addressed in a manner that assures the WLA will be achieved.

Based on an extensive engineering feasibility analysis, four Priority Outfalls have been identified along with implementation actions that have reasonable assurance of attaining the WLA, as shown in **Table 5-1** and **Figure 5-1**. The drainage areas for these outfalls are shown in **Figure 5-2,** and pictures of the outfalls are shown in **Figure 5-3**. The following four Priority Outfalls were identified for the LRS:

- **R2-A:** this outfall exhibited the highest *E. coli* loading rate along Segment B during the BSI Study (see Table 4-1). As described in the next section, a diversion is already operational at this site, which removes 100% of the dry-weather *E. coli* loading.
- **R2-K:** this outfall exhibited the 2nd highest *E. coli* loading rate along Segment B during the BSI Study. As described in the next section, a diversion is already operational at this site, which removes 100% of the dry-weather *E. coli* loading.
- **R2-02:** this outfall exhibited the 3rd highest *E. coli* loading rate along Segment B during the BSI Study. As described in the next section, a "reuse and removal urban flow system" (r2UFS) has been conceptually designed for the site.
- **R2-04**: this outfall exhibited the 8th highest *E. coli* loading rate along Segment B during the BSI study. It was selected by the Group because it is the highest-loading outfall that is not primarily in the jurisdiction of City of LA[9]. As described in the next section, an infiltration wetland has been conceptually designed for the site.

Following implementation of the proposed LRS actions, the expected *E. coli* loading rate from the ULAR EWMP Group is 274 billion MPN per day, which is below the final dry weather WLA of 285 billion MPN per day (**Figure 5-1**). As such, the LRS has reasonable assurance of achieving the final WLA for discharges from the ULAR EWMP Group to Segment B. The specific implementation actions to be performed at the Priority Outfalls are described in Section 6.

[9] For the fourth Priority Outfall, any of the outfalls ranked between 4th and 8th (R2-J, R2-G, R2-E, R2-P/R2-NEW-14, or R2-04, see Table 4-1) could be selected and the final WLA would be attained. The outfall R2-04 was selected based on equitability for jurisdictional responsibilities for LRS implementation. R2-04 was the highest-loading outfall that is not primarily in the jurisdiction of City of LA.

Table 5-1. Priority Outfall Analysis: Monte Carlo *E. coli* Loading versus the Final WLA

Priority Outfall	Proposed LRS Action	Lead Agency[1]	Expected *E. coli* Loading Rate from Outfall after Proposed LRS Actions (10^9 MPN per day)	Expected *E. coli* Loading Rate from all ULAR EWMP Group outfalls to Segment B after Proposed LRS Actions (10^9 MPN per day)
Baseline Loading Prior to LRS Actions = 929				
R2-A	Low Flow Diversion	Los Angeles	0 (100% removal)	532
R2-K	Low Flow Diversion	Los Angeles	0 (100% removal)	406
R2-02	Reuse and Removal Urban Flow System	Los Angeles	0 (100% removal)	313
R2-04	Infiltration Wetland	Uninc. County and LACFCD	0 (100% removal)	**274**

<<< Below WLA of
<<< 285 billion
<<< MPN per day

1 – Other EWMP Group members are responsible for supporting operations and maintenance

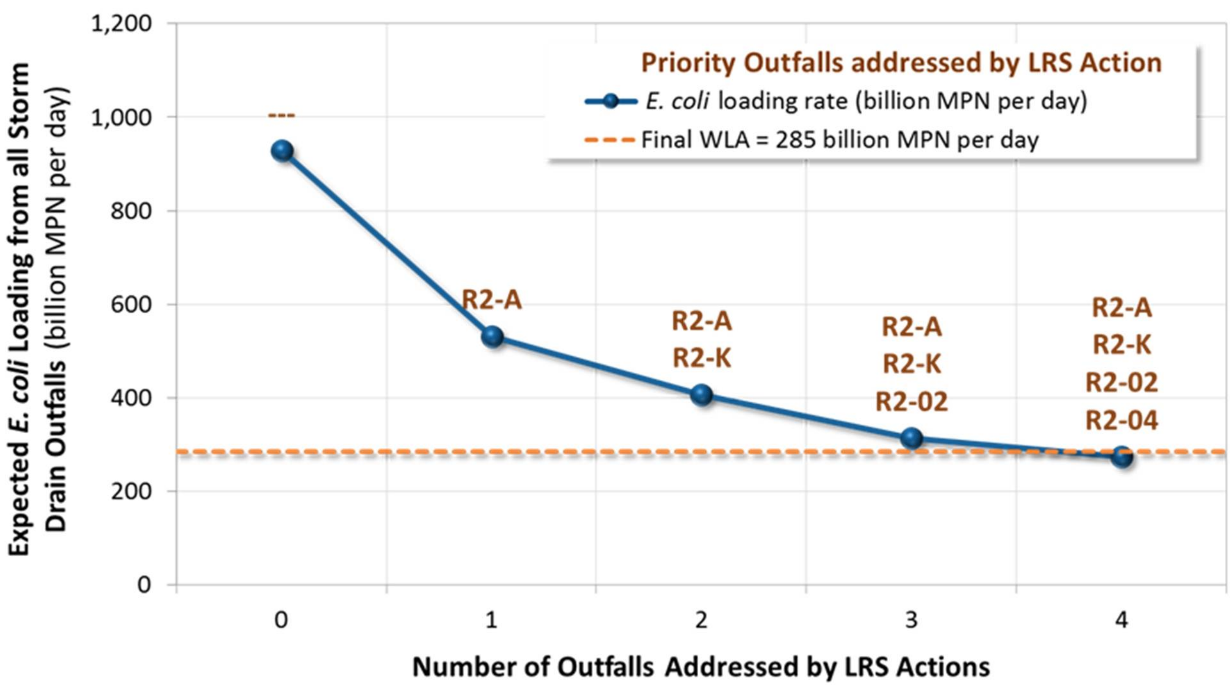


Figure 5-1. Effect of Priority Outfall Actions on *E. coli* Loading to Segment B from ULAR EWMP Group

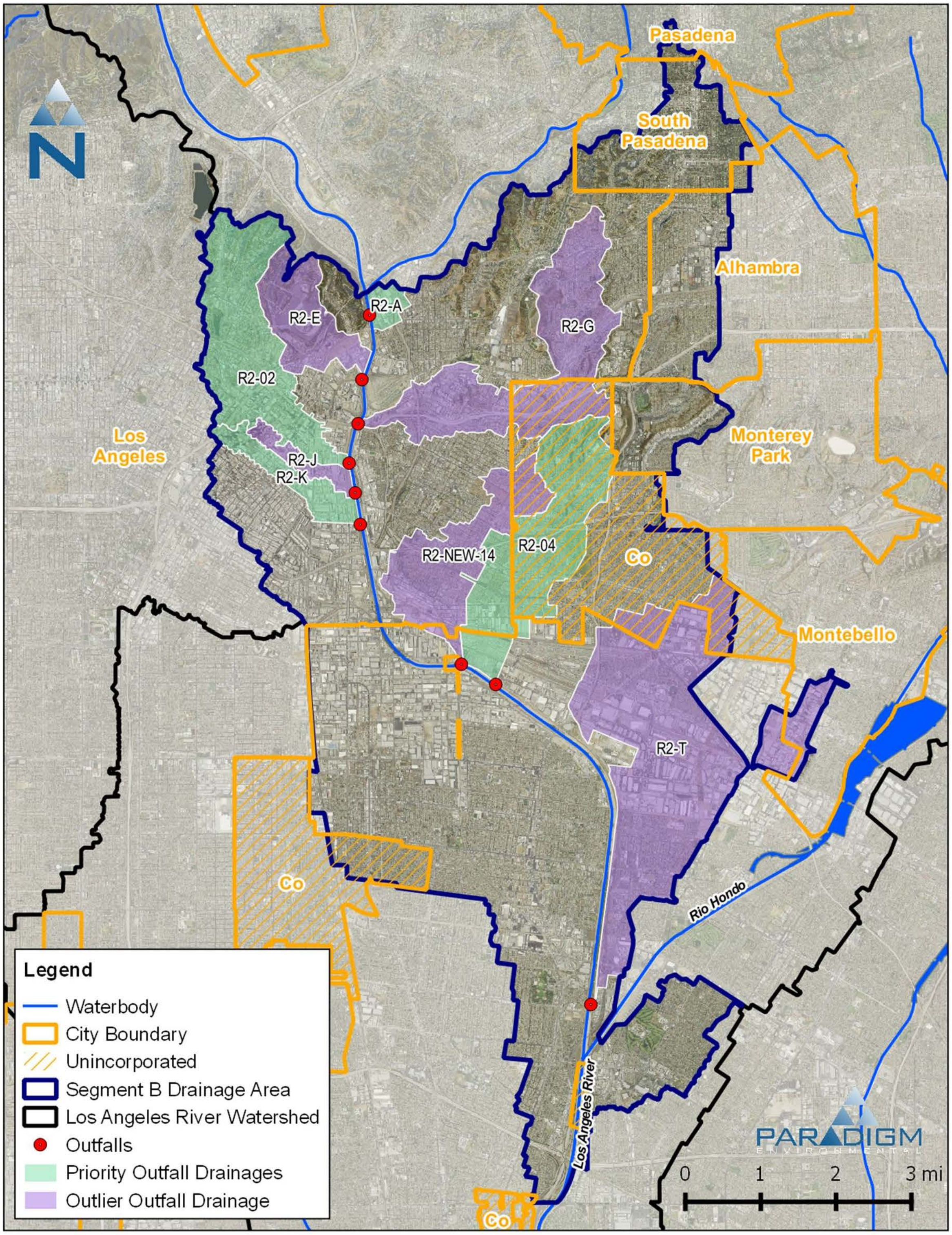


Figure 5-2. Drainage Areas of the Priority and Outlier Outfalls for the ULAR EWMP Group.

Figure 5-3. Pictures of Segment B Priority Outfalls for ULAR EWMP Group.
(from BSI Study report [CREST, 2008])

5.2 Outlier Outfalls

Identification of Outlier Outfalls is based on comparing the snapshot monitoring data to the WLA, minus loading from the Priority Outfalls, which flags any unexpected exceedances of the WLA that might not have been predicted by the Monte Carlo model. Outfalls categorized as Outlier Outfalls are generally thought to exhibit episodically high *E. coli* loading rates. Because Outlier Outfalls do not exhibit consistently high loading rates, they are not subject to structural actions in the LRS; instead Outlier Outfalls are subject to investigative actions.

The Outlier Outfall analysis is presented in **Table 5-2**. Each monitoring event during the BSI Study was compared to the final WLA for the ULAR EWMP Group. During 3 of 6 snapshot events, the WLA for the ULAR EWMP Group was attained. During three events, one or two outfalls exhibited an *E. coli* loading that drove the discharge from the ULAR EWMP Group above the WLA even if Priority Outfalls would have been addressed[10]. The outfalls R2-E, R2-NEW-14, R2-G, and R2-T are categorized as Outlier Outfalls for the ULAR EWMP Group. **Figure 5-2** shows the drainage areas of the Outlier Outfalls and **Figure 5-3** shows pictures. Recall that **Table 4-1** details the proportional drainage areas by jurisdiction and multipliers used to separate loading by the ULAR EWMP Group from other groups. Of the Outlier Outfalls, only R2-T is not entirely in the ULAR EWMP area – the drainage area is only 14% in the ULAR EWMP area (however, even with the 0.14 multiplier on the measured loading, the outfall is still flagged as an Outlier Outfall).

The following describes the determination of the Outlier Outfalls for ULAR EWMP (recall that Appendix B has the snapshot data):

- During event #2 the outfall R2-E would have caused the WLA to be exceeded even if Priority Outfalls were addressed. This was the only event when R2-E drove the loading from the ULAR EWMP Group above the WLA. The outfall for R2-E was flowing during all 6 events with relatively high flow rates (see **Table 4-1**).
- During event #4 the outfalls R2-NEW-14 and R2-T would have caused the WLA to be exceeded. The loading from R2-T alone exceeded the WLA for the entire Segment B (without considering the multiplier for co-mingling). This was the only event when R2-NEW-14 or R2-T drove the loading from the ULAR EWMP Group above the WLA. R2-NEW-14 was only flowing during this event (it was dry during the other five snapshots) while R2-T was flowing during all six (6) events with relatively high flow rates. The drainage area for R2-T one of the largest drainage areas among the outfalls that potentially discharge flow from the ULAR EWMP Group to Segment B.
- During event #6 the outfall R2-G would have caused the WLA to be exceeded. Both of these outfalls were flowing during all six (6) snapshot events. The drainage area for R2-G is relatively large. The *E. coli* loading rate from R2-G during this event was 188 billion MPN per day during this event, while the maximum loading during the other five events was only 27 billion MPN per day. Also, note that during event #6 the next-highest ranked outfall after R2-G was R2-J, which exhibited loading rates greater than 100 billion MPN per day during two snapshots and is being considered for an implementation action linked to Priority Outfall R2-02.

The investigative actions to be performed for the Outlier Outfalls by the ULAR EWMP Group are described in the next section.

[10] Because the Priority Outfalls are all subject to 100% elimination, "addressed" means all loading was assumed to be removed for the Outlier Outfall analysis.

Table 5-2. Outlier Outfall Analysis: Snapshot-measured *E. coli* Loading versus the Final WLA if Priority Outfalls were Addressed during Monitoring Events

				If WLA exceeded:	
BSI Study Snapshot Event	**Number of Outfalls Flowing with Potential to Discharge Runoff from ULAR EWMP Group**	**Total Flow Rate from all Outfalls** (cfs)	**Total *E. coli* Loading Rate from ULAR EWMP Group if Priority Outfalls were Addressed** (billion MPN per day)	**Outfall with Highest *E. coli* Loading Rate**	**Total *E. coli* Loading Rate <u>without</u> Outfall with Highest Loading Rate** (billion MPN per day)
1	22	6.01	110	WLA attained	WLA attained
2	23	4.89	441	R2-E	267
3	25	3.76	280	WLA attained	WLA attained
4	24	4.20	124	WLA attained	WLA attained
5	26	4.88	739	R2-NEW-14	431
				R2-T	242
6	32	5.02	472	R2-G	284

6 LRS ACTIONS TO BE IMPLEMENTED

For its discharges to Segment B, the ULAR EWMP Group has four (4) Priority Outfalls and four (4) Outlier Outfalls. The Priority Outfalls will be addressed by structural implementation actions while the Outlier Outfalls will addressed by source investigations, as described in this section. The relative jurisdictional drainage areas within the Priority Outfalls and Outlier Outfalls are presented in **Table 6-1**.

The responsibility of the ULAR EWMP Group for implementation actions to address the Priority Outfalls are delineated in **Table 5-1,** the lead agencies are City of Los Angeles for R2-A, R2-K and R2-02 and Unincorporated Los Angeles County and LACFD for R2-04. The other members of the ULAR EWMP Group – Alhambra, Montebello, Pasadena, South Pasadena and Monterey Park – are responsible for supporting operations and maintenance of the Priority Outfall actions.

6.1 Priority Outfalls

Specific structural actions have been identified for R2-A, R2-K, R2-02 and R2-04. The identified actions are a result of extensive efforts to assess the feasibility of actions and to identify the top candidate conceptual designs for the actions, as described below. The LRS actions for two Priority Outfalls, R2-A and R2-K, have already been completed and are operational.

6.1.1 R2-A

The City of Los Angles completed construction of the Humboldt Greenway Project in October 2012, with project components that included a low-flow diversion and green infrastructure/ infiltration elements (see **Figure 6-1**). The primary objective of the Humboldt Stormwater Greenway project is to intercept dry-weather runoff and to treat wet-weather runoff. Dry-weather flows will be intercepted using a Reuse and Removal Urban Flow System (R^2UFS), similar to those installed along Santa Monica Bay. The R2UFS system intercepts dry-weather flow and potentially re-uses runoff for irrigation. The Humboldt Stormwater Greenway will provide many benefits to the City and local community as a regional transit greenway and a special event destination. Other project elements may also provide and support community and economic benefits. Details of the project are included in **Appendix C**.

The project also includes wet-weather benefits, including "day-lighting" an existing storm drain, conveying the higher flows through a multi-use open space stormwater treatment facility constructed within the City's right-of-way boundary and City-owned parcels. These wet-weather flows will be treated using a combination of oxygenation, settling, biofiltration, and ultraviolet exposure processes as its flow is directed through the greenway.

6.1.2 R2-K

The City of Los Angeles completed construction of the Downtown Los Angeles Low Flow Diversion (LFD) Project at 7th Street in Downtown LA in September 2013 to eliminate and divert dry-weather flows from Priority Outfall R2-K (see **Figure 6-2**). The LFD Project was designed to divert year round dry-weather flow from a storm drain line to a nearby sanitary sewer pipeline for conveyance to Hyperion Treatment Plant for treatment. The project receives urban runoff from an approximately 450-acre drainage area, which consists mostly of 47 percent industrial and 30 percent commercial land uses. The remaining areas are categorized as mixed urban, transportation, residential, public facilities, and open space land uses. The area also includes a few pockets of homeless population within and around the Downtown Produce District, Toy District, and portions of the Downtown Center. Details of the project are included in **Appendix D** of this LRS.

6.1.3 R2-02

The City of Los Angeles has developed conceptual plans for a dry-weather diversion and green infrastructure/infiltration BMPs to address wet-weather flows from R2-02. Dry-weather flows will be treated with a combination of a LFD and a R^2UFS intended to intercept flow from the storm drain prior to discharging into the LA River. The proposed project also includes an additional element that may be pursued to address R2-J, which exhibited a loading rate greater than 100 billion MPN per day during two events. BMPs to treat dry- and wet-weather flows have been conceptualized for the sites using green infrastructure concepts suited for implementation in the public right-of-way, including permeable pavement and bioretention. See **Figure 6-3** and **Appendix E** for details on the project's design elements.

6.1.4 R2-04

The LACFCD and Unincorporated Los Angeles County have developed a concept for an infiltration wetland to address the dry-weather flows from R2-04. Approximately two-thirds of the R2-04 drainage area is in Unincorporated County, while 20% is in Los Angeles. Approximately 12% of the drainage area is in the Upper Reach 2 WMP Group jurisdictional area (10% is in Vernon and less than 2% is in Commerce). The infiltration wetland will intercept flows from R2-04 just prior to discharge from the outfall in an adjacent utility easement. The wetland will have a continuous baseflow but there will be no discharge from its outlet. Conceptual level modeling was conducted to confirm the wetland can remove 100% of the flows from R2-04. See **Figure 6-4** and **Appendix F** for details on the project's design elements.

Table 6-1. Proportional Jurisdictional Areas for Drainages to the Priority Outfalls and Outlier Outfalls

City	Priority Outfalls				Outlier Outfalls				
	R2-A	R2-K	R2-02	R2-04	R2-E	R2-G	R2-J	R2-T	R2-P, NEW-14
Los Angeles	100.0%	100.0%	100.0%	21.8%	100%	79.4%	100.0%	---	80.9%
Unincorporated	---	---	---	66.7%	---	20.4%	---	8.6%	15.0%
Monterey Park	---	---	---	---	---	0.2%	---	---	---
Alhambra	---	---	---	---	---	---	---	---	---
South Pasadena	---	---	---	---	---	---	---	---	---
Pasadena	---	---	---	---	---	---	---	---	---
Montebello	---	---	---	---	---	---	---	5.37%	---
Non-ULAR Jurisdictions									
Vernon	---	---	---	9.7%	---	---	---	1.8%	4.1%
Commerce	---	---	---	1.7%	---	---	---	55.4%	---
Bell	---	---	---	---	---	---	---	7.8%	---
Bell Gardens	---	---	---	---	---	---	---	17.4%	---
South Gate	---	---	---	---	---	---	---	2.9%	---
Cudahy	---	---	---	---	---	---	---	0.6%	---

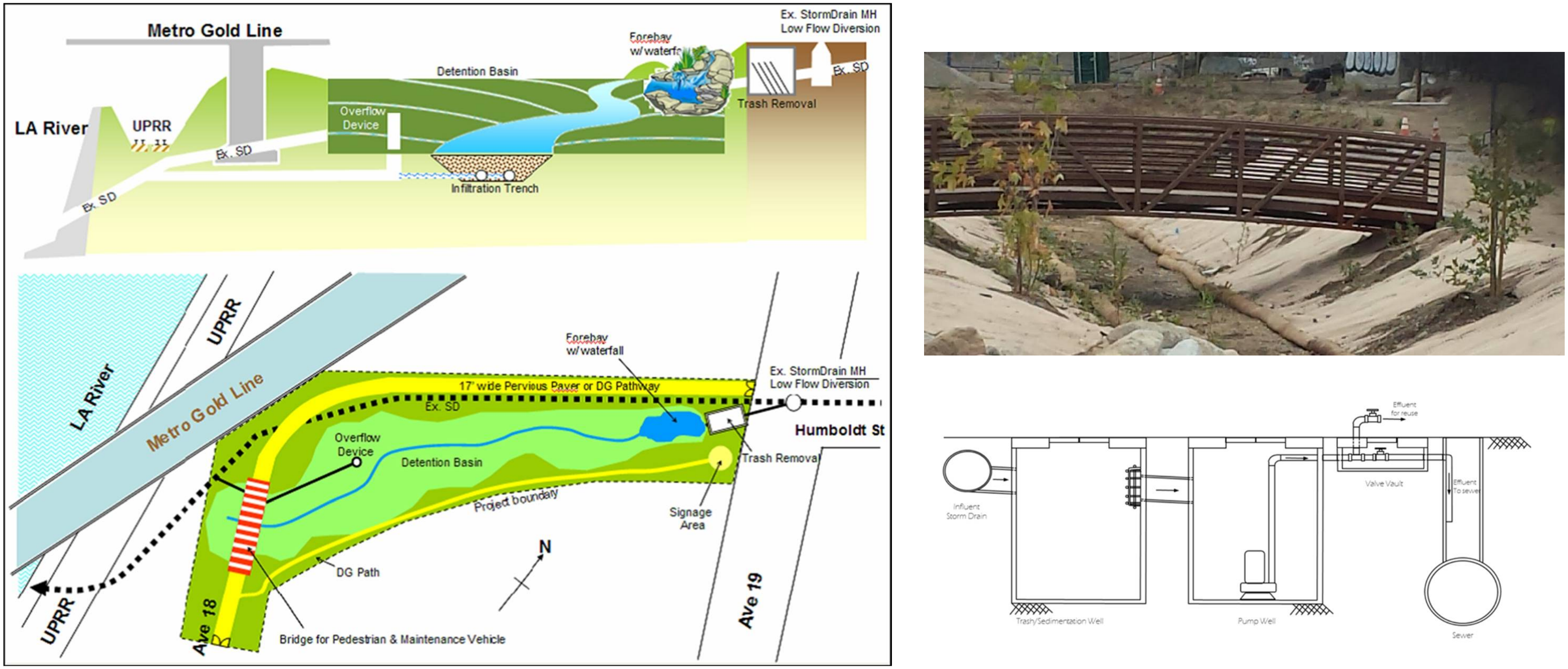
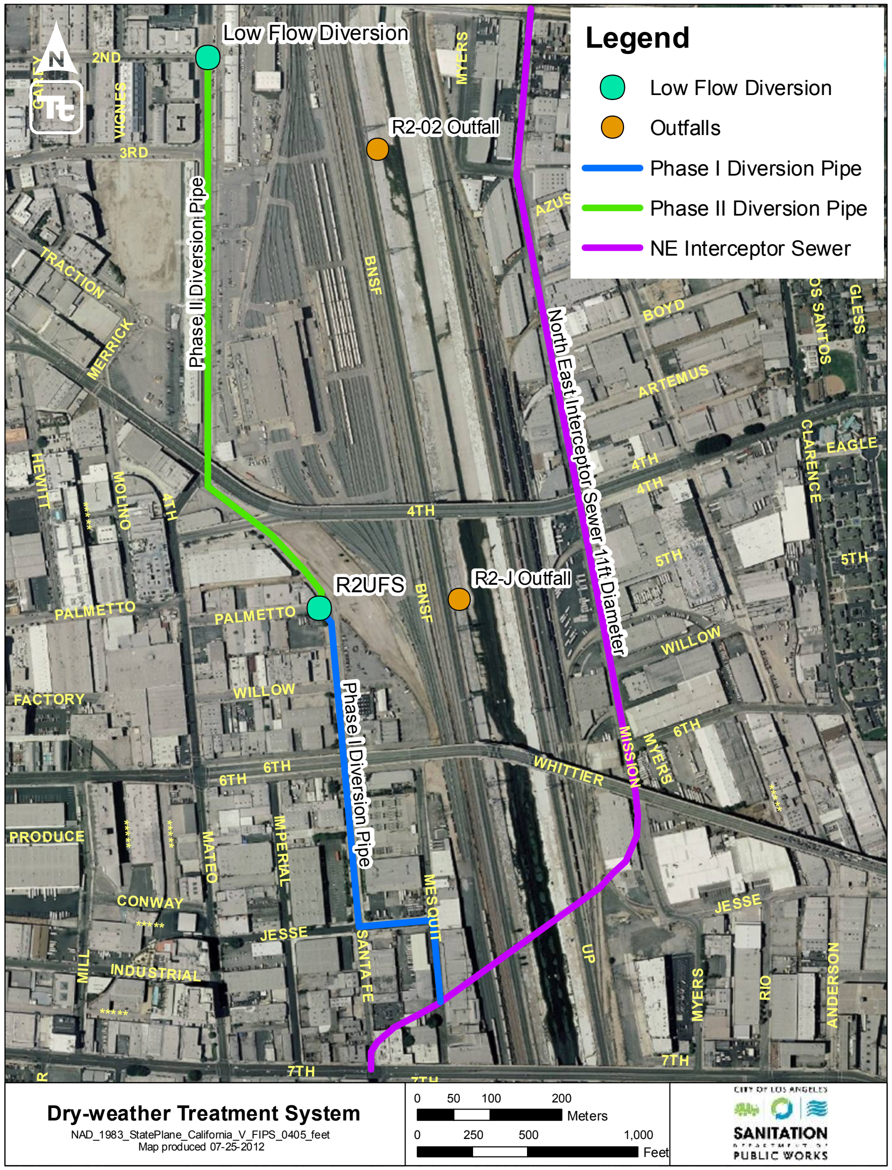


Figure 6-1. Elements of the LRS Actions for R2-A (diversion is already completed, see Appendix C)

Figure 6-2. Elements of the LRS Actions for R2-K (diversion is already completed, see Appendix D)



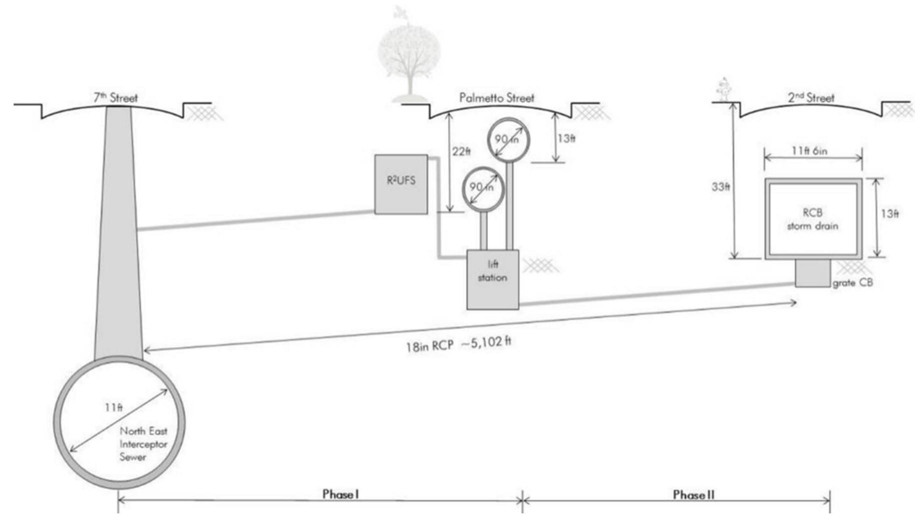


Figure 6-3. Elements of the LRS Actions for R2-02 (project is in planning phase, see Appendix E)

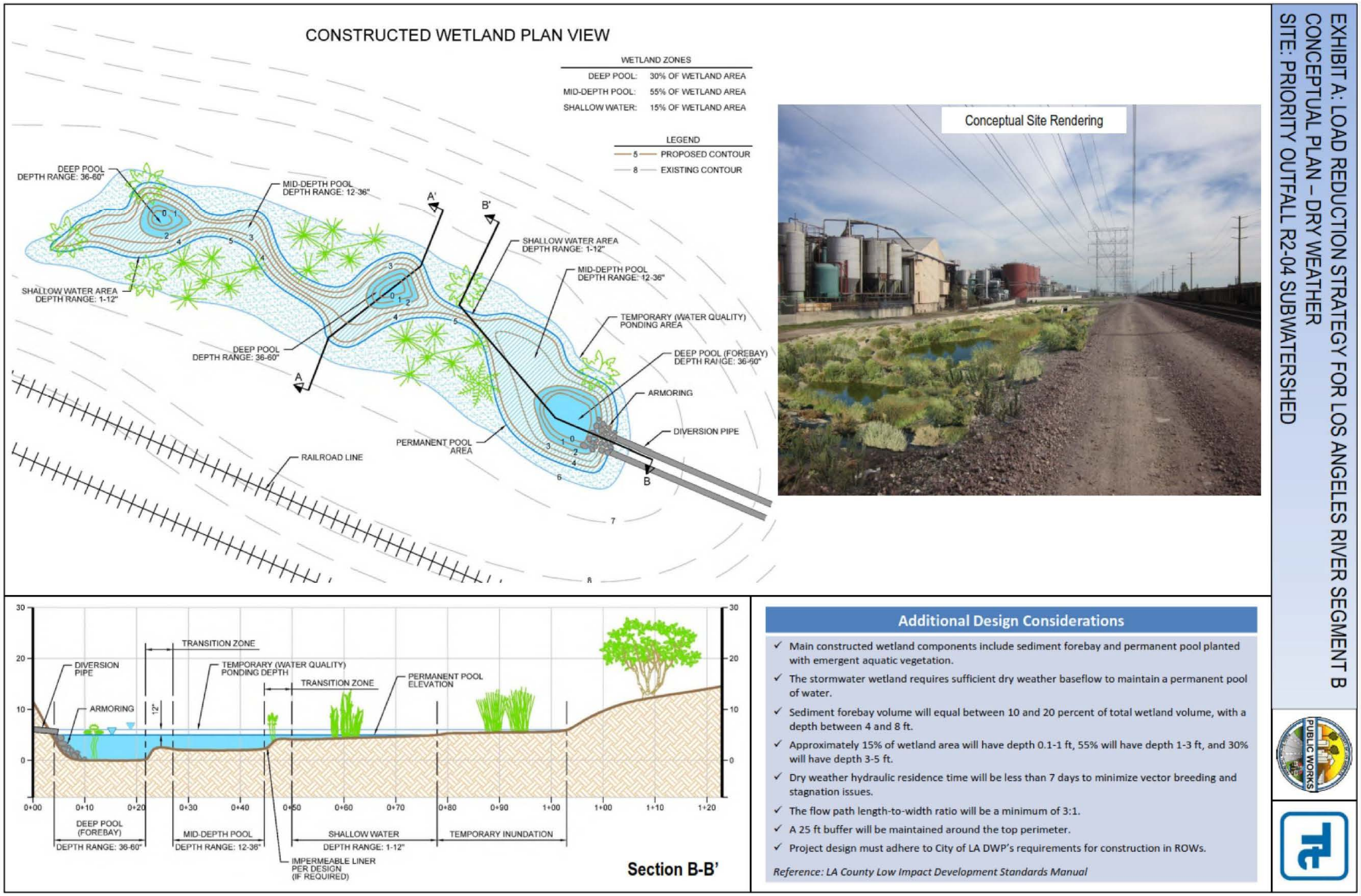


Figure 6-4. Elements of the LRS Actions for R2-04 (project is in planning phase, see Appendix F)

6.2 Outlier Outfalls

This section describes the LRS actions for the four Outlier Outfalls, R2-E, R2-G, R2-NEW-14, and R2-T. Per the TMDL, the four Outlier Outfalls and their corresponding storm drain networks and drainage areas within the ULAR EWMP Group will be investigated to determine potential sources of *E. coli*. The exact investigative actions to be implemented will be determined over the course of the LRS implementation period and will be completed and reported to the Regional Board by March 2019. The ULAR EWMP Group may potentially collaborate with the other groups along Segment B[11].

The ULAR EWMP Group intends to integrate the results of this LRS into the nonstormwater screening process under the Coordinated Integrated Monitoring Program (CIMP), which is currently being reviewed by the Regional Board. The CIMP includes an approach that leverages the robust LRS process as the primary component of its non-stormwater program. The four Outlier Outfalls have been categorized as the significant outfalls for Segment B and will be subject to source investigation actions under the non-stormwater screening program. These actions will be completed according the schedule detailed in the CIMP for the ULAR EWMP Group.

The actions to be implemented for the Outlier Outfalls could include the following:

- Determine the drainage area for R2-NEW-14 and confirm the drainages areas for the other Outlier Outfalls (see Figure 5-1) and determine whether R2-NEW-14 is private or municipally-owned.
- Identification of potential sources of *E. coli* within the drainage areas of Outlier Outfalls (e.g., dog parks, locations where sewer lines and storm drains are in close proximity to one another, etc.)
- Visual observations of non-stormwater sources including observations of surface flows into catch basins.

By March 2022, the outfalls that discharge runoff from the ULAR EWMP Group to Segment B will be subject to three (3) post-LRS snapshots that measure flow rate and *E. coli* from each outfall. The results of that monitoring will be used to compare the loading from the ULAR EWMP Group to the interim and final WLAs. If a second phase is necessary, the revised LRS will be submitted to the Regional Board by March 2023.

7 REFERENCES

CREST (Cleaner Rivers through Effective Stakeholder TMDLs). 2008. *DRAFT Los Angeles River Bacteria Source Identification Study: Final Report*. Prepared for CREST by the CREST Consulting Team, November 2008.

CREST (Cleaner Rivers through Effective Stakeholder TMDLs). 2010a. *DRAFT Los Angeles River Watershed Bacteria TMDL–Technical Report Section 5: Dry Weather Linkage Analysis*. Prepared for CREST by the CREST Consulting Team, April 2010.

CREST (Cleaner Rivers through Effective Stakeholder TMDLs). 2010b. *Los Angeles River Watershed Bacteria TMDL–Technical Report Section 6: Dry Weather Load and WLAs Plan*. Prepared for CREST by the CREST Consulting Team, April 2010.

[11] R2-T is also an Outlier Outfall for other groups along Segment B, which may lead to collaboration on source investigation efforts.

CREST (Cleaner Rivers through Effective Stakeholder TMDLs). 2010c. *Los Angeles River Watershed Bacteria TMDL Technical Report Section 7: Dry Weather Implementation*. Prepared for CREST by the CREST Consulting Team, April 2010.

APPENDIX A:
EXCERPT FROM CREST TECHNICAL REPORT REGARDING REQUIRED METHODOLOGY FOR LOAD REDUCTION STRATEGIES

APRIL 2010

NOTE: as a reference, this appendix is inserted in its entirety from the CREST Technical Report (CREST, 2010c).

Appendix 1: Details for Load Reduction Strategies and Scenarios for the Los Angeles River Watershed Bacteria TMDL Technical Report Dry Weather Implementation Plan

Prepared for:

CLEANER RIVERS THROUGH EFFECTIVE STAKEHOLDER-LED TMDLS (CREST)

Prepared by:

CREST CONSULTING TEAM

Table of Contents

List of Tables

List of Figures

A1.1 Introduction

This **Appendix 1** supports the Dry Weather Implementation Plan (**Section 7)** of the LA River Bacteria TMDL Technical Report. The sections herein are very similar to the corresponding cost and timeline sections in Section 7, except they provide additional detail with respect to assumptions and methodology for development MS4 Load Reduction Strategies (LRSs) for individual LA River segments or tributaries. Some of the text/information herein is duplicative for Section 7, which is intentional to allow both Section 7 and Appendix 1 to be standalone documents. Additional details for the following implementation components are included herein:

- Outfall-based Load Reduction Strategy (**Section A1.2**)
- Downstream-based Load Reduction Strategy (**Section A1.3**)

Note that these approaches apply to *individual* LA River segments or tributaries. Examples of combinations of LRS approaches that could be used to address the *entire Watershed* are described as "Watershed-wide Strategies" in **Section 7.8**.

For reference, **Figure 1** shows the spatial extent of the LA River segments and tributaries addressed under this TMDL. The LA River segments are as follows:

- **Segment E**: Reach 6 – LA River headwaters to Balboa Boulevard
- **Segment D**: Reach 5 to middle Reach 4 – Balboa Boulevard to Tujunga Avenue
  Segment C: lower Reach 4 and Reach 3 – Tujunga Avenue to Figueroa Street
- **Segment B**: upper and middle Reach 2 – Figueroa Street to Rosecrans Avenue
- **Segment A**: lower Reach 2 and Reach 1 – Rosecrans Avenue to Willow Street

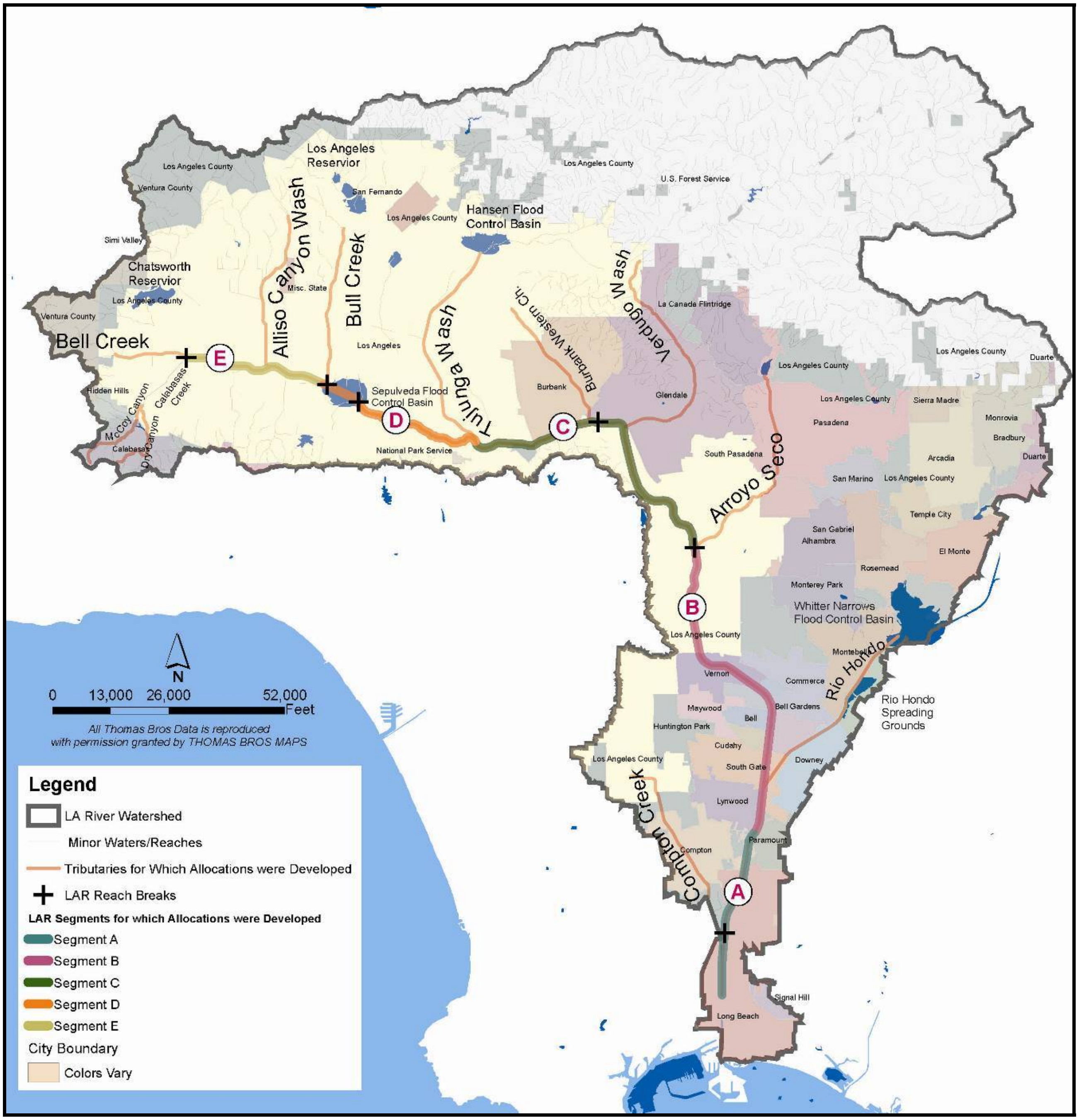


Figure 1. Segments and Tributaries for which Allocations were Developed for the Los Angeles River Watershed Dry Weather Bacteria TMDL

A1.2 Outfall-based Load Reduction Strategy for an Individual LA River Segment or Tributary

The Outfall-based approach emphasizes reducing loading from outfalls that discharge to a mainstem LA River segment or tributary. The discharges from these outfalls are predominantly from MS4s, but the Outfall-based approach could also identify problematic discharges from industrial stormwater and other source types. As shown in **Figure 2**, the Outfall-based approach is a stepwise process that includes monitoring of bacteria discharges from outfalls, implementation of actions to reduce MS4 discharges below the WLA, and follow-up assessment of additional actions needed both regulatory actions and structural actions, if necessary**.** Due to the highly-variable nature of bacteria discharges from outfalls, this stepwise process for each mainstem LA River segment and tributary may need to be repeated in subsequent "iterations" during TMDL implementation.

A1.2.1 Implementation Actions for Outfall-based Approach

Each of the seven steps presented in **Figure 2** is described in detail in **Sections A1.2.1.1** through **A1.2.1.6.1**. Implementation actions will continue on segments or tributaries during subsequent iterations as necessary (i.e., if the implementation actions were insufficient to meet the WLA) based on the procedure outlined in **Figure 2** and described in **Section A1.2.1.6.1**. The Implementation Schedule section (**Section 7.10**) provides detail on the timing of actions and incorporation of final WLAs into NPDES permits.

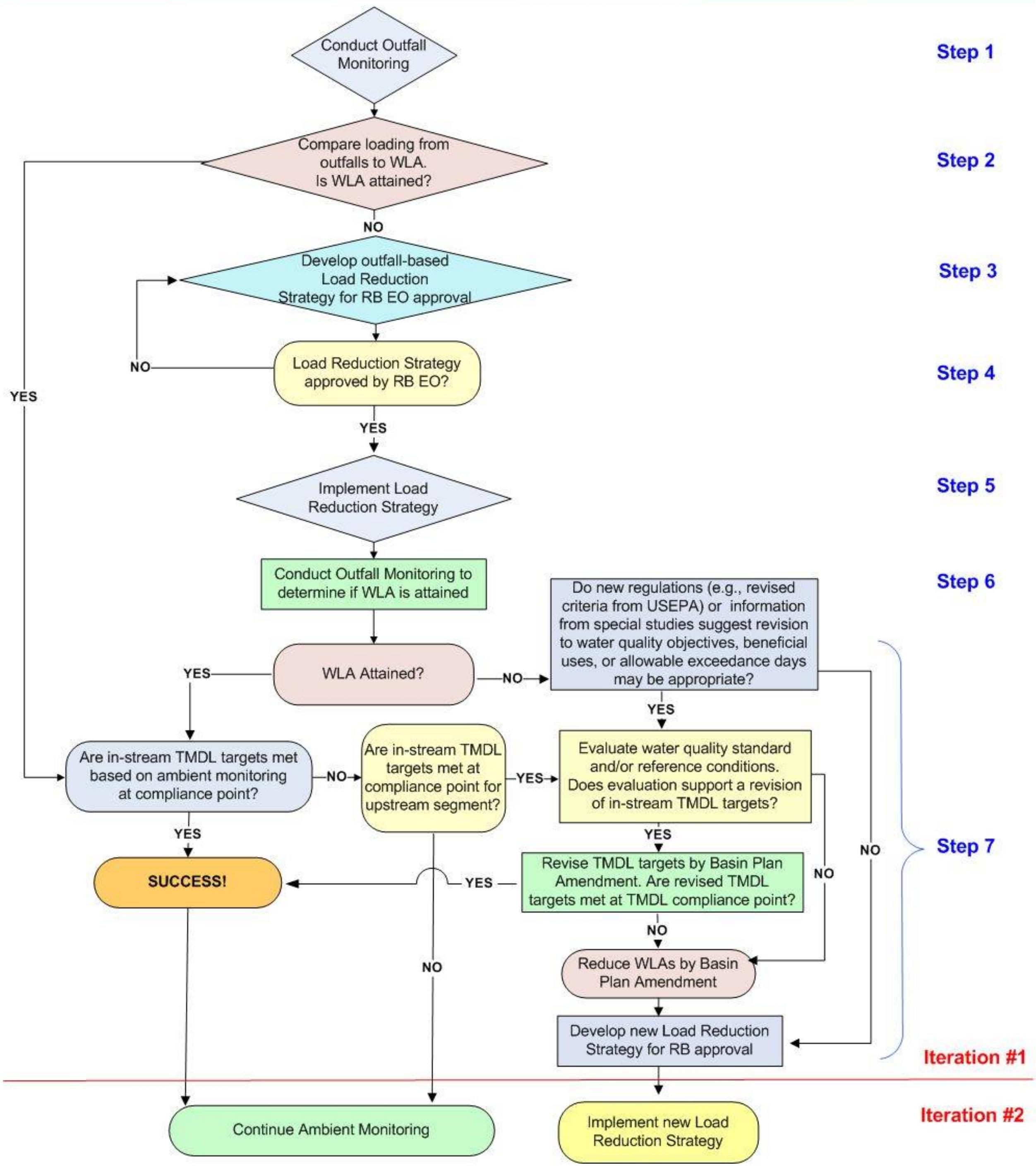


Figure 2. LA River Bacteria TMDL Outfall-based Approach Flow Diagram

WLA = Wasteload Allocation RB EO = Regional Board Executive Officer

A1.2.1.1 Step 1: Conduct Outfall Monitoring

As the first step, monitoring "snapshots" will be conducted at all flowing outfalls (i.e., storm drains) in the targeted segment or tributary. Outfall monitoring will be conducted as described in **Section 8** (not yet developed). Additionally, in-stream data will be collected to evaluate receiving water conditions as described in **Section 8** (not yet developed). The goal of the outfall monitoring is to characterize the bacteria loading from the cumulative discharges of dry weather runoff from the MS4 system to the segment or tributary. All storm drain discharges that are occurring during each monitoring event will be sampled. Both flow rate and *E. coli* concentrations will be measured at all flowing sites. The calculated *E. coli* loading rates (the product of flow rate and concentration) from individual outfalls and all outfalls are utilized in the subsequent steps to prioritize outfalls for implementation actions. The Permittees are also encouraged to collect source identification data (e.g., concentrations of human *Bacteroidales* or human viruses) to assist with prioritization of outfall actions. Outfall monitoring is not necessary in Segment B because data for all outfalls flowing during dry weather were collected through the Los Angeles River Bacteria Source Identification (BSI) Study (CREST 2008).

A1.2.1.2 Step 2: Compare Loading from Outfalls to Waste Load Allocations

Under the second step in the first iteration, the total storm drain loading of *E. coli* from MS4 discharges to a targeted segment or tributary will be compared to the applicable WLA. Total storm drain loading is calculated for the monitoring events conducted during Step 1 by summing the loading rates measured at all individual storm drain outfalls. If a reported sanitary sewer overflow (SSO) was found to be contributing to bacteria loading at a storm drain outfall, the loading from that outfall will not be considered in calculating the total loading. SSOs are not under the control of MS4 Permittee and are addressed through other regulatory mechanisms, and MS4s have procedures by which they respond to SSOs and report them to the Regional Board. The total storm drain loading of *E. coli* during each monitoring event will be compared to the WLA for the given segment. If the total loading from storm drain outfalls that discharge to the segment exceeds the WLA during any monitoring event then the MS4 Permittees would continue to Step 3 described below. If the total loading from storm drain outfalls to the segment meets the WLA in all events then the MS4 Permittees would skip steps 3, 4, 5, and 6 below and consider the requirements of Step 7 (Identifying Next Steps).

A1.2.1.3 Step 3: Develop Load Reduction Strategy for Outfall-based Approach

The third step represents the development of a Load Reduction Strategy (LRS) for attaining the WLA. The LRS is a detailed document that specifies the proposed number, types and locations of actions that will be implemented to attain the MS4 WLA for a mainstem LA River segment or tributary. There are three primary parts that each LRS shall contain:

Part 1: Prioritization of storm drain outfalls for implementation actions

Part 2: Field assessment of feasibility of potential implementation actions and investigation of potential sources to Priority Outfalls

Part 3: Summarize investigation and identify load reduction actions to be implemented

Within the LRS, there is much flexibility regarding the number, types, and locations of actions; essentially, the Permittees may use any combination of actions as long as it is demonstrated that the proposed suite of actions are expected to result in WLA attainment. If the LRS is developed per the process outlined below, the BMPs proposed will have been identified in a manner consistent with the assumptions of the WLAs. The three components of the LRS and the process for Regional Board EO approval are described below.

LRS Part 1: Prioritize Storm Drain Outfalls for Implementation Actions

The following outlines a process for identifying outfalls that would potentially be included in the LRS. The prioritization process is based on conducting Monte Carlo simulations [or equivalent] to (1) evaluate both the individual and cumulative *E. coli* loading rates from outfalls along a segment or tributary and (2) prioritize implementation actions based on these *E. coli* loading rates and, if desired, data for other indicators including source identification data (e.g., human *Bacteroidales*, human-specific viruses, etc.). Two types of outfalls are addressed in the LRS, as follows:

- **Priority Outfalls** – these outfalls are identified using Monte Carlo simulations (or equivalent) that predict the expected *E. coli* loading from storm drains before and after implementation actions. The prioritization process highlights Priority Outfalls because they have the highest loading rates of *E. coli* and, optionally, comparatively high levels of human-specific bacteria or viruses. Overall, Priority Outfalls have relatively consistent, problematic discharges that both drive storm drain loading rates above the WLA and are considered to likely pose the highest risk to human health. As such, Priority Outfalls are the highest priority for source investigation and specific implementation actions (i.e., structural controls).

- **Outlier Outfalls –** these outfalls are identified by retrospectively comparing the results of the Monte Carlo simulations to the "raw" monitoring data. Due to episodic, high loading rate *E. coli* discharges from some outfalls, called Outlier Outfalls, there may be instances when complete "removal" of the Priority Outfalls would not have led to the storm drain discharges of *E. coli* being below the WLA. Outlier Outfalls are initially subject to follow-up investigations such as sanitary surveys.

Identification of Priority Outfalls

To prioritize implementation actions, outfall data collected during monitoring is input into a relatively simple stochastic (Monte Carlo) model to simulate the *E. coli* loading rates from storm discharges into LA River segments and tributaries addressed within an LRS. The model outputs can be used to evaluate both the individual and cumulative *E. coli* loading rates from outfalls under a variety of scenarios. The Monte Carlo outputs can be used to estimate the total *E. coli* loading from all outfalls along a segment/tributary if discharges from Priority Outfalls were addressed (i.e., through implementation of structural controls).

A second tier of action prioritization could be based on data for other indicators including human-specific source identifiers (e.g., human *Bacteroidales*, human-specific viruses, etc.). For example, the BSI Study (CREST 2008) employed a Weight of Evidence (WOE) Approach based on *E. coli*, *Enterococcus*, human *Bacteroidales*, universal *Bacteroidales*, and human adenovirus to highlight the "most problematic" storm drain outfalls along Segment B (Reach 2) and portions of Segment C and D (Reach 4). The results were used to identify outfalls that discharge relatively high levels of both traditional indicator bacteria and human-specific bacteria or viruses. Outfalls with these types of discharges could be considered to be the highest priority for TMDL implementation actions.

The use of a WOE is recommended, but not required by this TMDL. Agencies may elect to collect and analyze only *E. coli* data to identify Priority Outfalls for implementation actions (as opposed to relying upon a WOE Approach). Note that the WOE approach could be developed using a variety of methodologies. The BSI Study developed the WOE approach based on statistical properties (e.g., statistical differences and 90th and 99th percentile values) of the measured concentrations and loading rates of the suite of indicators. Furthermore, alternative approaches to the Monte-Carlo simulation are acceptable as long as they provide similar confidence that implementing actions on Priority Outfalls will result in attainment of WLAs.

To illustrate an EO-acceptable LRS approach to identifying Priority Outfalls, data collected during the BSI Study from Segment B are used herein, as shown in **Table 1**. The actual LRS for Segment B would be developed and submitted by MS4 Permittees during TMDL implementation. A map of the 51 unique outfalls that were flowing at least once during the BSI Study is presented in **Figure 3**.[1] The example approach utilized the following steps to identify Priority Outfalls for consideration in a hypothetical LRS:

1. Use a Monte Carlo model to analyze the loading rate of *E. coli* from each outfall sampled (**Section A1.2.1.1**). The model uses the measured log-transformed means and standard deviations to "randomly" simulate loading from each outfall during at least 50,000 iterations. The total *E. coli* loading from all outfalls is the sum of the total number of outfalls that were sampled along a given segment. For any parameter, the "expected" value is the median value over the 50,000 (or more) iterations. Accordingly, Step #1 in **Table 1** is the expected *E. coli* loading rates of the monitored outfalls from upstream to downstream.
2. Rank all drains from highest to lowest based on their simulated expected *E. coli* loading rate.
3. Identify whether outfalls were considered "problematic" for WOE indicators such as human virus used during the BSI Study. As stated above, this step is optional.
4. Rank all drains identified as problematic for WOE indicators highest to lowest based on their simulated expected *E. coli* loading rate (note in **Table 1** that only outfalls labeled as "YES" in Step #2 were carried to Step #3). As stated above, this use of the WOE approach is optional.
5. Priority Outfalls are those drains whose "elimination" results in the total *E. coli* loading rate from all outfalls along the segment being below the WLA (see the drains above the "WLA cutoff" in Step #3).

The results in **Table 1** demonstrate the potential Priority Outfalls for inclusion in a potential LRS for Segment B. By performing the Monte Carlo analysis, it is demonstrated that the elimination

[1] It should be noted that some of the identified/monitored outfalls during the BSI Study may be private/industrial outfalls as opposed to MS4 discharges. In this case, these discharges would not be considered MS4 discharges, and would not "count against" the MS4 WLA. Instead, the responsible industrial agencies would be required to meet their WLA using Best Available Technology.

of discharges from the following outfalls leads to the expected *E. coli* loading rate from outfalls to Segment B being lower than the WLA: R2-A, R2-K, R2-02, R2-06, and R2-J. The actual LRS for Segment B (and list of Priority Outfalls) would be developed and submitted by MS4 Permittees during TMDL implementation. A total of five outfalls may represent the minimum number of Priority Outfalls for the Segment B LRS. This number of outfalls could increase for a variety of reasons, including: actions are implemented that do not completely eliminate (100% reduce) the Priority Outfall discharges, or if MS4 agencies do not coordinate their efforts and submit separate LRS reports[2]. It is important to note that compliance with this TMDL is not based on whether or not an agency's discharge is draining to a Priority Outfall or Outlier Outfalls. All Permittees along the LA River segments/tributaries addressed under this TMDL are responsible for implementing bacteria source control actions as necessary to meet the WLAs, even if they do not have outfalls that discharge directly into a mainstem LA River segment or tributary.

Permittees may also want or need to consider evaluating potential actions at additional or other outfalls beyond Priority Outfalls to account for situations that could include, but are not limited to, when:

- Permittees prefer to perform actions at non-Priority outfalls (e.g., under non-coordinated implementation efforts).
- Implementation actions are infeasible at one or more Priority Outfalls (e.g., no local sewer capacity to accept runoff from one of the Priority Outfalls)
- Inclusion of the alternative outfalls would allow for a more cost-effective or multi-benefit solution while still resulting in attainment of the WLAs.
- Instead of completely "eliminating" a discharge (e.g., full infiltration of flow), agencies choose to utilize BMPs that reduce a significant portion of the *E. coli* loading from the outfall (e.g., a treatment device that achieves a 70% reduction).

For example, additional outfalls that might be evaluated as "backup" or alternative outfalls include R2-G, R2-E, R2-F, R2-Q, and R2-B (i.e., the outfalls that fell just below the WLA cutoff in **Table 1**).

[2] The MS4 WLAs in Section 6 are group-based allocations for discharges from all Permittees along a segment or tributary via the outfalls that are directly connected to the waterbody. As described in that section, if the Permittees elect to conduct individual implementation efforts, the WLA can be distributed to different agencies (or groups of agencies) based on proportional drainage area. In this case, each LRS would be designed to attain the proportional WLA, and the points-of-compliance would be the sets of outfalls that discharge from the corresponding jurisdictional areas.

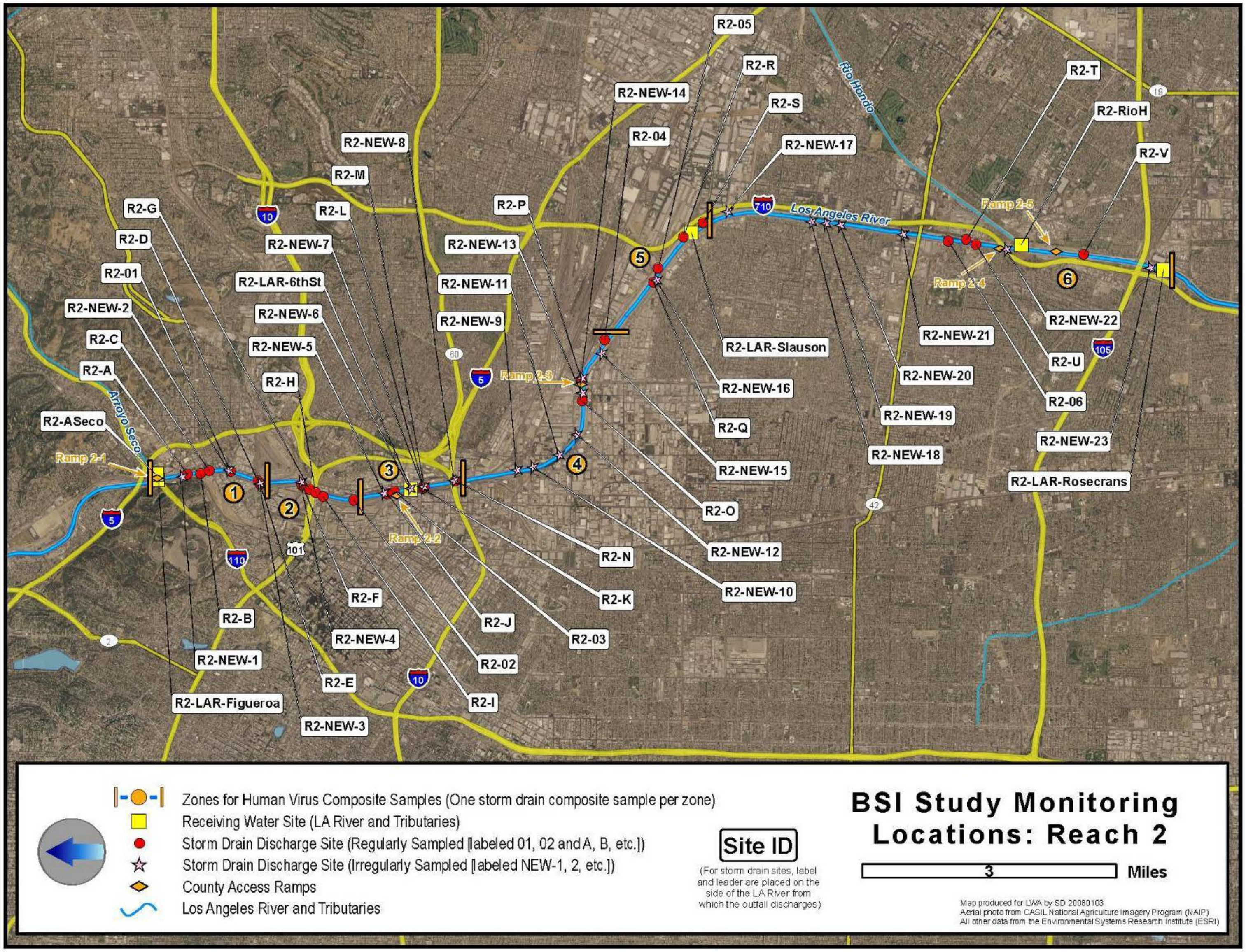


Figure 3. Segment B Outfalls Monitored during the BSI Study (CREST 2008)

Table 1. Monte Carlo Approach to Identifying Priority Outfalls for Outfall-based Load Reduction Strategy based on the LA River BSI Study (CREST 2008) Results for Segment B (upper and middle Reach 2, between Figueroa Street and Rosecrans Avenue) **[see notes at bottom of each column]**

Step #1		**Step #2**			**Step #3**		
Create model (Monte Carlo) of storm drain discharges along LA River segment based on outfall monitoring data.		Rank outfalls from highest to lowest based on expected *E. coli* loading rate and categorize using a Weight of Evidence (WOE) Approach.			Sum the *E. coli* loading from all outfalls, and identify the number of WOE outfalls required to reduce total storm loading of *E. coli* to below WLA of 472 x 10^9 MPN/day.		
Outfall ID	**Expected *E. coli* Loading Rate from Outfall** (10^9 MPN/day)	**Outfall ID**	**Expected *E. coli* Loading Rate from Outfall** (10^9 MPN/day, based on Simulation Median)	**Problematic for WOE Indicators other than *E. coli***	**Outfall ID**	**Expected <u>Total</u> Storm Drain *E. coli* Loading Rate if Discharge From Outfall Eliminated** (Cumulative, based on Simulation Median) (10^9 MPN/day)	
R2-NEW-1	0.00001	R2-A	140	H, ENT, UN		1,431 = Loading Prior to Action	
R2-A	140	R2-K	78	H, UN	R2-A	864	
R2-B	0.44	R2-02	31	H	R2-K	730	
R2-C	0.010	R2-06	29	ENT	R2-02	629	Priority Outfalls
R2-NEW-2	0.0065	R2-J	20	V	R2-06	521	
R2-01	3	R2-G	15	H, V, ENT	R2-J	438	
R2-D	1	R2-E	12	UN	R2-G	355	
R2-NEW-3	0.00001	R2-V	10	none	R2-E	301	
R2-E	12	R2-P	6	none	R2-F	274	
R2-NEW-4	0.00005	R2-04	5	none	R2-Q	259	Non-Priority Outfalls
R2-F	4	R2-F	4	H, V, and UN	R2-B	258	
R2-G	15	R2-03	4	none	R2-NEW-18	217	
R2-H	0.0013	R2-Q	4	ENT, UN	R2-NEW-15	214	
R2-I	2	R2-01	3	none			
R2-02	31	R2-R	2	none			
R2-NEW-5	0.0001	R2-05	2	none			
R2-J	20	R2-M	2	none			
R2-03	4	R2-I	2	none			
R2-NEW-6	0.00001	R2-T	1	none			
R2-K	80	R2-D	1	none			
R2-NEW-7	0.00005	R2-B	0.44	ENT, V			

Continued on next page

Step #1		Step #2			Step #3	
Create model (Monte Carlo) of storm drain discharges along LA River segment based on outfall monitoring data.		Rank outfalls from highest to lowest based on expected *E. coli* loading rate and categorize using a Weight of Evidence (WOE) Approach.			Sum the *E. coli* loading from all outfalls, and identify the number of WOE outfalls required to reduce total storm loading of *E. coli* to below WLA of 472 x 10^9 MPN/day.	
Outfall ID	**Expected *E. coli* Loading Rate from Outfall** (10^9 MPN/day)	**Outfall ID**	**Expected *E. coli* Loading Rate from Outfall** (10^9 MPN/day, based on Simulation Median)	**Problematic for WOE Indicators other than *E. coli***	**Outfall ID**	**Expected Total Storm Drain *E. coli* Loading Rate if Discharge From Outfall Eliminated** (Cumulative, based on Simulation Median) (10^9 MPN/day)
R2-L	0.0013	R2-U	0.33	none		
R2-M	2	R2-NEW-23	0.16	none		
R2-NEW-8	0.00005	R2-S	0.014	none		
R2-NEW-9	0.00001	R2-NEW-18	0.012	ENT		
R2-NEW-10	0.00003	R2-C	0.010	none		
R2-NEW-11	0.00001	R2-NEW-2	0.0065	none		
R2-NEW-12	0.00001	R2-L	0.0013	none		
R2-O	0.00027	R2-H	0.0013	none		
R2-NEW-13	0.00003	R2-NEW-20	0.0007	none		
R2-P	6	R2-NEW-16	0.0007	none		
R2-NEW-14	0.00009	R2-NEW-17	0.0005	none		
R2-NEW-15	0.00007	R2-O	0.0003	ENT		
R2-04	5	R2-NEW-5	0.0001	none		
R2-Q	4	R2-NEW-14	0.00009	none		
R2-NEW-16	0.0007	R2-NEW-15	0.00007	UN, ENT		
R2-05	2	R2-NEW-22	0.00006	none		
R2-R	2	R2-NEW-7	0.00005	none		
R2-S	0.014	R2-NEW-4	0.00005	none		
R2-NEW-17	0.0005	R2-NEW-8	0.00005	none		
R2-NEW-18	0.012	R2-NEW-13	0.00003	none		
R2-NEW-19	0.00002	R2-NEW-10	0.00003	none		
R2-NEW-20	0.00070	R2-NEW-19	0.00002	none		
R2-NEW-21	0.00000	R2-NEW-11	0.00001	none		
R2-06	29	R2-NEW-1	0.00001	none		

Continued on next page

Step #1		Step #2			Step #3	
Create model (Monte Carlo) of storm drain discharges along LA River segment based on outfall monitoring data.		Rank outfalls from highest to lowest based on expected *E. coli* loading rate and categorize using a Weight of Evidence (WOE) Approach.			Sum the *E. coli* loading from all outfalls, and identify the number of WOE outfalls required to reduce total storm loading of *E. coli* to below WLA of 472 x 10^9 MPN/day.	
Outfall ID	**Expected *E. coli* Loading Rate from Outfall** (10^9 MPN/day)	**Outfall ID**	**Expected *E. coli* Loading Rate from Outfall** (10^9 MPN/day, based on Simulation Median)	**Problematic for WOE Indicators other than *E. coli***	**Outfall ID**	**Expected <u>Total</u> Storm Drain *E. coli* Loading Rate if Discharge From Outfall Eliminated** (Cumulative, based on Simulation Median) (10^9 MPN/day)
R2-T	1	R2-NEW-9	0.00001	none		
R2-U	0.33	R2-NEW-3	0.00001	none		
R2-NEW-22	0.00006	R2-NEW-12	0.00001	none		
R2-V	10	R2-NEW-6	0.00001	none		
R2-NEW-23	0.16	R2-NEW-21	0.00000	none		
Note: Order is from upstream to downstream.		**Note**: Order is from highest expected *E. coli* loading rate, based on median of Monte Carlo simulation. WOE indicators for the BSI Study were: ENT = *Enterococcus*, H = Human *Bacteroidales*, UN = Universal *Bacteroidales*, and V = Adenovirus. **Note:** It should be noted that some of these identified outfalls may be private/industrial outfalls as opposed to MS4 discharges. In this case, these discharges would not be considered MS4 discharges, and would not "count against" the MS4 WLA. Instead, the responsible industrial agencies would be required to meet their WLA using Best Available Technology. **Option**: For cost savings, agencies may elect to emphasize only *E. coli* for implementation actions (as opposed to relying upon the WOE Approach).			**Note**: Order is from highest to lowest expected *E. coli* loading rate, but only WOE outfalls. "cutoff " is drawn below the outfalls that once addressed would result in meeting Segment B WLA of 472 x 10^9 MPN/day. Only WOE outfalls above the WLA cutoff are targeted for the Load Reduction Strategy if complete elimination of their discharges is feasible and desirable. **Option**: Instead of completely eliminating a discharge from an outfall (e.g., infiltration of all flow), agencies may elect to utilize BMPs that reduce a significant portion of the *E. coli* loading from the outfall (e.g., a treatment facility that achieves a 70% reduction). In this case, additional outfalls (i.e. outfalls below the "cutoff") would likely need to be addressed. The model (Monte Carlo) can be used to estimate the combination of outfalls and BMPs needed to meet the WLA.	

Identification of Outlier Outfalls

The Monte Carlo approach (or equivalent) is based on the "expected" loading rate, and therefore generates a list of Priority Outfalls that tend to have consistent, relatively high *E. coli* loading rates. These are the highest priority outfalls for implementation actions. However, in some cases, a subset of outfalls (termed "Outlier Outfalls") could have episodic (unexpected) discharges with relatively large *E. coli* loading rates. For instance, an outfall could be observed to flow during only one of several monitoring events, but during that single event its *E. coli* loading rate was very high, leading to an exceedance of the WLA. The Monte Carlo analysis may not highlight this outfall because its *E. coli* discharge is rare or "unexpected". Therefore, the LRS approach includes a second tier of prioritization that assesses whether discharges from Outlier Outfalls occurred.

Outlier Outfalls are identified as the outfalls that have the highest potential to drive MS4 loading above the WLA even after Priority Outfalls are addressed. In other words, the list of Outlier Outfalls can be generated by retrospectively determining the *E. coli* loading rate that *would have been* measured from storm drains along a segment/tributary if the Priority Outfalls were addressed. The process for identifying Outlier Outfalls is presented in **Table 2** using the Segment B data from the BSI Study**.**

The results in **Table 2** demonstrate the potential Outlier Outfalls for inclusion in a potential LRS for Segment B. If each of the Priority Outfalls would have been addressed with a BMP that resulted in 100% removal of the *E. coli* loading, the Outlier Outfalls that would have caused the WLA to be exceeded are: R2-E, R2-T, R2-NEW-14, R2-NEW-18, and R2-NEW-20. The actual LRS for Segment B (and list of Outlier Outfalls) would be developed and submitted by MS4 Permittees during TMDL implementation.

Because the discharges from Outlier Outfalls are episodic, it is not expected that they would be subject to structural actions during subsequent iterations. Instead, the Outlier Outfalls would be investigated to determine potential sources of *E. coli*, particularly human fecal sources that could have led to the elevated bacteria loading rates. The LRS should clearly state the investigative actions that are planned for the Outlier Outfalls. These investigative actions would occur while actions are being implemented at Priority Outfalls. During follow-up monitoring to determine if WLAs have been met, the Outlier Outfalls would also be monitored which would evaluate whether more regular discharges of indicator bacteria are occurring. If so, the Outlier Outfalls might be candidates for follow-up structural actions.

Table 2. Monte Carlo Approach to Identifying Outlier Outfalls for Outfall-based Load Reduction Strategy based on the LA River BSI Study (CREST 2008) Results for Segment B (upper and middle Reach 2, between Figueroa Street and Rosecrans Avenue)

Step #1		Step #2			Step #3
Determine the total *E. coli* loading from all non-Priority outfalls. Note: these loading rates are measured, not simulated.		For events with non-Priority loading greater than WLA, rank outfalls based on *E. coli* loading, and determine the number of outfall discharges that must be "removed" to meet WLA. Note: these loading rates are measured, not simulated.			The highest-ranked outfalls that caused *E. coli* loading to be above the WLA are the Outlier Outfalls.
Event	**Measured *E. coli* Loading Rate from All Non-Priority Outfalls** (10^9 MPN/day)	**Outfall ID**	**Measured *E. coli* Loading Rate from Outlier Outfall** (10^9 MPN/day)	**Measured *E. coli* Loading Rate from Non-Priority Outfalls after Cumulative Removal of Outlier Outfalls** (10^9 MPN/day)	**Identified Outlier Outfalls**
1	263 √	-	-	-	R2-E [1] R2-T [2] R2-NEW-14 [a, b] R2-NEW-18 [b, c] R2-NEW-20 [b, c]
2	559	R2-E	174	385	
3	297 √	-	-	-	
4	539	R2-NEW-18	416	123	
5	2,805	R2-T	1,808	997	
		R2-NEW-14	308	689	
		R2-NEW-18	274	415	
6	15,910	R2-NEW-20	15,476	434	

√ – *E. coli* loading rate is below the WLA of 472 x 10^9 MPN/day, and thus there are zero Outlier Outfalls.
1 – Human-specific *Bacteroidales* was detected at this site in 2 of 6 samples collected during the BSI Study.
2 – Human-specific *Bacteroidales* was detected at this site in 5 of 6 samples collected during the BSI Study.
a – Human-specific *Bacteroidales* was detected at this site in 1 of 1 samples collected during the BSI Study.
b – Based on a preliminary GIS investigation, these outfalls may be private/industrial outfalls as opposed to MS4 discharges, and thus these outfalls/discharges may not be a required component of the MS4 LRS. Instead, these discharges would be addressed by industrial Permittees using Best Available Technology.
c – Human-specific *Bacteroidales* was detected at this site in 0 of 2 samples collected during the BSI Study.

LRS Part 2: Field Assessment for Priority Outfalls

A wide array of structural actions could be taken to reduce bacteria and pathogen loading from Priority Outfalls. Additionally, it may be possible to track down and eliminate upstream *E. coli* sources (e.g., through a sanitary survey or a more detailed investigation of the sanitary sewer system), which could eliminate the need to install BMPs/structural controls. Thus Part 2 of the LRS includes a field assessment of the feasibility of potential structural actions at the Priority Outfalls and potentially an investigation of sources.

The primary purpose of conducting a field assessment is to evaluate the feasibility of potential actions to provide assurance that actions proposed in the LRS are implementable. One purpose of a field assessment would be to evaluate the technical feasibility of constructing a specific BMP/structural control given potential site-specific constraints. Potential site constraints could include, but are not limited to, availability of land to construct a project, access to utilities, and/or proximity to wastewater infrastructure with available capacity.

Another purpose of a field assessment would be to conduct more detailed investigation of potential sources to determine if source elimination (e.g., from a sanitary sewer connection), rather than a structural BMP to divert or manage the runoff would be an appropriate option. Thus source investigations could take very different paths. Potential steps for investigating sources are provided as an example below. MS4 Permittees can take alternative steps to conduct an investigation or bypass the investigation entirely if it is not necessary to support the proposed action. For example, if MS4 Permittees determine the appropriate action is a low flow diversion near the point of discharge, then the aforementioned information may not be needed. The following example steps could be utilized within the drainage areas of the Priority Outfalls:

1. **Conduct a desktop GIS evaluation** – GIS land use data could be used to delineate the sub-drainage area for each specific Priority Outfall. This analysis could (1) determine the area from which the water discharged from the outfalls and (2) examine land uses and evaluate whether specific land uses might contribute significant bacteria loadings. For example, if an associated land use in the sub-drainage area includes equestrian-related activities, these types of activities could be a potential source of the bacteria loading to the outfall.
2. **Investigate presence of Onsite Wastewater Treatment Systems (OWTS) –** conduct review of sub-drainage area by contacting local sewer and/or public health agencies to determine whether OWTS are present in the drainage area. Leaks from septic systems may be a bacteria source in dry weather runoff. Information regarding OWTS is proved in the Source Assessment (Section 4).
3. **Coordinate with POTW agencies and evaluate Sanitary Sewer Overflows (SSOs)** – contact wastewater collection agencies within the outfall sub-drainage area to determine if the sewer system is in need of rehabilitation or if there have been reported capacity issues or reports of SSOs which may be a potential source for bacteria loading.
4. **Evaluate illegal discharge and illicit connections (ID/IC) related activities –** evaluate ID/IC inspection and enforcement information as conducted by the local municipal agency. It is possible that historical information may provide evidence that might suggest sources contributing to bacteria loading.

5. **Conduct upstream source tracking/monitoring** – upstream source tracking/monitoring of *E. coli* could be used to identify hot spots and narrow the geographic extent of the potential actions.

LRS Part 3: Summarize Field Assessment and Identify Actions for Priority Outfalls and Outlier Outfalls

There are five components the LRS that should be used to summarize field assessment efforts and identify proposed actions at Priority Outfalls and Outlier Outfalls, as follows:

A. Summarize results of field assessment at the Priority Outfalls.
B. Identify proposed actions for Priority Outfalls.
C. Demonstrate that implementation of actions at the Priority Outfalls will result in attainment of WLAs.
D. Establish timeline for implementation of actions at Priority Outfalls.
E. Identify proposed follow-up/investigation efforts at Outlier Outfalls.

These five components (A through E) are described below.

A. Summarize Results of Field Assessment at Priority Outfalls

If Priority Outfalls have been investigated for potential sources for bacteria loading (as described in LRS Part 2), the responsible agencies shall summarize the results of investigations. In particular, if a bacteria source was identified and abated, and therefore expected to reduce the loading of *E. coli* from a Priority Outfall (and the corresponding need for structural controls), then supporting field data shall be provided. The current/expected loading rate from the Priority Outfall (after the source abatement) shall be estimated.

Also, it is possible that the field assessment determines that one or more Priority Outfalls are privately-owned (e.g., industrial). In this case, the discharge is not a contributor to the MS4, and thus is not actually an Outlier Outfall for which MS4 Permittees would have responsibility. It is the responsibility of the private owner to take action to address the problematic discharge. The problematic discharge shall be reported to the Regional Board by the MS4 as soon as possible, documented by the MS4 in the LRS field assessment summary, and the Regional Board will follow-up with the private owner to reduce or eliminate *E. coli* loading in accordance with their WLA.

B. Identify Proposed Actions for Priority Outfalls

Permittees may choose whichever implementation actions are preferred to reduce or eliminate the *E. coli* loading from Priority Outfalls. Sufficient information for actions must be submitted to the Regional Board EO to provide reasonable assurance, as described in Part C below, that implementing proposed actions will result in a load reduction sufficient to attain the WLAs. The range of actions could include source control BMPs implemented on a local and/or system-wide basis (presented in **Section 7.7.4**) to structural BMPs implemented at the Priority Outfalls or within the outfall drainage area (e.g., low flow diversions or infiltration). The primary goal of these actions would be to address one or more of the following:

- Reduce human pathogen source inputs
- Reduce or eliminate dry weather runoff
- Emphasize multi-purpose benefits wherever possible

The following describes potential structural controls that could be used to reduce bacteria loading from Priority Outfalls. Recall that system wide source control actions are described in **Section 7.7.4**.

It should be noted that it may not be feasible/desirable in some cases to locate structural controls in the proximity of the Priority Outfall. Instead, structural controls may be located further upstream in the outfall's drainage area, capturing or treating runoff from a portion of the subwatershed.

Low Flow Diversions

Low flow diversions (LFDs) are a commonly used BMP to eliminate dry weather bacteria loading from storm drain outfalls. This type of project would generally involve diverting the dry weather flows from the Priority Outfalls and conveying it directly to the sanitary sewer system. By doing so, the LFD would completely eliminate the dry weather discharge and any potential *E. coli* loading from the Priority Outfall to the LA River segment or tributary being addressed. This type of BMP would also remove other pollutants and thus benefit implementation efforts for other TMDLs (e.g., the Metals TMDL). A number of LFD projects have been completed by the City of Los Angeles, County of Los Angeles, and the City of Santa Monica to eliminate dry weather discharges from storm drains to address the Santa Monica Beaches TMDL. A major challenge for LFD installations is to (1) identify a local sanitary sewer connection to receive the storm drain runoff and to (2) determine if the sanitary sewer system and corresponding wastewater treatment plant has sufficient capacity to accept the discharges. In addition, the LFD project may require pumping if the closest sewer line with capacity is at a higher elevation than the storm drain. Construction of a pump station structure or manhole may require acquisition of property and connection of utilities, which can be a challenge in urbanized areas.

Infiltration BMPs

Another example treatment BMP would be one that infiltrates dry weather runoff from a downstream storm drain within a priority subwatershed into the subsurface soil. The location of infiltration BMPs could range from "green streets" projects to a constructed basin or an area such as a park or other property where runoff could be infiltrated and/or reused for purposes such as irrigation. Infiltration BMPs would also remove other pollutants and thus benefit implementation efforts for other TMDLs (e.g., the Metals TMDL). A major challenge with infiltration BMPs can be attaining sufficient land for an infiltration site.

A distributed approach to infiltration of dry weather runoff is often categorized as "low impact development" (LID) or green infrastructure. With this approach, runoff from multiples sites (e.g., houses, developments, street blocks, etc.) is infiltrated directly on-site or conveyed to nearby infiltration sites (e.g., planters along the edge of a street). According to stakeholders at a CREST Implementation Workshop held in September 2009, this is the preferred approach to runoff management; however, the time scales associated with retrofitting large drainage areas are likely relatively long compared to discrete structural controls installed near storm drains and/or outfalls.

Treatment BMPs

A third general option is that flow from a subwatershed could be routed through a treatment BMP (e.g., a sand filter or a treatment wetland) with the ability to reduce bacteria concentrations in dry weather flows and discharge the treated runoff. It is likely that the effective BMP removal of the bacteria discharged from the outfall would be less than 100%. Peer-reviewed information on treatment BMPs that effectively reduce bacteria concentrations is scarce. It is unclear whether treatment BMPs for bacteria would also remove other pollutants and benefit implementation efforts for other TMDLs (e.g., the Metals TMDL).

C. Demonstration that Proposed Actions at Priority Outfalls are Expected to Result in Attainment of the WLAs

The LRS may contain a wide array of action types at a variety of locations, and thus there is much flexibility within the LRS to formulate an implementation strategy for a given LA River segment or tributary. The primary requirement of the LRS is that it must demonstrate that implementation actions proposed for the Priority Outfalls are expected to result in attainment of the WLAs. The following outlines a process for providing reasonable assurance to the Regional Board EO that proposed implementation actions at the Priority Outfalls will result in attainment of the WLAs. Alternative approaches are acceptable as long as they provide an equivalent (or higher) level of assurance that implementation actions proposed for the Priority Outfalls will result in attainment of WLAs. Recall that discharges from Outlier Outfalls will be addressed with follow-up source investigations, as discussed in the next subsection.

Monte Carlo simulations similar to those utilized to identify Priority Outfalls could be used to that demonstrate that implementation actions proposed for the Priority Outfalls will result in attainment of the WLAs. The expected performance (i.e., expected concentration and associated load from effluent) after a proposed BMP is installed could be input into the already-constructed Monte Carlo model. For example, if infiltration of all flow from the Priority Outfall is the action selected for a specific outfall, then the expected reduction used in the Monte Carlo simulation would be 100%. If an alternative action that is expected to result in less than 100% removal (i.e., wetland or treatment device) then the expected reduction would be based on the available treatment effectiveness data.

Using data from Segment B, **Table 3** provides an example, of a demonstration for inclusion in an LRS if all Priority Outfalls are addressed by actions expected to *completely eliminate* dry weather discharges (i.e., complete infiltration, diversion, etc.). As shown in **Table 3**, it is expected that the proposed LRS actions at the Priority Outfalls in Segment B would result in attainment of the WLA; the expected *E .coli* loading rate from all storm outfalls along Segment B is 461 x 10^9 MPN/day, which is less than the WLA of 472 x 10^9 MPN/day.

An example demonstration that incorporates BMPs that do not achieve 100% reduction is shown in **Table 4**. This example provides estimates of post-BMP *E. coli* loading rates for a sand filter and treatment wetland based on values reported from the International Stormwater BMP

Database (www.bmpdatabase.org; Clary et al. 2008). A variety of approaches could be used to estimate post-treatment BMP loading rates, including:

- Setting the *E. coli* concentration in BMP effluent equal to the expected concentration based on reliable field data (i.e., data previously collected by other entities)
- Adjusting the post-BMP effluent rate to the expected flow rate value if the BMP includes a flow reduction mechanism
- Multiplying the expected loading by an estimated percent reduction from reliable field data (i.e., data previously collected by other entities)

The hypothetical example in **Table 4** highlights the potential for an LRS based on BMPs that are less effective at removing *E. coli* (compared to complete diversion) could require actions at a greater number of Priority Outfalls (5 outfalls in **Table 3** versus 7 outfalls in **Table 4**).

Table 3. Hypothetical LRS for Segment B based on Complete Diversion and Infiltration at Priority Outfalls[1]

Priority Outfall	**Expected Current *E. coli* Loading Rate** (10^9 MPN/day)	**Proposed LRS Action[2]**	**Expected *E. coli* Loading Rate after Proposed LRS Actions** (10^9 MPN/day) (% Reduction)	**Expected *E. coli* Loading Rate from all Segment B Outfalls after Proposed LRS Actions[3]** (10^9 MPN/day)
R2-A	140	Diversion	0 (100%)	864
R2-K	78	Diversion	0 (100%)	730
R2-02	31	Infiltration	0 (100%)	629
R2-06	29	Infiltration	0 (100%)	521
R2-J	20	Diversion	0 (100%)	438

1 – Expected values are based on Monte Carlo simulation medians
2 – These actions are completely hypothetical for demonstration purposes only and have not been assessed for feasibility or desirability.
3 – These loading rates are cumulative based on LRS actions, starting at R2-A and ending at R2-J.

Table 4. Hypothetical LRS for Segment B based on Incorporating Treatment BMPs at Priority Outfalls[1]

Priority Outfall	Current Expected *E. coli* Loading Rate[2] (10^9 MPN/day)	Proposed LRS Action[1]	Expected *E. coli* Loading Rate after Proposed LRS Actions (10^9 MPN/day) (% Reduction)	Expected *E. coli* Loading Rate from all Segment B Outfalls after Proposed LRS Actions[3] (10^9 MPN/day)
R2-A	140	Diversion	0 (100%)	883
R2-K	78	Diversion	0 (100%)	742
R2-02	31	Wetland [4]	15 (50%)	694
R2-06	29	Media filter [5]	10 (65%)	637
R2-J	20	Wetland [4]	9 (50%)	597
R2-G	15	Diversion	0 (100%)	508
R2-E	12	Diversion	0 (100%)	446

1 – These actions are completely hypothetical for demonstration purposes only and have not been assessed for feasibility or desirability.
2 – Expected values are based on Monte Carlo simulation medians using data collected from the BSI Study.
3 – The expected *E. coli* loading from all outfalls *prior* to action is 1372 x 10^9 MPN per day. The expected post-action loading rates are cumulative based on employed BMPs, starting with a LFD at R2-A and ending with an LFD at R2-E. The MS4 WLA for Segment B is 472 x 10^9 MPN per day.
4 – Median of 4 values reported by Clary et al. (2008) from the International Stormwater BMP Database (www.bmpdatabase.org). Reductions ranged from 0 to 98.5%. The average reduction was 38.4%.
5– Median of 12 values reported by Clary et al. (2008) from the International Stormwater BMP Database. Reductions ranged from 0 to 94.8%. The average reduction was 40.6%.

D. Establish Timeline for Implementing Proposed Actions at Priority Outfalls

A timeline for implementing the specific actions at Priority Outfalls must be provided in the LRS, including milestones during the course of LRS implementation. Information that could be provided to support a proposed a timeline includes the following:

- The requirements and corresponding timeline to plan, design, construct and initiate operation of a treatment facility.
- The requirements and corresponding timeline to implement specific actions to address wastewater infrastructure issues related to a Priority Outfall.
- The requirements and corresponding timeline to implement ordinances to address specific sources to a Priority Outfall such as OWTS.

The proposed timeline for an LRS must be in accordance with the Implementation Schedule in **Section 7.10**.

E. Summarize Proposed Investigation Actions at Outlier Outfalls

Outlier Outfalls and their corresponding drainage areas and storm drain networks shall be investigated to determine potential sources of *E. coli*, particularly human fecal sources that could have led to the episodic elevated bacteria loading rates. The LRS should clearly state the investigative actions that are planned for the Outlier Outfalls, along with a proposed timeline for the investigative actions.

It should be noted that the one or more of the Outlier Outfalls may be privately-owned (e.g., industrial). In this case, the discharge is not a contributor to the MS4, and thus is not actually a Outlier Outfall for which MS4 Permittees would have responsibility. It is the responsibility of the private owner to take action to address the problematic discharge. The problematic discharge shall be reported to the Regional Board by the MS4 as soon as possible, documented by the MS4 in the LRS field assessment summary, and the Regional Board will follow-up with the private owner to reduce or eliminate *E. coli* loading in accordance with their WLA.

A1.2.1.4 Step 4: Regional Board EO Approval of LRS

The LRS shall be submitted for Regional Board EO approval. The Regional Board EO shall approve the LRS if:

1. Priority Outfalls and Outlier Outfalls are identified in a manner consistent with the Monte Carlo simulation approach presented above (or an alternative approach that provides equivalent assurance that implementing actions on Priority Outfalls will result in attainment of WLAs).
2. Summary information is presented from the field assessment of Priority Outfalls. If a source was identified and abated, then supporting evidence shall be provided along with an estimate of the current (post source-control) *E. coli* loading rate. Also, if Priority Outfalls are identified as non-MS4, then supporting information shall be provided for RB follow-up.
3. It is demonstrated that proposed actions at Priority Outfalls will result in attainment of WLAs in a manner consistent with the Monte Carlo simulation approach presented above (or an alternative approach that provides equivalent assurance that implementing actions on Priority Outfalls will result in attainment of WLAs).
4. The timeline for implementation of actions presented in LRS is consistent with the TMDL schedule presented in **Section 7.10**.
5. Proposed investigative actions and corresponding timelines are detailed for Outlier Outfalls.

A1.2.1.5 Step 5: Implement Load Reduction Strategy

Step 5 represents the implementation of the LRS (i.e., implementing controls at Priority Outfalls and investigating Outlier Outfalls). Implementation of actions will be initiated upon Regional Board EO Approval of the LRS.

A1.2.1.6 Step 6: Conduct Outfall Monitoring to Determine Compliance with WLA

Upon completion of the implementation actions identified in the LRS, outfall monitoring must be conducted to evaluate whether the LRS resulted in attainment of the WLAs. The monitoring will be conducted in the same manner as under Step 1, and as described in **Section 8** (not yet developed). The goal of the outfall monitoring is to characterize the *E. coli* loading from all flowing storm drain outfalls (Priority Outfalls, Outlier Outfalls, and all other outfalls) and determine if WLAs were attained after the LRS was implemented. If a reported SSO is contributing to bacteria loading at an outfall, the loading from that outfall will not be considered in calculating the total storm drain loading. The SSO should be documented and reported to the Regional Board in accordance with State regulations. Also, in the case of non-MS4 discharges, it is the responsibility of those Permittees to take actions to address problematic discharges.

A1.2.1.6.1 Step 7: Identify Next Steps

The next steps for TMDL implementation shall be based on an evaluation of attainment of the WLAs and in-stream target. The Outfall-based Approach Flow Diagram (**Figure 2**) presents three scenarios that represent the potential outcomes of implementing an Outfall-based Approach LRS, as follows:

- Scenario 1: MS4 WLA attained and in-stream target met
- Scenario 2: MS4 WLA attained but in-stream target is not met
- Scenario 3: MS4 WLA not attained and in-stream target is not met

The following describes each scenario in more detail. The Implementation Schedule section (**Section 7.10**) provides detail on the timing of completion of Step 7 for each iteration.

Scenario 1: WLA attained and in-stream target met

Scenario 1 represents the situation where the WLA is attained in a given LA River segment or tributary and the in-stream TMDL target is met at the ambient (in-stream) monitoring location. This scenario represents success for TMDL implementation. In-stream monitoring shall be continued to support evaluation of conditions in relation to the in-stream TMDL target as described in **Section 8** (not yet developed). Should future conditions change and in-stream concentrations at the ambient monitoring location consistently exceed the TMDL target, then outfall monitoring would be resumed to confirm that the MS4 discharges are not the cause of WQO exceedance. Through this monitoring it may be possible to identify the causes of the WQO exceedances. Because LA River segments and tributaries are addressed in a stepwise fashion (i.e., not all segments and tributaries are addressed immediately and the most downstream segments are prioritized before upstream segments), it is expected that Scenario 1 will not occur in some segments until the TMDL target is attained in upstream segments (i.e., loading from upstream segment as opposed to MS4 discharges within the segment may cause TMDL target exceedances).

Scenario 2: WLA attained but in-stream target is not met

There are several situations that could lead to the TMDL target not being met, even though the WLAs are attained. For example, LA River segments are addressed in a stepwise fashion, and in some cases, it is not expected that the TMDL target will be met until the TMDL target is attained in the upstream segments (i.e., loading from upstream segment as opposed to MS4 discharges within the segment may cause TMDL target exceedances). For example, flows from Segment D could lead to exceedances in Segment C[3]. Once the WLAs are attained for a segment or tributary and upstream tributaries and segments, it is expected that the in-stream TMDL target will be met at the ambient (in-stream) monitoring location. If not, then either the TMDL Target or the MS4

[3] In some cases, discharges of WRP effluent and accompanying dilution may limit the effect of upstream segments on downstream bacteria concentrations. For example, *E. coli* concentrations at the upstream end of Segment B are much lower than concentrations in Segment C above City of LA-Glendale WRP. Thus, the watershed downstream of City of LA-Glendale WRP may be "uncoupled" from the watershed upstream of the City of LA-Glendale WRP.

WLA need to be evaluated as described in Scenarios 2a, 2b, and 2c, including consideration of information generated through special studies and monitoring. That is, one or both of the following efforts would be undertaken:

1. ***Evaluate the water quality standards and reference watershed information to determine if a revision to the in-stream TMDL target is appropriate.*** For example, the WQOs may be revised due to new or revised criteria from SWRCB or USEPA; the beneficial uses could be revised based on an evaluation of the existing and attainable beneficial uses; special studies information from reference watersheds could suggest that the number of allowable exceedance days (the TMDL target and LA for natural, non-point sources) should be revised; or special studies could support a Natural Sources Exclusion.

2. ***Revise the WLAs to attain the in-stream TMDL target.*** For example, new information could suggest calculated WLAs are too large, and need to be revised.

Three scenarios might follow from the evaluation of the TMDL targets:

- **Scenario 2a: No revision to TMDL target is warranted -** if special studies and/or monitoring data do not support a revision to the TMDL target (i.e., changes to the WQOs, beneficial uses, and/or the number of allowable exceedance days), then the WLA would need to be revised (i.e., lowered) to attain the in-stream TMDL target. WLAs would need to be revised through a Basin Plan Amendment (BPA). If the loading from the MS4 system is not meeting the revised WLA, then a new LRS would be required for submittal to the Regional Board EO for approval per the Implementation Schedule section (**Section 7.10**). The new LRS would demonstrate how Permittees would meet the new WLA (per LRS Step 3, described above in **Section A1.2.1.3**) and the iterative process would be initiated (i.e., Steps 4 through 7 would be conducted again).
- **Scenario 2b: Revision to TMDL target is warranted and revised in-stream TMDL target is then met –** if special studies and/or monitoring data support a re-evaluation of the TMDL target, then a BPA would need to be developed and considered by the Regional Board for adoption (to adjust the WQOs, beneficial uses, and/or the number of allowable exceedance days). Following the BPA, available water quality data would be evaluated to determine if *E. coli* concentrations at the ambient (in-stream) monitoring location meet the new/revised target. If the segment is no longer categorized as impaired per the State's Listing Policy, then a new LRS is not required. This scenario represents success for TMDL implementation. In this case, in-stream monitoring shall be continued to evaluate in-stream conditions per Scenario 1.
- **Scenario 2c: Revision to in-stream TMDL target warranted but revised in-stream TMDL target is not met –** if the in-stream TMDL target is revised but continues to not met according to recent water quality data, then the TMDL WLAs would need to be revised (i.e., lowered) through a BPA to ensure attainment of the in-stream TMDL target. A new LRS would be required for submittal to the Regional Board EO for approval per the Implementation Schedule section (**Section 7.10**). The new LRS would demonstrate how Permittees would meet the new WLA (per LRS Step 3, described above in **Section A1.2.1.3**) and the iterative process would be initiated (i.e., Steps 4 through 7 would be repeated).

Scenario 3: WLA not attained and in-stream TMDL target is not met

The LRS submitted by MS4 Permittees will clearly identify the actions required to attain WLAs and the analysis supporting the proposed actions will demonstrate the LRS is expected to result in WLA attainment. However, given the challenges discussed throughout the TMDL it is possible that WLAs will not be attained even if all actions identified in the LRS are taken (i.e., new or previously unidentified sources introduce *E. coli* into the MS4 system). Even under this scenario it is important to consider any new information that has become available regarding bacteria in the Watershed (i.e., information generated through special studies and monitoring). Thus, just was with Scenario 2, the following two steps are necessary under Scenario 3:

1. ***Evaluate the water quality standards and reference watershed information to determine if a revision to the in-stream TMDL target is appropriate.*** For example, the WQOs may be revised due to new or revised criteria from SWRCB or USEPA; the beneficial uses could be revised based on an evaluation of the existing and attainable beneficial uses; special studies information from reference watersheds could suggest that the number of allowable exceedance days (the TMDL target and LA for natural, non-point sources) should be revised; or special studies could support a Natural Sources Exclusion.

2. ***Revise the WLAs to attain the in-stream TMDL target.*** For example, new information could suggest calculated WLAs are too large, and need to be revised.

Three scenarios might follow from the evaluation of the TMDL targets:

- **Scenario 3a: No revision to TMDL target warranted –** if special studies and/or monitoring data do not support a revision to the TMDL target (i.e., changes to the WQOs, beneficial uses, and/or the number of allowable exceedance days), then a new LRS would be required for submittal to the Regional Board EO for approval per the Implementation Schedule section (**Section 7.10**). The new LRS would demonstrate how Permittees would meet the WLA (per Step 3, described above in **Section A1.2.1.3**) and the iterative process would be initiated (i.e., Steps 4 through 7 would be conducted again).
- **Scenario 3b: Revision to TMDL target warranted and revised in-stream TMDL target is then met –** if special studies and/or monitoring data support a re-evaluation of the TMDL target, then a BPA would need to be developed and considered by the Regional Board for adoption (to adjust the WQOs, beneficial uses, and/or the number of allowable exceedance days). Following the BPA, available water quality data would be evaluated to determine if *E. coli* concentrations at the ambient (in-stream) monitoring location meet the new/revised target. If the segment is no longer categorized as impaired per the State's Listing Policy, then a new LRS is not required. This scenario represents success for TMDL implementation. In this case, in-stream monitoring shall be continued to revaluate in-stream conditions per Scenario 1.
- **Scenario 3c: Revision to TMDL target warranted but revised in-stream TMDL target is not met –** if the in-stream TMDL target is revised but continues to not be met according to recent water quality data, then the TMDL WLAs would need to be revised (i.e., lowered) through a BPA to ensure attainment of the in-stream TMDL target. A new

LRS would be required for submittal to the Regional Board EO for approval per the Implementation Schedule section (**Section 7.10**). The new LRS would demonstrate how Permittees would meet the new WLA (per LRS Step 3, described above in **Section A1.2.1.3**) and the iterative process would be initiated (i.e., Steps 4 through 7 would be repeated).

A1.3 Downstream-based Load Reduction Strategy for an Individual LA River Segment or Tributary

An alternative approach to protecting recreational uses in a LA River segment or tributary is a "Downstream-based" approach. While the Outfall-based approach systematically addresses discharges *to* an LA River segment or tributary, the Downstream-based approach protects recreational uses by implementing actions *within or adjacent to* the segment/tributary. The general approach to developing a Downstream-based LRS is to identify implementation actions just upstream of a TMDL ambient (in-stream) monitoring location that would result in attainment of the TMDL target at the monitoring location. For example, an LRS that employs a Downstream-based approach for an LA River segment/tributary could include, but is not limited to, the following implementation actions (referred to herein as "Downstream Solutions"):

- **In-stream project –** Create an in-stream project immediately upstream of ambient (in-stream) monitoring location that provides in-stream treatment for bacteria reduction and perhaps has multiple benefits (e.g., constructed wetland that provides habitat and is designed to maximize bacteria reduction).
- **Treatment and discharge/reuse –** Divert flow immediately upstream of ambient (in-stream) monitoring location (immediately prior to confluence with the LA River), treat and return to waterbody and/or reuse dry weather flow to supplement drinking water supplies.
- **Divert and infiltrate –** Divert flow immediately upstream of ambient (in-stream) monitoring location, and infiltrate diverted flow at a nearby site.
- **Diversion to WRP –** Divert all or a portion of a tributary or segment's surface runoff to the sanitary sewer for conveyance to and treatment at a WRP.

Even though Downstream-based approaches may be not be possible for any of the LA River segments or tributaries due to regulatory and/or engineering constraints (discussed in **Section A1.3.1.1**), the following describes an iterative LRS process (analogous to the Outfall-based approach) that could be utilized to address a segment/tributary with a Downstream-based approach. A potential scenario for addressing all impaired LA River segments and tributaries (a "watershed-wide strategy") using a combination of Outfall-based and Downstream-based approaches is described in **Section 7.8.2**.

Implementing the TMDL utilizing a Downstream-based approach may allow for a strategy that is potentially more reliable and protective, less costly, and less time-intensive. Specifically, implementation actions could be directed at discrete locations along a segment/tributary (i.e., just upstream of areas subject to observed recreational use) rather than constructing individual projects at tens or hundreds of storm drain outfalls. However, as discussed below, a Downstream-based approach for TMDL implementation would require consideration of whether proposed actions are consistent with current regulatory requirements. There are also technical challenges associated with implementing the TMDL using Downstream-based approaches, as described below. Even if a Downstream-based LRS was allowed, it may be an undesirable or infeasible approach for Permittees. In this case, the Outfall-based approach outlined in **Section A1.2**, or other lawful approach to meeting WLAs, could be utilized.

The magnitude of the TMDL implementation effort for tributaries is a key factor that led to the development of a Downstream-based approach. Tributaries assigned allocations represent almost twice as many miles of length compared to the mainstem LA River, and tributaries have little to no assimilative capacity for bacteria discharges from point and nonpoint sources. Due to the limited assimilative capacity, implementation strategies based on reducing loading from storm drain discharges to tributaries, as represented in the Outfall-based approach (**Section A1.2**), could potentially necessitate implementation of structural BMPs at a majority of flowing storm outfalls (i.e., a majority of the outfalls may be categorized as Priority Outfalls). When compared to the mainstem LA River, this could represent a four-fold or greater increase in the *proportion* of flowing outfalls that would require BMPs. At the same time, the relatively low flow rates in tributaries (generally less than 3 cfs) suggests that engineering solutions in or adjacent to the channel would be much more efficient than implementing actions at numerous upstream outfalls (generally discharging less than 0.1 cfs) with an Outfall-based approach. Finally, many of the tributaries that received allocations have minimal access, either due to vertical channels/fencing or very shallow flow conditions, significantly reducing the potential for recreational activities. A Downstream-based approach could be used to minimize the effect of bacteria loading from the tributaries to the mainstem LA River.

A1.3.1 Implementation Actions for Downstream-based Approach

This section outlines the implementation process for cases when MS4 Permittees decide to comply with MS4 WLAs by implementing an Regional Board EO approved LRS using a Downstream-based approach. The LRS steps that would be taken in each segment or tributary addressed through a Downstream-based approach are shown in **Figure 4**. The six-step process described in **Figure 4** and detailed in sections **A1.3.1.1** through **A1.3.1.6** is used to determine which implementation actions will be taken in order to meet the dry weather (in-stream) TMDL targets at the monitoring ambient (in-stream) monitoring location.[4] Just as with the Outfall-based approach, there is much flexibility within a Downstream-based LRS regarding the number, types, and locations of actions; essentially, the Permittees may use any combination of actions as long as it is demonstrated that the proposed actions are expected to result in WLA attainment. Further, implementation actions would continue as necessary during subsequent LRS iterations if the Downstream Solutions were insufficient, as outlined in **Figure 4** and described in **Section A1.3.1.6**. The Implementation Schedule section (**Section 7.10**) provides an alternative schedule and phased implementation approach if Downstream Solutions were allowable and desirable, using the watershed-wide strategy described in **Section 7.8.1**.

[4] The Monitoring Plan Section will be developed at a later date.

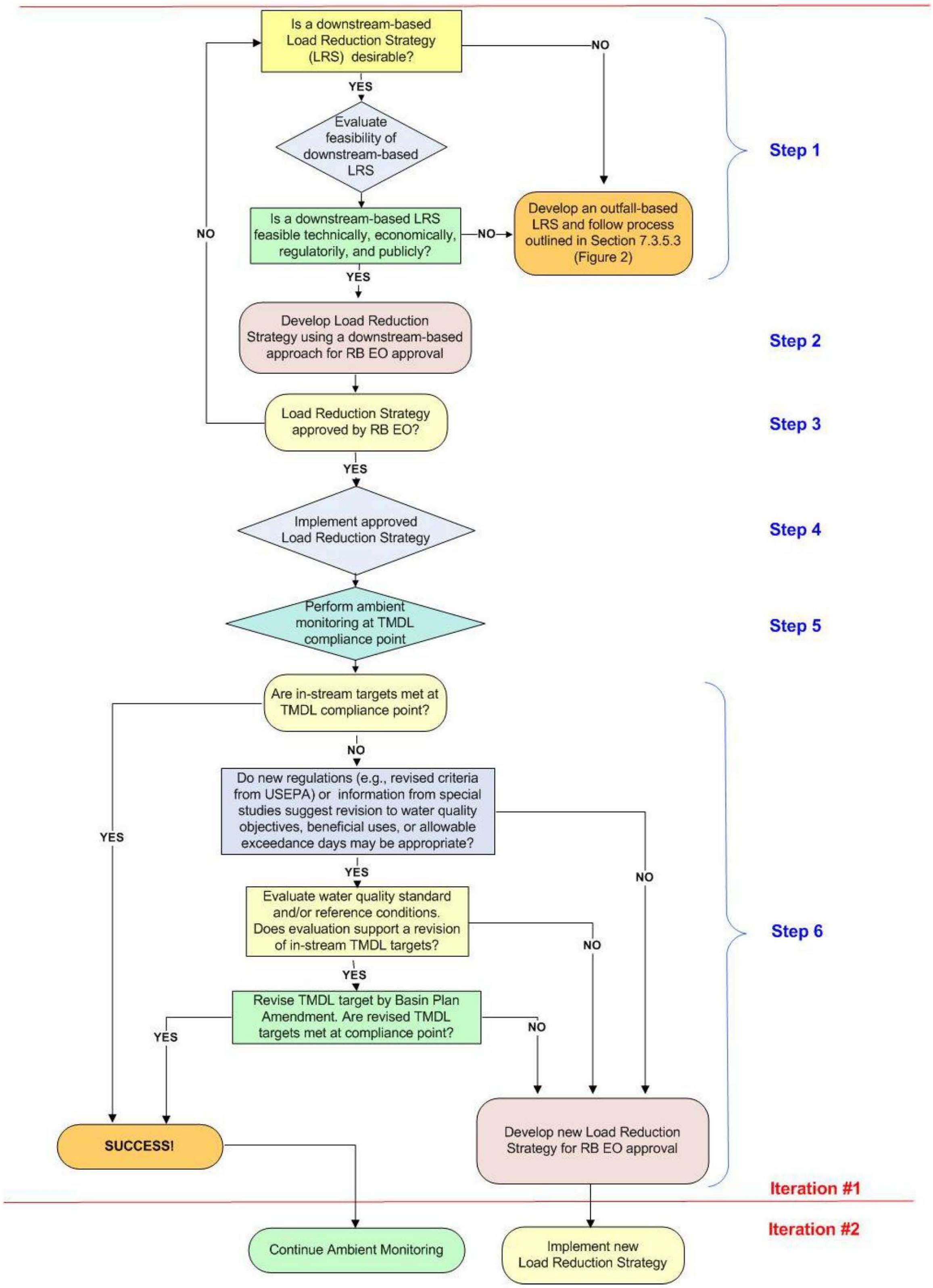


Figure 4. LA River Bacteria TMDL Downstream-based Approach Flow Diagram

LRS = Load Reduction Strategy; RB EO = Regional Board Executive Officer

A1.3.1.1 Step 1: Evaluate Desirability and Feasibility of Implementing a Downstream-based Approach

As the first step, the MS4 Permittees should determine whether a Downstream-based approach is desirable and feasible. The goal of a Downstream-based approach is to attain TMDL WLAs by virtue of meeting the TMDL target at the ambient (in-stream) monitoring location.[5,6] If a Downstream-based LRS approach were to be proposed for a segment or tributary, then an evaluation of the feasibility of the proposed approach shall be conducted and include the following components:

- **Technical feasibility** – the ability to construct a Downstream-based project under the given site constraints including ability to treat the flow rates present, land available for treatment facilities, and available of a treatment technology to effectively reduce bacteria (and pathogen) concentrations.
- **Economic feasibility** – the likelihood of funding the project given other available alternatives. In some cases, a Downstream Solution may technically feasible, but only at a very high cost, which would reduce its feasibility.
- **Regulatory acceptability under federal and State laws** – the permissibility of the project under current regulations. A major consideration is the beneficial uses designated upstream of the proposed Downstream Solution. In particular, the Downstream-based approach may require the performance of a Use Attainability Analysis (UAA) to evaluate whether to re- or de-designate the recreational beneficial uses per 40CFR131.10(g). Otherwise, the portion of the segment or tributary that is just upstream of the Downstream Solution would remain out of compliance with the TMDL target (and WQOs), potentially requiring additional actions in the future. MS4s are unlikely to consider undertaking a Downstream-based LRS approach if they could later be required to also utilize an Outfall-based LRS (or traditional) approach. There may be segments/tributaries for which a UAA would not support a re- or de-designation. Further, UAAs may not be publicly acceptable (as discussed below).

  In addition, the Clean Water Act discourages direct treatment of navigable waterbodies. It is unclear whether the intent of this provision of the Clean Water Act was to exclude Downstream Solutions along highly-engineered, flood control channels (i.e., as opposed to natural riparian systems), and thus a policy decision from USEPA and the Regional Board would likely be needed to allow for a Downstream-based approach to TMDL implementation.
- **Environmental impacts** – the ability to construct a Downstream Solution and minimize environmental impacts. The LA River and its tributaries have multiple designated beneficial uses related to aquatic life, and some areas provide important habitat. Thus, any proposed Downstream Solution would need to consider potential environmental impacts associated with alteration of the channel, habitat, and/or flow regime.
- **Public acceptability** – the likelihood of public acceptance of the project given other available alternatives. In some cases, it may be preferred by the public to utilize an

[5] The Monitoring Plan Section will be developed at a later date.

[6] The WLAs for a segment are assumed to be attained if the targets at the corresponding ambient (in-stream) monitoring location are met (Section 6.5). Thus a Downstream-based approach that led to TMDL target attainment would also result in WLA attainment.

Outfall-based approach. Public acceptability may depend on the Downstream Solution being proposed. For instance, an in-channel "wetland" BMP that has multiple benefits may be more desirable than a divert-and-treat option. Public acceptability may also be affected by efforts to reconsider beneficial uses and conduct UAAs. Economic considerations affect public acceptability as well; the public could overwhelmingly prefer a Downstream-based approach if it was much less expensive than an Outfall-based approach, particularly in these economic times.

A Downstream-based approach could be considered "infeasible" according to any of the above criteria. If a Downstream-based approach was categorized as infeasible then the Outfall-based approach outlined in **Section A1.2**, or other lawful approach, would be utilized to meet the WLAs in the segment or tributary.

A1.3.1.2 Step 2: Develop Load Reduction Strategy for a Downstream-based Approach

If the LRS proposes to use a Downstream-based approach to meet WLAs (by virtue of a Downstream Solution that will result in attainment of the TMDL target at the ambient monitoring location), then the LRS shall contain the following two components:

1. ***Downstream-based LRS Part 1: Propose a Downstream-based Approach*** – this component describes the proposed a Downstream-based approach to implement actions in the mainstem segment or tributary and/or associated subwatershed. The LRS shall present a summary of the feasibility analysis and details of the proposed downstream project. There is much flexibility regarding the allowable approaches. Permittees may choose whichever potential flow and source control BMPs, treatment facilities, and/or in-stream restoration actions that are considered appropriate, as long as sufficient information for actions is presented to provide reasonable assurance that implementing solutions will result in attainment of the WLAs/targets.
2. ***Downstream-based LRS Part 2:*** **Provide sufficient information for approval of the LRS by the Regional Board EO –** this component of the LRS demonstrates that the proposed actions are expected to result in attainment of the TMDL target at the ambient monitoring location. This demonstration shall include a consideration of the bacteria concentrations and flow rates of the influent and effluent (if any) of the proposed solution. For example, if a constructed wetlands project was proposed in the tributary channel, then less than 100% removal may be expected, as such the expected bacteria concentration and flow rate of the wetland effluent would need to be estimated based on available and reliable data (i.e., from previous projects/research). If a total diversion to the sanitary sewer is the action proposed, then the effluent flow rate downstream of the solution (at the ambient monitoring location) is expected to be zero. A timeline for implementing actions identified in the Downstream-based LRS must also be provided.

A1.3.1.3 Step 3: Regional Board EO Approval of Downstream Based LRS

The Downstream-based LRS would be submitted by the MS4 Permittee(s) for Regional Board EO approval. The Regional Board EO shall approve the LRS if:

1. Summary information is presented for and supports the feasibility of the proposed Downstream Solution.
2. It is demonstrated that actions (e.g., targeted flow and source control BMPs, treatment facilities, and/or in-stream restoration actions) are expected to result in attainment of WLAs (by virtue of meeting the TMDL targets at the ambient monitoring location).
3. The timeline for implementation of actions presented in Downstream-based LRS is consistent with the TMDL schedule presented in **Section 7.10**.

A1.3.1.4 Step 4: Implement Load Reduction Strategy

Step 4 represents the implementation of the Downstream-based LRS including construction and start-up of the Downstream Solution and associated actions. Implementation of the LRS will be initiated upon Regional Board EO approval.

A1.3.1.5 Step 5: Conduct Monitoring

Because the Downstream Solution is expected to result in attainment of the TMDL targets at the corresponding TMDL ambient monitoring location, the WLAs would be attained by virtue of meeting the TMDL target. Determination of the attainment of the WLAs will be evaluated immediately downstream of the solution (e.g., treatment, infiltration, diversion, etc.) by collecting in-stream samples and comparing measured concentrations to the TMDL target. Note this differs from the Outfall-based approach, which is assessed by measuring *E. coli* loading from all storm drain outfalls that discharge to the tributary and comparing the measured loading rate to the WLA.

A1.3.1.6 Step 6: Identify Next Steps

The next steps for TMDL implementation utilizing a Downstream-based LRS would be based on an evaluation of attainment of the TMDL target. Two potential scenarios, as detailed below:

- Scenario 1: TMDL target met at ambient (in-stream) monitoring location
- Scenario 2: TMDL target is not met at ambient (in-stream) monitoring location

Scenario 1: TMDL target is met at ambient (in-stream) monitoring location

Scenario 1 represents the situation where the TMDL target is attained at the ambient (in-stream) monitoring location, and as such the WLA is considered attained. In-stream monitoring would be continued to support evaluation of conditions in relation to the in-stream TMDL target. If conditions changed, and the target was found in the future to be consistently exceeded at the ambient monitoring location, then the TMDL target would no longer be categorized as "met", and the outcomes presented in Scenario 2 below would be considered.

Scenario 2: TMDL target is not met at ambient (in-stream) monitoring location

The Downstream-based LRS submitted by MS4 Permittees would clearly identify the Downstream Solution and associated actions, and provide reasonable assurance that the TMDL target would be expected to be met at the ambient monitoring location. However, given the challenges discussed throughout the TMDL it is possible that the TMDL target will not be attained (even if all actions identified in the LRS are taken). As described in Scenarios 2a, 2b, and 2c, if the TMDL target is not met at the ambient monitoring location, it is still important to consider information generated through special studies and monitoring that may affect water quality standards and reference watershed information. There are three possible outcomes under Scenario 2, as described below:

- **Scenario 2a: No revision to TMDL target warranted –** if special studies and/or monitoring data do not support a revision to the TMDL target (i.e., the WQOs or the beneficial uses, and/or the number of allowable exceedance days), then the Downstream Solution was insufficient and a new LRS would be required for submittal to the Regional Board EO for approval. The new LRS would be developed per Step 2, described above in **Section A1.3.1.2**. After EO approval of the LRS, the iterative process would be initiated (i.e., Steps 2 through 6 would be conducted again). Alternatively, an Outfall-based approach could be developed as described above in **Section A1.2.1.3**.
- **Scenario 2b: Revision to TMDL target warranted and in-stream TMDL target is then met –** if special studies and/or monitoring data support a revaluation of the TMDL target, then a BPA would need to be developed and considered by the Regional Board for adoption (to adjust the WQOs, beneficial uses, and/or the number of allowable exceedance days). Following the BPA, available water quality data would be evaluated to determine if *E. coli* concentrations at the ambient monitoring location meet the new/revised target. If the segment is no longer categorized as impaired per the State's Listing Policy, then a new LRS is not required. This scenario represents success for TMDL implementation. In this case, in-stream monitoring shall be continued to evaluate in-stream conditions per Scenario 1.
- **Scenario 2c: Revision to TMDL target warranted but revised in-stream TMDL target is not met –** if the in-stream TMDL target is revised but continues to not be met according to recent water quality data, then the Downstream Solution was insufficient and a new LRS would be required for submittal to the Regional Board EO for approval. The new LRS would be developed per Step 2, described above in **Section A1.3.1.2**. After Regional Board EO approval of the LRS, the iterative process would be initiated (i.e., Steps 2 through 6 would be conducted again). Alternatively, an Outfall-based LRS could be developed as described above in **Section A1.2.1.3**.

APPENDIX B: BSI STUDY DATA FOR OUTFALLS IN VICINITY OF UPPER LA RIVER EWMP GROUP

Event	Outfall ID	Flow Rate (cfs)	*E. coli* Concentration (MPN/100mL)	*E. coli* Loading Rate (billion MPN per day)
1A	R2-NEW-1	0	no flow	0.00
2A	R2-NEW-1	0	no flow	0.00
3A	R2-NEW-1	0	no flow	0.00
4A	R2-NEW-1	0	no flow	0.00
5A	R2-NEW-1	0	no flow	0.00
6A	R2-NEW-1	0.013240871	10	0.00
1A	R2-A	0.02	4106000	2323.55
2A	R2-A	0.015511836	159700	60.61
3A	R2-A	0.005185792	2481000	314.78
4A	R2-A	0.017748724	298700	129.71
5A	R2-A	0.004722875	3076000	355.43
6A	R2-A	0.008660306	18700	3.96
1A	R2-B	0.026	2014	1.28
2A	R2-B	0.015545753	473	0.18
3A	R2-B	0.021271126	2282	1.19
4A	R2-B	0.020714962	435	0.22
5A	R2-B	0.026546278	798	0.52
6A	R2-B	0.010997325	959	0.26
1A	R2-C	0	no flow	0.00
2A	R2-C	0.005843438	12810	1.83
3A	R2-C	0.000422078	10390	0.11
4A	R2-C	0	no flow	0.00
5A	R2-C	0.005137299	8130	1.02
6A	R2-C	0.001617424	7270	0.29
1A	R2-NEW-2	0	no flow	0.00
2A	R2-NEW-2	0	no flow	0.00
3A	R2-NEW-2	0.03376006	flow only	flow only
4A	R2-NEW-2	0.003900858	113700	10.85
5A	R2-NEW-2	0	no flow	0.00
6A	R2-NEW-2	0.003444947	21300	1.80
1A	R2-01	0.29	4611	32.70
2A	R2-01	0.14	1090	3.65
3A	R2-01	0.227775	75	0.42
4A	R2-01	0.41512574	336	3.41
5A	R2-01	0.311823175	480	3.66
6A	R2-01	0.266397166	384	2.50

Event	Outfall ID	Flow Rate (cfs)	E. coli Concentration (MPN/100mL)	E. coli Loading Rate (billion MPN per day)
1A	R2-D	0.03	1650	1.28
2A	R2-D	0.031101248	1092	0.83
3A	R2-D	0.026815709	5475	3.59
4A	R2-D	0.010787124	13760	3.63
5A	R2-D	0.0443318	4611	5.00
6A	R2-D	0.002856414	305	0.02
1A	R2-NEW-3	0	no flow	0.00
2A	R2-NEW-3	0	no flow	0.00
3A	R2-NEW-3	0	no flow	0.00
4A	R2-NEW-3	0	no flow	0.00
5A	R2-NEW-3	0.001235492	41	0.00
6A	R2-NEW-3	0	no flow	0.00
1A	R2-E	0.16	12033	48.52
2A	R2-E	0.337161928	21050	173.64
3A	R2-E	0.148107062	410	1.49
4A	R2-E	0.216802786	441	2.34
5A	R2-E	0.330675244	1153	9.33
6A	R2-E	0.235461381	1860	10.72
1A	R2-NEW-4	0	no flow	0.00
2A	R2-NEW-4	0	no flow	0.00
3A	R2-NEW-4	0	no flow	0.00
4A	R2-NEW-4	0.061553928	15150	22.82
5A	R2-NEW-4	0	no flow	0.00
6A	R2-NEW-4	0	no flow	0.00
1A	R2-F	0.11	173	0.45
2A	R2-F	0.170997106	20140	84.26
3A	R2-F	0.144355206	2046	7.23
4A	R2-F	0.136784815	6867	22.98
5A	R2-F	0.100054488	213	0.52
6A	R2-F	0.175013901	345	1.48
1A	R2-G	1.19	355	10.33
2A	R2-G	0.462355227	561	6.35
3A	R2-G	0.036821711	9804	8.83
4A	R2-G	0.12693062	8664	26.91
5A	R2-G	0.129969101	723	2.30
6A	R2-G	1.25427736	6131	188.14
1A	R2-H	0.02	158	0.09
2A	R2-H	0.018355659	301	0.14
3A	R2-H	0.0486603	10	0.01
4A	R2-H	0.002360026	31	0.00
5A	R2-H	0	no flow	0.00
6A	R2-H	0	no flow	0.00

Event	Outfall ID	Flow Rate (cfs)	E. coli Concentration (MPN/100mL)	E. coli Loading Rate (billion MPN per day)
1A	R2-I	0.02	158	0.07
2A	R2-I	0.026281757	884	0.57
3A	R2-I	0.029471022	488	0.35
4A	R2-I	0.034310658	983	0.83
5A	R2-I	0.014983597	48840	17.90
6A	R2-I	0.015992538	143900	56.30
1A	R2-02	1.77	605	26.21
2A	R2-02	0.536421655	3448	45.25
3A	R2-02	0.383489583	1616	15.16
4A	R2-02	0.344917969	32550	274.68
5A	R2-02	0.656671875	959	15.41
6A	R2-02	0.346371094	1565	13.26
1A	R2-NEW-5	0	no flow	0.00
2A	R2-NEW-5	0	no flow	0.00
3A	R2-NEW-5	0	no flow	0.00
4A	R2-NEW-5	0	no flow	0.00
5A	R2-NEW-5	0.01461277	146	0.05
6A	R2-NEW-5	0.005408756	683	0.09
1A	R2-J	0.12	1050	3.05
2A	R2-J	0.070976307	20980	36.43
3A	R2-J	0.105730748	72700	188.06
4A	R2-J	0.076298419	4106	7.66
5A	R2-J	0.068180316	1670	2.79
6A	R2-J	0.174926347	24600	105.28
1A	R2-03	0.03	9060	7.76
2A	R2-03	0.031868287	5794	4.52
3A	R2-03	0.048951662	8664	10.38
4A	R2-03	no access	no access	no access
5A	R2-03	0.068180316	676	1.13
6A	R2-03	0.091986459	1017	2.29
1A	R2-NEW-6	0	no flow	0.00
2A	R2-NEW-6	0	no flow	0.00
3A	R2-NEW-6	0	no flow	0.00
4A	R2-NEW-6	0	no flow	0.00
5A	R2-NEW-6	0	no flow	0.00
6A	R2-NEW-6	0.000605067	10	0.00
1A	R2-K	0.69	15150	256.66
2A	R2-K	0.422650533	12740	131.74
3A	R2-K	0.301673177	3654	26.97
4A	R2-K	0.442916667	10140	109.88
5A	R2-K	0.72375	8664	153.42
6A	R2-K	0.36775	1785	16.06

Event	Outfall ID	Flow Rate (cfs)	E. coli Concentration (MPN/100mL)	E. coli Loading Rate (billion MPN per day)
1A	R2-NEW-7	0	no flow	0.00
2A	R2-NEW-7	0	no flow	0.00
3A	R2-NEW-7	0	no flow	0.00
4A	R2-NEW-7	0	no flow	0.00
5A	R2-NEW-7	0.015282731	101700	38.03
6A	R2-NEW-7	0	no flow	0.00
1A	R2-L	0.01	855	0.18
2A	R2-L	0.007545376	10	0.00
3A	R2-L	0.003466052	10	0.00
4A	R2-L	0.002375311	10	0.00
5A	R2-L	0	no flow	0.00
6A	R2-L	0.000417826	576	0.01
1A	R2-M	0.08	520	1.07
2A	R2-M	0.07946875	26130	50.80
3A	R2-M	0.060499238	1086	1.61
4A	R2-M	0.026892893	697	0.46
5A	R2-M	0.044987119	959	1.06
6A	R2-M	0.042597401	504	0.53
1A	R2-NEW-8	0	no flow	0.00
2A	R2-NEW-8	0	no flow	0.00
3A	R2-NEW-8	0	no flow	0.00
4A	R2-NEW-8	0	no flow	0.00
5A	R2-NEW-8	0	no flow	0.00
6A	R2-NEW-8	0.003022489	224700	16.62
1A	R2-N	0.04	5172000	5303.85
2A	R2-N	0.04204522	5794000	5960.16
3A	R2-N	0.033435343	4884000	3995.25
4A	R2-N	0	no flow	0.00
5A	R2-N	0	no flow	0.00
6A	R2-N	0	no flow	0.00
1A	R2-NEW-9	0	no flow	0.00
2A	R2-NEW-9	0	no flow	0.00
3A	R2-NEW-9	0	no flow	0.00
4A	R2-NEW-9	0	no flow	0.00
5A	R2-NEW-9	0	no flow	0.00
6A	R2-NEW-9	0.006736433	10	0.00
1A	R2-NEW-10	0	no flow	0.00
2A	R2-NEW-10	0	no flow	0.00
3A	R2-NEW-10	0	no flow	0.00
4A	R2-NEW-10	0	no flow	0.00
5A	R2-NEW-10	0	no flow	0.00
6A	R2-NEW-10	0.045912818	504	0.57

Event	Outfall ID	Flow Rate (cfs)	E. coli Concentration (MPN/100mL)	E. coli Loading Rate (billion MPN per day)
1A	R2-NEW-11	0	no flow	0.00
2A	R2-NEW-11	0	no flow	0.00
3A	R2-NEW-11	0	no flow	0.00
4A	R2-NEW-11	0	no flow	0.00
5A	R2-NEW-11	0	no flow	0.00
6A	R2-NEW-11	0.001478426	281	0.01
1A	R2-NEW-13	0	no flow	0.00
2A	R2-NEW-13	0	no flow	0.00
3A	R2-NEW-13	0	no flow	0.00
4A	R2-NEW-13	0	no flow	0.00
5A	R2-NEW-13	0	no flow	0.00
6A	R2-NEW-13	0.009650606	1553	0.37
1A	R2-P	0.06	1314	1.92
2A	R2-P	0.088837674	2603	5.66
3A	R2-P	0.106390164	19890	51.77
4A	R2-P	0.08101057	5172	10.25
5A	R2-P	0.048679711	98	0.12
6A	R2-P	0.021882328	160700	86.03
1A	R2-NEW-14	0	no flow	0.00
2A	R2-NEW-14	0	no flow	0.00
3A	R2-NEW-14	0	no flow	0.00
4A	R2-NEW-14	0	no flow	0.00
5A	R2-NEW-14	0.070260729	178900	307.53
6A	R2-NEW-14	0	no flow	0.00
1A	R2-04	0.17	6867	29.07
2A	R2-04	0.107476577	2723	7.16
3A	R2-04	0.082492918	364	0.73
4A	R2-04	0.092063303	327	0.74
5A	R2-04	0.124585232	70300	214.28
6A	R2-04	0.152525013	120	0.45
1A	R2-NEW-16	0.00128	flow only	flow only
2A	R2-NEW-16	0.023106515	flow only	flow only
3A	R2-NEW-16	0	no flow	0.00
4A	R2-NEW-16	0	no flow	0.00
5A	R2-NEW-16	0	no flow	0.00
6A	R2-NEW-16	0	no flow	0.00
1A	R2-05	0.66	51	0.83
2A	R2-05	0.949819995	246	5.72
3A	R2-05	0.784625	52	1.00
4A	R2-05	0.379	63	0.58
5A	R2-05	0.830078125	241	4.89
6A	R2-05	0.548657311	146	1.96

Event	Outfall ID	Flow Rate (cfs)	E. coli Concentration (MPN/100mL)	E. coli Loading Rate (billion MPN per day)
1A	R2-06	0.23	1539	8.62
2A	R2-06	0.814969486	48840	973.82
3A	R2-06	0.577245248	4352	61.46
4A	R2-06	0.460816742	1010	11.39
5A	R2-06	0.484197781	717	8.49
6A	R2-06	0.6484	836	13.26
1A	R2-T	0.14	10	0.04
2A	R2-T	0.368173921	144	1.30
3A	R2-T	0.303536169	20	0.15
4A	R2-T	0.393001963	10	0.10
5A	R2-T	0.313253371	235900	1807.95
6A	R2-T	0.2813	309	2.13
1A	R2-NEW-22	0.04	flow only	flow only
2A	R2-NEW-22	0	no flow	0.00
3A	R2-NEW-22	0	no flow	0.00
4A	R2-NEW-22	0	no flow	0.00
5A	R2-NEW-22	0	no flow	0.00
6A	R2-NEW-22	0	no flow	0.00
1A	R2-V	0.12	1187	3.40
2A	R2-V	0.151536171	6488	24.05
3A	R2-V	0.241373682	3448	20.36
4A	R2-V	0.843077548	359	7.40
5A	R2-V	0.435117035	2046	21.78
6A	R2-V	0.269906528	754	4.98
1A	R2-NEW-23	0	no flow	0.00
2A	R2-NEW-23	0.037376926	flow only	flow only
3A	R2-NEW-23	0.033950238	flow only	flow only
4A	R2-NEW-23	0.009887091	712	0.17
5A	R2-NEW-23	0.014525561	259	0.09
6A	R2-NEW-23	0.015072503	121	0.04

APPENDIX C:
CONCEPT DESIGN TO ADDRESS PRIORITY OUTFALL R2-A
(City of Los Angeles)

DRAFT

Conceptual Plans to Address Dry- and Wet-Weather Urban Runoff for Downtown Los Angeles

R2-A

CITY OF LOS ANGELES SANITATION DEPARTMENT OF PUBLIC WORKS

City of Los Angeles
Department of Public Works
Bureau of Sanitation, Watershed Protection Division
1149 S Broadway, 10th Floor
Los Angeles, CA90015-2213

(page intentionally left blank)

Table of Contents

Figures

1. Introduction and Background

This concept report describes a multi-benefit stormwater treatment project for the Bureau of Sanitation (BOS) Watershed Protection Division (WPD) to reduce the impacts of stormwater flows from downtown Los Angeles to the Los Angeles River (LA River). The project treats dry weather and wet weather flows from LA River subwatersheds utilizing both conventional and green infrastructure approaches. The stormwater projects described in this concept report support the City of Los Angeles (City's) Water Quality Master Plan and contribute to compliance with stormwater regulations.

1.1. Stormwater Regulations and Work to Date

The LA River is impaired by pollutants including bacteria, metals, trash, oil and nutrients. To address these impairments, the State has developed Total Maximum Daily Loads (TMDLs), which contain compliance schedules for the City to reduce impacts from stormwater discharges. The LA River Metals TMDL has final compliance dates of 2024 and 2028 for dry and wet weather, respectively. The LA River Bacteria TMDL, perhaps the most challenging TMDL faced by the City, has a phased dry weather compliance schedule depending on reach/tributary and a wet weather compliance date of 2037. For Reach 2 of the LA River (also referred to as Segment B), the Bacteria TMDL requires submittal of a dry weather Load Reduction Strategy (LRS), with details of and commitments to the specific BMPs that will be implemented. The Humboldt Stormwater Greenway project described in this concept report is a key component of the Bacteria LRS, and addresses many other stormwater pollutants from the targeted subwatersheds during both dry and wet weather.

BOS/WPD identified discharge locations that have the highest impact on bacteria loading in the LA River. These top outfalls were then prioritized based on cost-effectiveness. In 2007, the City conducted one of the most sophisticated bacteria studies conducted to date (in California, the United States, or elsewhere), called the Bacteria Source Identification Study (BSI Study). The BSI Study sampled over 110 outfalls in the LA River watershed in order to determine their water quality impacts. The R2-A outfall was identified as being a high priority discharge, having significant water quality impacts in the LA River. This outfall is shown in Figure 1, and is the focus of this conceptual design report.

2. Project Description

The primary objective of the Humboldt Stormwater Greenway project is to intercept dry weather runoff and to treat wet weather runoff. The project is located in the Lincoln Heights area and was completed in October 2012. Dry weather flows are intercepted using a Reuse and Removal Urban Flow System (R^2UFS), similar to the Low Flow Diversions (LFDs) installed along Santa Monica Bay. The project's wet weather strategy consists of "day-lighting" an existing storm drain, conveying the higher flows through a multi-use open space stormwater treatment facility constructed within the City's right-of-way boundary and City-owned parcels. These wet weather flows are treated using a combination of oxygenation, settling, biofiltration, and ultraviolet exposure processes as it is allowed to flow through the greenway. General project components are shown in the schematic in Figure 2.

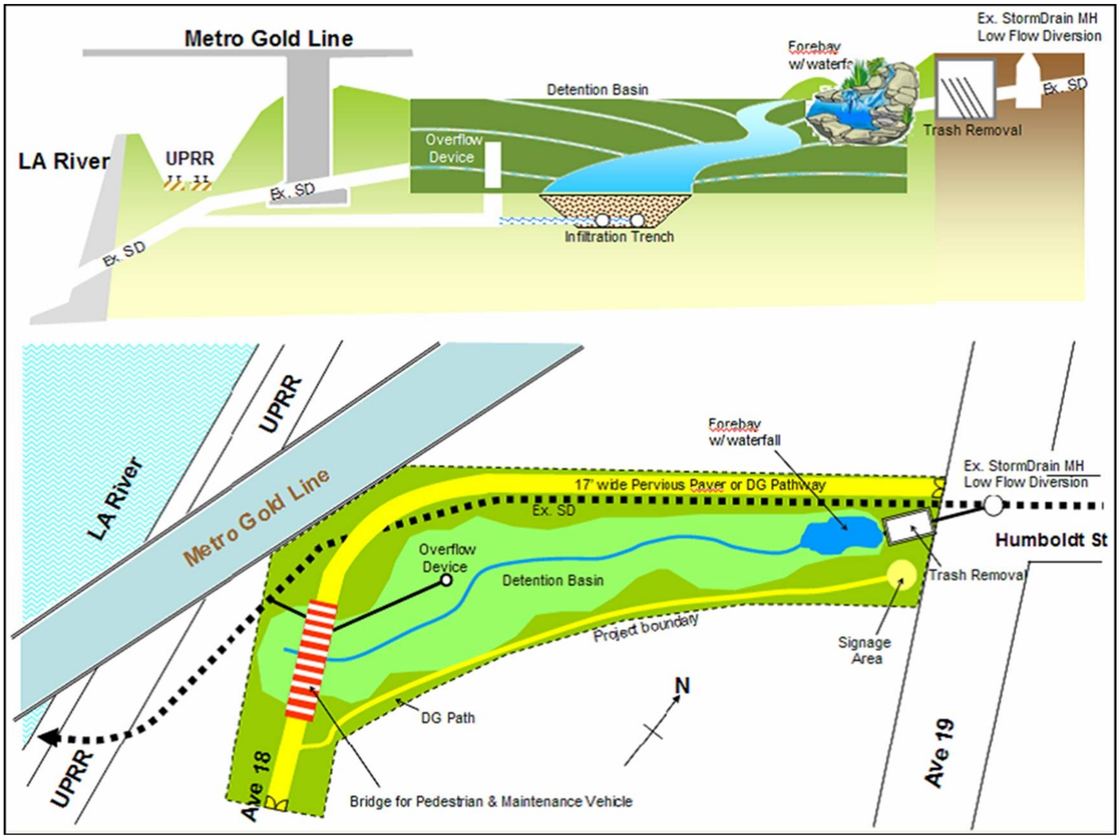
Figure 1. Overview of the Humboldt Stormwater Greenway Project Area

Figure 1
Overview of
Humboldt Stormwater Greenway
Project Area

N
1 inch = 500 feet

Legend
R2-A Outfall
Humboldt Stormwater Greenway Project

Figure 2. Overview and Concept Design of Humboldt Stormwater Greenway Project



2.1. Project Location

The project is located in the Lincoln Heights neighborhood within the northeastern part of the City. It encompasses a total area of 1.15 acres, which includes an unpaved portion of the Humboldt Street right-of-way between Avenue 18 and Avenue 19, and four City-owned parcels. South of the site, a railway easement runs along the north bank of the LA River. A private food-based manufacturing facility borders the site to the west, and a parking lot belonging to a community church borders the site to the east. An undeveloped Metro light rail platform exists to the northwest of the site along the active Metro Gold Line where the rail crosses the LA River.

2.2. Existing Site Conditions

The total project area is 1.15 acres, which includes four City-owned parcels and a portion of the Humboldt Street right-of-way. Stormwater enters the site from a 135-acre drainage area through a 36-inch Reinforced Concrete Pipe (RCP). The previously existing drainage infrastructure conveyed flows southward before day lighting at the LA River.

An existing corrugated metal pipe (CMP) storm drain enters at the north end of the site, which was intercepted and day lighted per the project scope. The sewer shaft and sewer manhole constructed in the NOS Humboldt Project remain accessible to allow for BOS maintenance activities. These structures are located within the width of the project utility road. The top of pipe for the 48-inch NOS sewer diversion line that runs through the site is located approximately 35 feet below existing grade where some groundwater has been encountered. According to project designers (Mike Tan, 12/30/10 internal meeting), a portion of the line is located below bedrock and the northeast end of the pipe is encased within a 5-foot minimum thick concrete grout.

3. Dry Weather Implementation Strategy

The Humboldt Stormwater Greenway project implemented a R²UFS to prevent high bacteria loadings from entering the LA River under dry weather flow conditions. The R²UFS builds on the design of the highly successful LFDs implemented along Santa Monica Bay for treating bacteria. Dry weather runoff from the R2-A subwatershed is intercepted by the R²UFS, and ultimately diverted to the sanitary sewer system for treatment at the Hyperion Treatment Plant.

3.1. Overview

Dry weather urban runoff is a high priority source of pollutants because dry weather flows, being very low, typically carry a higher concentration of pollutants. Controlling contamination during dry weather times is also very important to the City because people are most likely to engage in REC-1 activities in the City's waterways during dry weather periods. Dry weather runoff from the R2-A subwatershed is treated using a R²UFS which completely intercepts dry weather flows from the storm drain prior to discharging into the LA River. The BOS has a long history of using diversions to address the impacts of dry-weather urban runoff, especially along Santa Monica Bay, with 23 LFDs currently being operated. The design and maintenance aspects of LFDs are well-documented, and have been incrementally improved with each new project. The major advantages of LFDs/R²UFSs are (1) they provide 100% elimination of dry weather flows, (2) they are reliable, and (3) the BOS maintenance protocols are well-established.

3.2. R²UFS and Lift Station Sizing

The dry weather implementation strategy consists of intercepting low flows from the 36-inch RCP storm drain that enters the north end of the Humboldt Stormwater Greenway site, near the intersection of North Avenue 19 and Humboldt Street. The R²UFS location is just upstream of where the RCP storm drain daylights as it enters the project site. Figure 3 displays the existing storm drain system, greenway project area, and R²UFS location.

Under dry weather conditions, low flows are diverted to the sanitary sewer via an 8-inch RCP pipe. The connection runs from the R²UFS structure to the 48-inch RCP sewer pipeline constructed in 2011 as part of the NOS Humboldt Project. The top of the sewer pipeline is approximately 35 feet below the existing 36-inch RCP storm drain, requiring the pipeline to be approximately 40 feet in length. The connection to the sanitary sewer is shown in Figure 3. During rain events, higher wet weather flows overpass the R²UFS and flow through the Humboldt Stormwater Greenway.

Flow data provided by the LA River BSI Study was utilized to size the R²UFS. The BSI Study provides flow data for the R2-A subwatershed at the most downstream end of the Humboldt Street storm drain before discharging into the LA River near the Metro Gold Line crossing. Table 1 below lists the available data from the BSI Study at the R2-A outfall location. An average dry weather flow rate of approximately 0.012 cubic feet per second (cfs) was used to size the R²UFS. This flow rate includes the contributions from a 135-acre drainage basin, including over 7,000 feet of storm drains, between 12-inches and 31-inches in diameter. While the BSI Study data collection point is downstream of the proposed R²UFS facility, it is estimated that the majority of runoff is contributed from upstream of the R²UFS site location. Flow measurements were field verified during the design phase.

Figure 3. Dry Weather Implementation Strategy Facilities

Figure 4
Dry Weather Implementaton
Strategy: R2UFS Details

Table 1Dry Weather Stormwater Quality Data from BSI Study

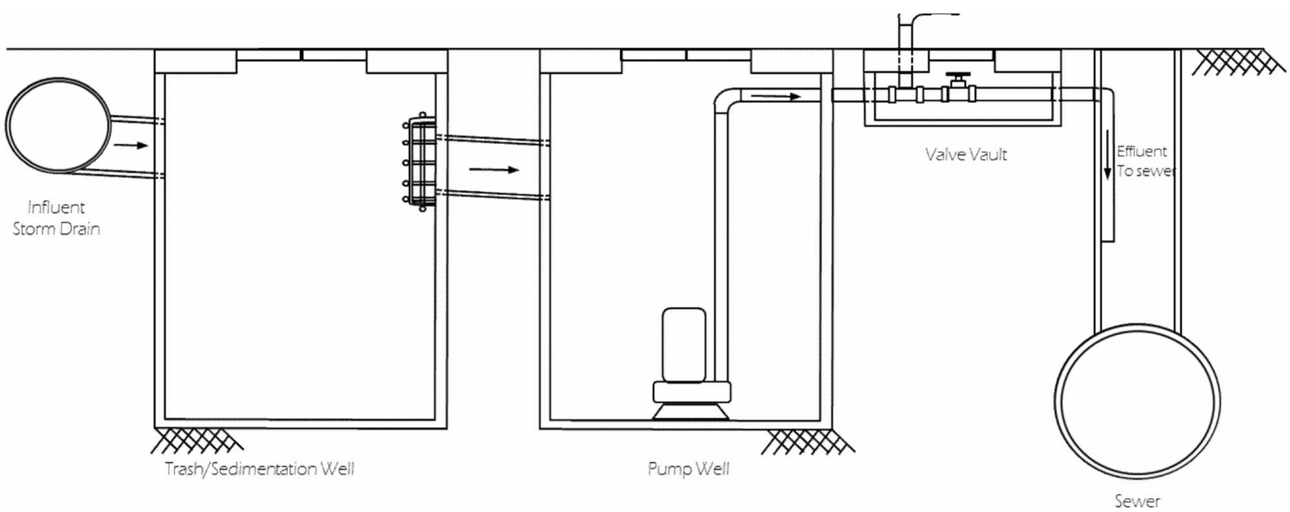
EVENT	SITE	FLOW RATE (CFS)		
		MEASURED	AVERAGE	MAXIMUM
1A	R2-A	0.020	0.012	0.020
2A	R2-A	0.016		
3A	R2-A	0.005		
4A	R2-A	0.018		
5A	R2-A	0.005		
6A	R2-A	0.009		

3.3. Conceptual Layout and Design

The R^2UFS design includes an initial trash well, which primarily serves to detain large, floatable debris and green waste. The outlet pipe within the trash well was installed toward the upper portion of the structure, allowing the structure to work as a sedimentation tank as well as detaining large, floatable debris. This performance is similar to that of hydrodynamic devices during dry weather flow conditions. It provides larger volume detention for both sediment and debris, which is important given that sediment is the primary transport mechanism for metals and bacteria.

The design incorporates a valve vault for restricting flow into the sanitary sewer during high flow conditions. During wet weather events, the R^2UFS splits the flow at the valve vault by directing flow to the outlet for reuse and treatment in the green infrastructure best management practices (BMP), the Humboldt Stormwater Greenway. The R^2UFS also incorporates a more robust control panel for the operation of the underground structure and of the aboveground elements. Figure 4 shows a schematic of the structural elements of the R^2UFS diversion system.

Figure 4. R^2UFS Schematic



3.4. Operations and Maintenance

Maintenance activities for the structural elements of the project is focused on the major system components. Table 2 outlines the required maintenance tasks, their associated frequency, and notes to expand the requirements of each task.

Table 2 O&M Considerations for Dry Weather Project Components

TASK	FREQUENCY	MAINTENANCE NOTES
Dry Season Inspection	1 time / year	Inspect once during the dry season to ensure volume capacity. Clean if required.
Wet Season Inspection	Monthly during the Wet Season	Monthly during wet season to ensure volume capacity.
Trash Well Cleaning	Dry Season – 1 time Wet Season – 3 times	Dry season cleaning to occur just before start of wet season.
Pump Well Cleaning	Dry Season – 1 time Wet Season – 3 times	Dry season cleaning to occur just before start of wet season.
Pump Maintenance	As needed	
Valve Maintenance	As needed	
Control Panel Maintenance	As needed	

3.5. General Cost

The general costs of implementing the structural dry weather components of the Humboldt Stormwater Greenway are shown in Table 3.

Table 3 General Summary of Costs for Dry Weather Project Components

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
1	RCP	40	LF	$575.00	$23,000.00
2	R^2UFS	1	Each	$1,000,000.00	$1,000,000.00
				Construction Subtotal	***$1,023,000.00***
3	Planning (20% of Construction Subtotal)				$204,600.00
4	Mobilization (10% of Construction Subtotal)				$102,300.00
5	Construction Contingency (25% of Construction Subtotal)				$255,750.00
				Construction Total	***$1,585,650.00***
6	Design (30% on Construction Subtotal)				$306,900.00
				TOTAL COST	**$1,892,550.00**

4. Wet Weather Implementation Strategy

The wet weather implementation strategy consists of incorporating treatment through green infrastructure. Wet weather flows are conveyed from the 36-inch Humboldt Street storm drain through the Humboldt Stormwater Greenway. The project area covers approximately 1.15 acres as was shown previously in Figure 3.

4.1. Overview

Wet weather flows tend to carry high concentrations of sediment, metals, nutrients, and bacteria and are a significant source of water quality impairments. Given the potentially large volumes of water during rain events, capturing and/or treating wet weather flows is a major challenge for BOS/WPD. While the LFDs and R²UFSs are optimal for eliminating dry weather flows, they do not operate during wet weather due to limited capacity of the sanitary sewer system. To reduce the impacts of wet weather flows from the R2-A subwatershed and increase the multi-benefit aspects of the concept design, a green infrastructure BMP was implemented. Green infrastructure practices work to effectively reduce the volume of stormwater runoff and reduce pollutant loads by replicating natural hydraulic processes. Green infrastructure techniques can enhance infiltration, percolation, and evapotranspiration to reduce adverse effects on surface waters and encourage groundwater recharge.

In addition to the water quality benefits, green infrastructure has been shown to have positive economic, social, and environmental impacts. Many aspects of green infrastructure can increase property values, including improved aesthetics, drainage, and recreational opportunities. Research suggests that green space makes places more inviting and attractive, increasing people's sense of well-being, safety, and aesthetic environment, and draws people outside to picnic, walk, bike, jog, bird watch, etc.

4.2. BMP Sizing

A modified storm drain formerly traversing the site to deliver untreated runoff with high levels of pollution into the LA River, was instead "day-lighted" at the new dry-basin. The site provides treatment for dry weather runoff and a percentage of the wet-weather runoff through bio-filtration and reuse in the native landscaping.

Initially, sediment containing metals and other pollutants is filtered from incoming storm water using a BMP called a hydrodynamic separator located below a new public plaza. Storm water is then treated with sunlight and biological organisms in an open and cobbled fore-bay at the plaza edge. Overflows from this water feature enter a larger dry-basin, and filter down through soil, plant roots and a stone infiltration gallery, which contains the media for the bio-filtration process. Once the subsurface channel (approximately 370 feet long) is filled, higher volumes rise above the ground, and fill the basin. The basin along with the associated storage and filtration structures are designed to detain approximately 50,000 cubic feet of runoff.

4.3. Conceptual Layout and Design

The project design was drawn from natural riparian elements such as plants, boulders and stream banks that are seen in the upper Los Angeles and Arroyo Seco Watershed. The project focuses on the day lighting of an existing storm drain at the north or upstream end of the project, after the storm drain passes under an open plaza and terminates at the concrete headwall. From the point of day-lighting the existing storm drain was removed to the south and flows continue in an open-channel following the contours of an approximately 300-foot long graded swale that contains a reinforced vegetated bed and toe-of-slope. The swale ends at the dry detention basin, with an engineered spillway designed with two invert elevations to release either high or low detention volumes. Two feet minimum freeboard above the basin rim was made available for emergency retention, and an ancillary spillway for any excess overflow was included. The spillway is surrounded by a vegetated basin that detains a volume of approximately 50,000 cubic feet of runoff. The invert of the lower spillway is designed to release water levels that exceed the soils and vegetative capacities to infiltrate, evaporate, or transpire in less than 48 hours. A schematic of an example engineered spillway, similar to the one included in this project's design, is shown in Figure 5.

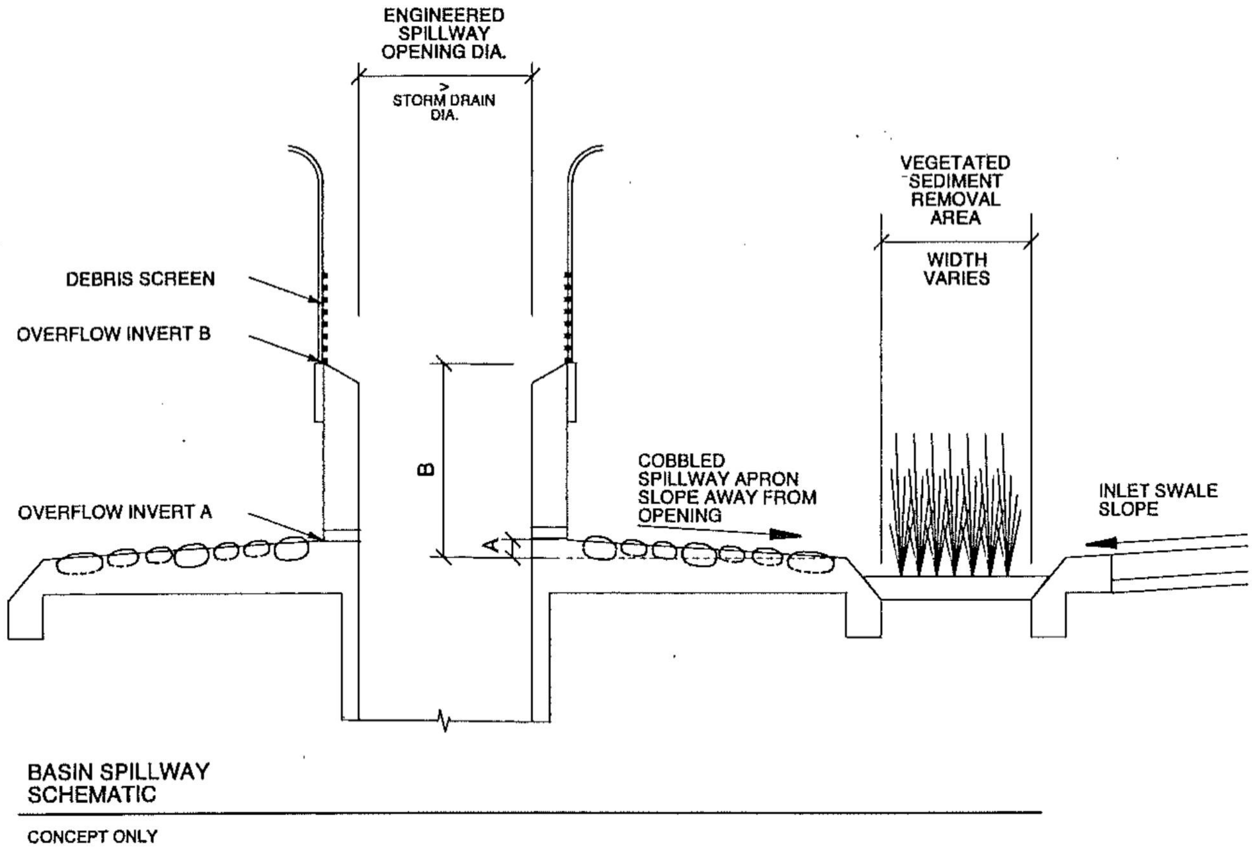


Figure 5. Engineered Spillway Conceptual Design

4.4. Green Infrastructure Components

The biological stormwater treatment area was planted with aquatic species selected for filtration capacity, manageable size (of up to 36" height), inundation tolerance, root structure, and growth rate. The following points briefly summarize some important characteristics of Southern California plant communities that were used in design, along with their properties. (Bornstein et al, 2005; Lenz and Dourley, 1981; Las Pilitas Nursery). Individual species selection was left to the discretion of the Landscape Architect of Design:

Chaparral (upper banks):

- Most extensive type of vegetation in California
- Primarily medium to large shrubs with thick, small, evergreen leaves; also contains fire adapted annuals
- May form dense thickets
- Many types of chaparral are recognized, depending on dominant species and combinations of species; this variation reflects different elevations, moisture levels, and soil types
- Prefer annual precipitation of 12-35 inches, occurring in infrequent, heavy events
- Found on hills and lower mountain slopes in areas with generally mild winters; and often on steep slopes that are very hot in summer
- Fairly drought-tolerant and adapted to fire; many shrub species can sprout from stumps following fire
- Prefer shallow, usually well-drained, rocky soils

Grassland (open areas):

- Comprised of bunch grasses, sedges, and annual and perennial wildflowers
- May merge with chaparral or oak woodland (a key for tree selection)
- Prefer annual precipitation of generally 6-20 inches
- Prefer soils ranging from deep alluvial fan and flood plain, to moderately deep upland with high organic matter, to low terrace land soils having moderately dense sub-soils, to poorly drained valley basin soils
- Rate to no longer abundant (largely replaced by agricultural land uses)
- Avoid invasive exotic grasses and other herbs that have impaired remaining California grasslands

Riparian (stormwater areas):

- Non-invasive riparian or inundation tolerant vegetation that is EPA approved for stormwater applications, and selected for resistance to erosion and east of maintenance

Trees (all areas):

- Native trees such as Big-lead Maples, Redbuds, Sycamores Oaks and Alders were considered for their water requirements, habitat value and shading. All plant materials were sited in appropriate hydro-zones with similar water consuming drought and/or inundation tolerant vegetation.

An irrigation system with programmable controller and rain shut off switch was installed for water conservation. Park elements include 17-foot wide multi-use trails of decomposed granite that allow for bicycle, pedestrian and utility access, and provide outcropping for granite pedestrian and jogging trail with educational signage. A bermed viewing area overlooking the LA River towards Elysian Park, and upwards to the southwest and across the LA River channel towards the Arroyo Seco overlook help to balance cut from onsite grading. Overall, the site increases awareness of the LA River and the beauty of its watershed.

Other scope elements include multi-use decomposed granite trails, lighting, and fencing to protect stormwater infrastructure from vandalism, and to control usage and minimize erosion.

4.5. Project Benefits

The Humboldt Stormwater Greenway provides many benefits to the City and local community such as potentially providing both a regional transit greenway and a special event destination. Project elements further support job creation, private enterprise, street vendors, and the cultural arts.

4.5.1. Water Supply Benefits

This project site is downstream of the City's DWP drinking water wells, so it is not expected to offer a recharge benefit for the San Fernando Groundwater Basin. However, the project implemented water conservation measures through the installation of efficient irrigation equipment and installed appropriate water-use plant species for drought and inundation tolerance.

4.5.2. Water Quality Benefits

The project treats runoff at a collection point of a drainage area targeted for bacteria prior to releasing flows to the LA River. The BOS Bacteria Source Tracking Study will continue to provide data and analyses as to which sections of the drainage area contribute to the high bacteria loads that have been detected at the outfall during the BSI Study.

4.5.3. Flood Protection Benefits

By diverting surface street runoff and ponding from the surrounding area into a bio-filter within a vegetated swale, this project helps to alleviate local flooding and trap sediment at the street-end portion of Humboldt where it abuts Avenue 19 and the proposed public plaza.

4.5.4. Other Benefits

In addition to the onsite stormwater improvements, other benefits of the project include:

- Pollutant reductions in downstream water bodies, including LA River
- Community economic benefits
- Pedestrian, bikeway, and transit linkages
- Open space and viewing locations
- Native riparian and upland habitat enhancements
- Public education and awareness through project location and signage
- Neighborhood aesthetic enhancements

4.6. Operations and Maintenance

BOS is responsible for collecting water quality data for up to three years and shall include at least one year with above average rainfall and one year with below average rainfall occurring in the Los Angeles region. BOS will also maintain the inlet and outlet structures for the life of the project. BOS will provide semi-annual vegetation management and inspection, occasional removal of plants and accumulated sediment, with scarifying and/or surface raking as necessary.

4.7. General Project Costs

General project costs listed in this section were presented in the *Phase I Project Concept Report* prepared by the City (2011).

TASK	DESCRIPTION	COST
a.	Project Construction	$2,599,990.00
b.	Design, Project Management, and Permitting	$727,997.00
	Total	**$3,327,987.00**

APPENDIX D:
CONCEPT DESIGN TO ADDRESS PRIORITY OUTFALL R2-K
(City of Los Angeles)

DRAFT

Actions to Address Dry Weather Urban Runoff for Downtown Los Angeles

R2-K

City of Los Angeles
Department of Public Works
Bureau of Sanitation, Watershed Protection Division
1149 S Broadway, 10th Floor
Los Angeles, CA90015-2213

(page intentionally left blank)

TABLE OF CONTENTS

1. Introduction and Background

This report describes the Downtown Low Flow Diversion (LFD) Project. The primary goal of the Downtown LFD Project is to divert dry weather flows from entering the Los Angeles River (LA River). The project addresses discharges to the LA River from a high priority, polluted storm drain in the Downtown Los Angeles area. The completion of this project contributes to the City's compliance with stormwater regulations.

1.1 Stormwater Regulations and Work to Date

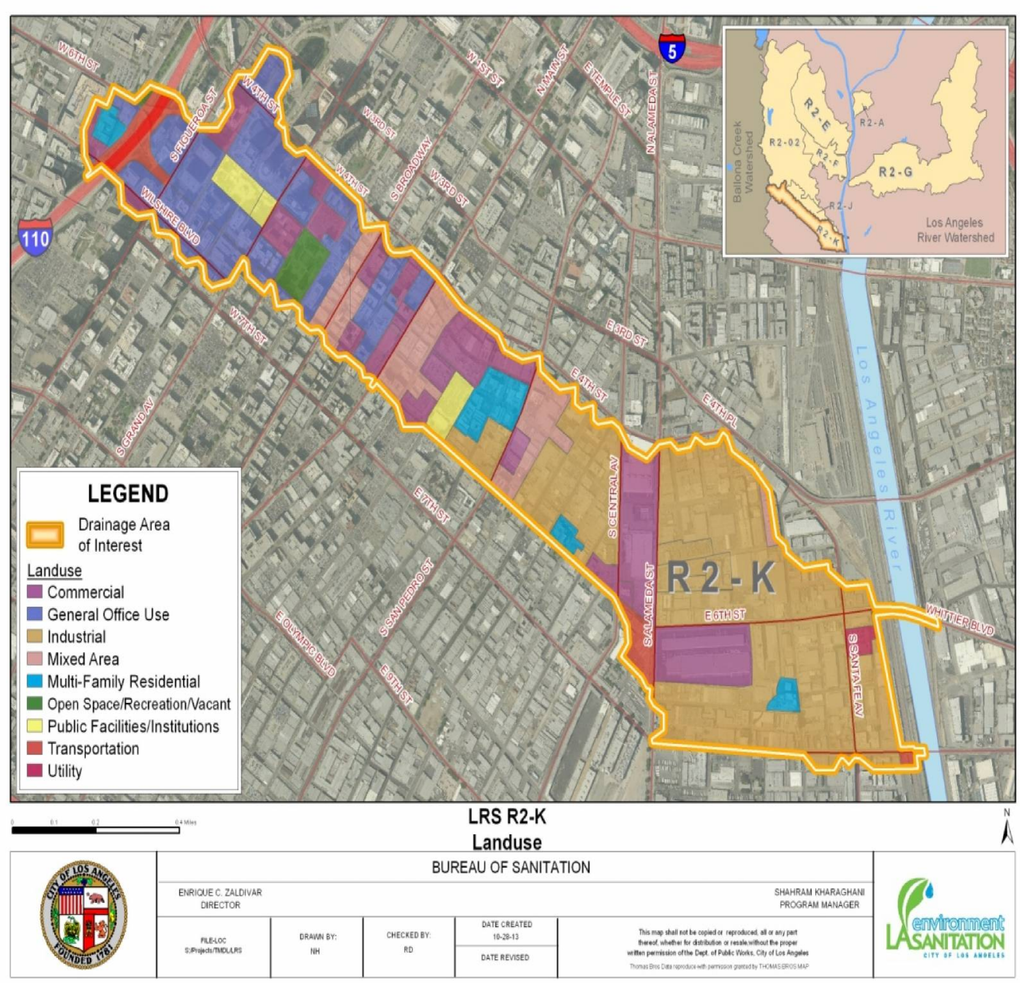
The LA River is impaired by pollutants including bacteria, metals, trash, oil and nutrients. To address these impairments the State has developed Total Maximum Daily Loads (TMDLs), which contain compliance schedules for the City to reduce impacts from stormwater discharges. The LA River Metals TMDL has final compliance dates of 2024 and 2028 for dry and wet weather, respectively. The LA River Bacteria TMDL, perhaps the most challenging TMDL faced by the City, has a phased dry-weather compliance schedule depending on reach/tributary and a wet weather compliance date of 2037. For Reach 2 of the LA River (also referred to as Segment B), the Bacteria TMDL requires the submittal of a dry weather Load Reduction Strategy (LRS), with details of and commitments to the specific BMPs that will be implemented. The Downtown LFD Project described in this report is a key component of the Segment B Bacteria LRS, and addresses many other stormwater pollutants from the targeted subwatersheds during dry weather.

BOS/WPD identified discharge locations that have the highest impact on bacteria loading in the LA River. These top outfalls were then prioritized based on cost effectiveness. In 2007, The City conducted one of the most sophisticated bacteria studies conducted to date (in California, the United States, or elsewhere), called the Bacteria Source Identification Study (BSI Study). The BSI Study sampled over 110 outfalls in the LA River watershed in order to determine their water quality impacts. The R2-K outfall was identified as being a high priority discharge, having significant water quality impacts in the LA River. The outfall location is shown in Figure 1, and is the focus of this report.

2. Project Description

The Downtown Los Angeles LFD Project was designed to divert year round dry weather flows from a storm drain line to a nearby sanitary sewer pipeline for conveyance to Hyperion Treatment Plant for treatment. The project is located at the corner of 7^{th} Street and San Mateo in Downtown LA and was completed in September 2013. The project receives urban runoff from an approximately 450-acre drainage area, shown in **Figure 1.** The drainage area consists mostly of industrial and commercial land uses, at 47 percent and 30 percent of the total respectively. The remaining areas are categorized as mixed urban, transportation, residential, public facilities, and open space land uses. The area also includes a few pockets of homeless population within and around the Downtown Produce District, Toy District, and portions of the Downtown Center. Results from the Street and Sidewalk Washing Study[1] conducted along 7^{th} and 8^{th} Streets by the City indicated that large amounts of trash and debris can be found on streets and sidewalks, as well as runoff on the curbsides flowing into catch basins and storm drains. Previous additional monitoring results from the outfalls and sub-drainage streams also indicated high levels of coliform bacteria.

Figure 1 R2-K Stormdrain Discharge Subwatershed Delineation



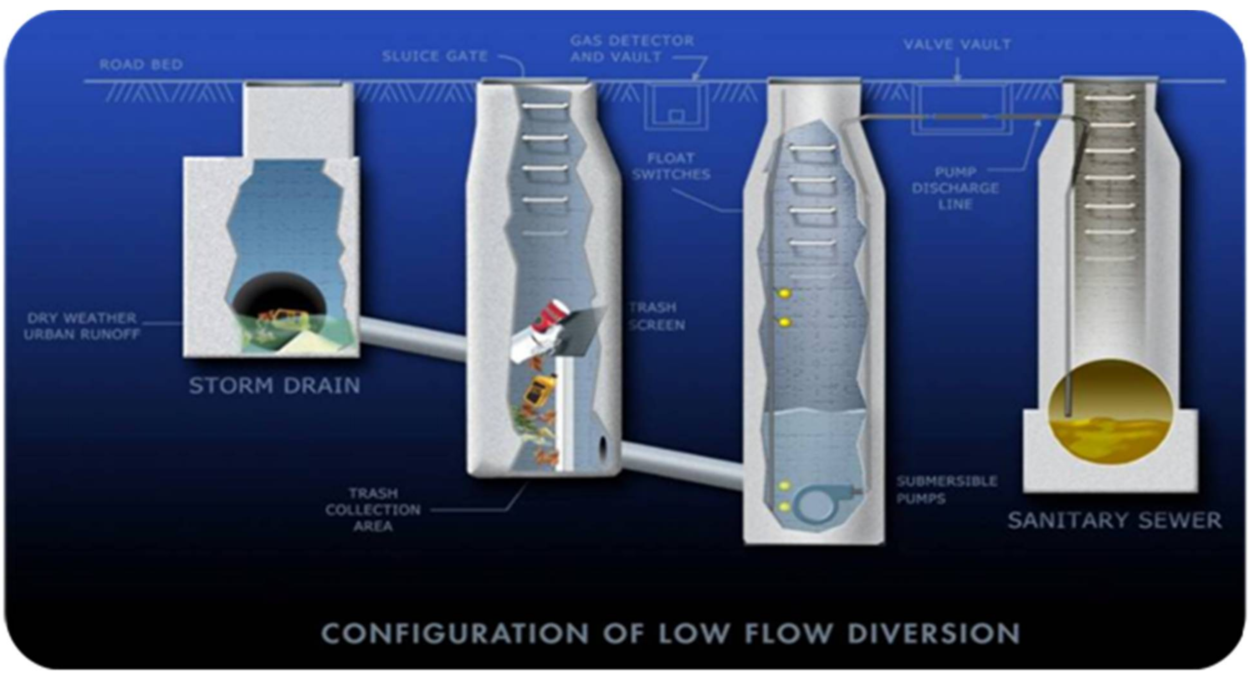
[1]Department of Public Works, City of Los Angeles. 1997. A Study of Pollutants Entering Storm Drains from Street and Sidewalk

The Downtown LFD Project captures dry weather flows and helps reduce the amount of pollutants that would otherwise be discharged to the Los Angeles River. The LFD structure diverts the dry-weather runoff from the storm drains to an existing 132-inch (NOS-ECIS Unit # 2) sanitary sewer trunk line for transport to the Hyperion Treatment Plant for treatment. A schematic drawing of the LFD is shown in **Figure 2**. The LFD Project's drainage area has an estimated average flow of 3 to 5 cubic feet per second (cfs).

A Fresh Creek screening unit was installed slightly upstream of the LFD to capture and screen out any trash and debris prior to diversion, thus helping reduce clogs and maintenance issues for the downstream LFD structure. The LFD Project site is the 7th Street storm drain line located near the intersection of 7th Street and Mateo Street. **Figure 3** illustrates the sewer lines and storm water pipes within the R2-K outfall drainage area, with the red star indicating the location of the LFD facility.

LOW FLOW DIVERSION UNIT

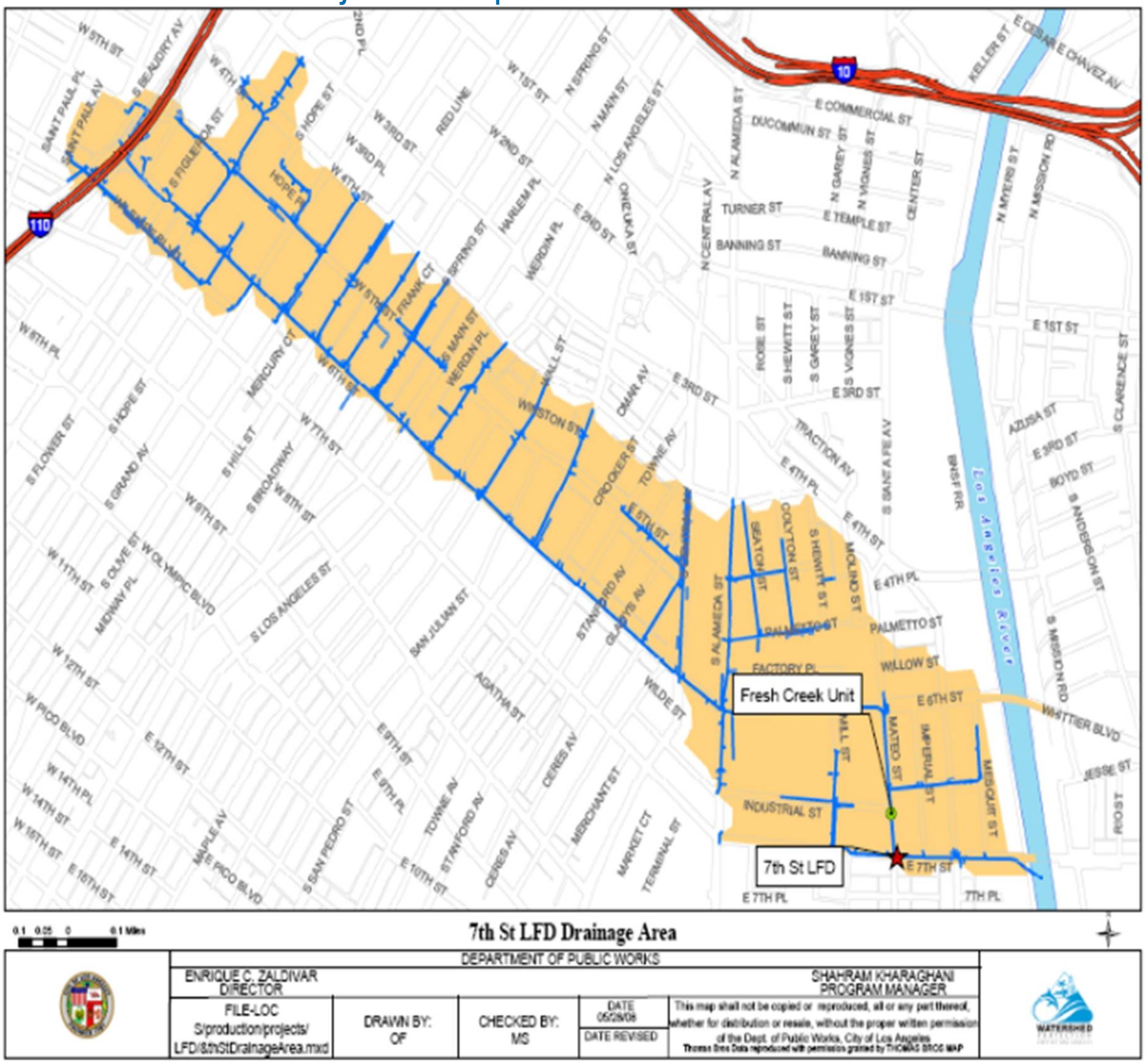
Figure 2. LFD Schematic Diagram



2.1 Project Location

The project is located in downtown Los Angeles. The LFD facility was installed near the intersection of 7th Street and Mateo Street to capture and divert runoff before it discharges to the LA River at the R2-K outfall. The facility location is shown below in **Figure 3**.

Figure 3 . Low Flow Diversion Facility Location Map



2.2 Existing Site Conditions

The total drainage area for the R2-K outfall is approximately 450 acres; however, since the LFD is located slightly upstream of the outfall, it receives runoff from a drainage area of approximately 440 acres.

3. Dry Weather Implementation Strategy

Dry weather runoff is a high priority source of pollution because dry weather flows, being very low, typically carry a higher concentration of pollutants. Controlling contamination during dry weather is also very important to the City because people are most likely to engage in REC-1 activities in the City's

waterways during dry weather periods. As a result of this project's implementation, dry weather runoff from the R2-K subwatershed is completely intercepted by the LFD prior to discharging to the LA River. These flows are diverted to the sanitary sewer and conveyed to the Hyperion Treatment Plant for treatment. The BOS (Bureau of Sanitation) has a long history of using diversion to address the impacts of dry-weather urban runoff, especially along Santa Monica Bay, with 23 LFDs currently being operated. The design and maintenance aspects of LFDs are well-documented and have been improved with each project. The major advantages of LFDs are (1) they provide 100% elimination of dry weather flows, (2) they are reliable, and (3) the BOS maintenance protocols are well established.

Table 1. Dry Weather Stormwater Quality Data from BSI Study

EVENT	SITE	FLOW RATE (CFS)		
		MEASURED	AVERAGE	MAXIMUM
1A	R2-K	0.692	0.492	0.724
2A	R2-K	0.423		
3A	R2-K	0.302		
4A	R2-K	0.443		
5A	R2-K	0.724		
6A	R2-K	0.368		

3.1. Layout and Design

The Downtown LFD Project includes a Fresh Creek Unit, which primarily serves to detain large trash items, other debris, and green waste. The trash separating unit has been installed on Mateo Street upstream of the LFD. It provides larger volume detention for both sediment and debris which is important given that sediment is the primary transport mechanism for metals and bacteria.

3.2. Operations and Maintenance

Maintenance activities for the structural elements of the project are focused on the major system components. **Table 2** outlines the required maintenance tasks, their associated frequency, and notes to expand the requirements of each task.

Table 2. O&M Considerations for Dry Weather Project Components

TASK	FREQUENCY	*MAINTENANCE NOTES*
Dry Season Inspection	**1 time/ year**	**Inspect once during the dry season to ensure volume capacity. Clean if required.**
Wet Season Inspection	**Monthly during the Wet Season**	**Monthly during wet season to ensure volume capacity.**
Trash Well Cleaning	**Dry-Season – 1 time Wet Season – 3 times**	**Dry season cleaning to occur just before the start of wet season**
Pump Well Cleaning	**Dry-Season – 1 time Wet Season – 3 times**	**Dry season cleaning to occur just before the start of wet season**
Pump Maintenance	**As needed**	
Valve Maintenance	**As needed**	
Control Panel Maintenance	**As needed**	

3.3. Project Cost

The cost for construction of the LFD at 7th Street was approximately $1,286,825. This includes planning, design, bid and award, and construction. It was assumed that operations and maintenance costs would be approximately 6 per cent of the total estimated capital costs. This results in O&M expenditures of over $60,000 per year. The general costs of implementing the Downtown LFD Project are listed in **Table 3**.

Table 3. Project Cost Summary

DESIGN		
	Design Costs[1]	**$188,354.00**
CONSTRUCTION		
	Task Description	**Costs**
1	Mobilization (GR-01292 & 01721)	$ 78,600.00
2	Class "B" Field Office with A/C (GR-01721)	$ 2,500.00
3	Traffic Control	$30,000.00
4	Project Sign Per Std. Plan S-791-1 (GR-1581)	$1,500.00
5	Expense for Differing Site Conditions (GR-01212)	$ 35,000.00
6	Expense for City's Construction Field Office and Office Supply (GR-01212)	$ 2,000.00
7	Expense for Neighborhood Impact Mitigation (GR 01212)	$ 3,100.00
8	Shoring for Trench Excavation	$ 10,000.00
9	Remove and Replace the Interfering Traffic Signal Conduits and Detector Loops per Plan R-2, Notice to Contractors note no. 18	$ 5,000.00
10	Install 18" Diversion Pipe per Plan, including Temporary Trench Resurfacing	$ 52,920.00
11	Install 12" Diversion Pipe per Plan, including Temporary Trench Resurfacing	$ 95,040.00
12	Install Concrete Berm per Plan	$ 2,000.00

13	Flow By-Passing per Plan	$ 5,000.00
14	Construct Wet Well & Valve Vault, including Shoring, per Plan, excluding all Mechanical, Electrical & Instrumentation Components	$ 153,400.00
15	Construct Cast-in-Place Diversion Box below the ex. 97" ø Storm Drain per Plan	$ 18,300.00
16	Construct trap maintenance (MH), including Shoring, per Plan	$ 36,800.00
17	Install 12" ø PVC Pipe & Appurtenant inside the ECIS MH Shaft per Plan, and pipe connection to ECIS MH per SPPWC, Section 208-1	$ 8,500.00
18	Install Temporary Sewer Odor Control or Containment Measures per Plan	$ 2,000.00
19	Mechanical Work, including piping, Knife Gate Valves & Actuator per Plan	$ 47,300.00
20	Electrical Work	$ 71,100.00
21	Instrumentation and Control Work, including the Installation of Ball Floats Assembly per Plan	$ 74,450.00
22	Trenchless Operation- Additional Cost	$ 95,000.00
23	SCADA System Upgrade	$10,877.00
24	Installation of sluice gates at wet well inlet	$48,702.00
25	Change Orders (net cost)	$ 159,118.00
TOTAL CONSTRUCTION COST		**$ 1,048,207.00**
TOTAL PROJECT COST		**$ 1,236,561.00**

[1] Design costs include, but are not limited to, costs incurred for predesign, planning, surveys, project feasibility study, BMP design plans and additional engineering services

(page intentionally left blank)

Appendix A

R2-K Low- Flow Diversion Photos during Construction

Wet Well and Valve Vault SZW00065

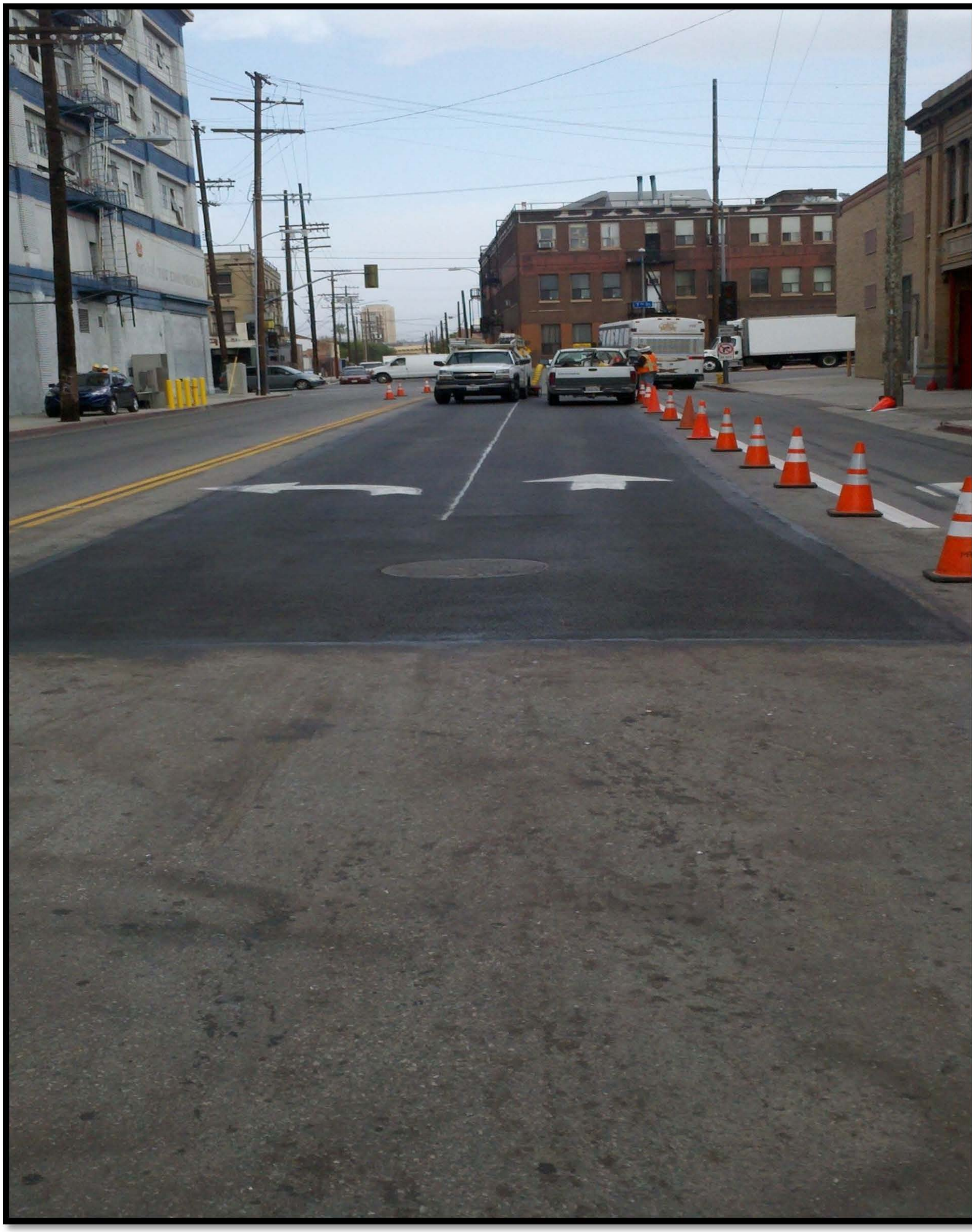
Diversion Opening and Flow Bypassing inside existing SD

Instrumentation Control Panel – testing

Trenching SZW00065

Wet Well and Valve Vault-2

Pipe Jacking Pit



Demobilization

SCADA Connection

Construction Site 27th and Santa Fe

Construction Site 7th and Sante Fe

Pipe Jacking Pit

Jacking Equipment

APPENDIX E:
CONCEPT DESIGN TO ADDRESS PRIORITY OUTFALL R2-02
(City of Los Angeles)

Conceptual Plans to Address Dry- and Wet-Weather Urban Runoff for Downtown Los Angeles

Appendix A.2 – R2-02 (Phase II)

Jointly prepared by:

Tetra Tech
800 West 6th Street, Suite 380
Los Angeles, CA 90017

CITY OF LOS ANGELES SANITATION DEPARTMENT OF PUBLIC WORKS

City of Los Angeles
Department of Public Works
Bureau of Sanitation, Watershed Protection Division
1149 S Broadway, 10th Floor
Los Angeles, CA 90015-2213

October 25, 2012

1. R2-02 (Phase II)

This conceptual design is for Phase II of the project which will address dry- and wet-weather flows for approximately 1,710 acres in the Civic Center section of the city, plus a larger portion from the northwest that includes the drainage area of Echo Park Lake. This appendix presents details of the implementation strategy to treat dry- and wet-weather flows from the R2-02 watershed which proposes implementing a low-flow diversion (LFD) near the intersection of 2nd Street and South Santa Fe Avenue and a green street along Patton Street between West Temple Street and Colton Street as shown in the next section.

1.1. Project Location and Site Description

The targeted subwatershed, referred to as the R2-02 watershed, is bordered by the terminus of the Glendale Freeway to the north, the neighborhoods of Silverlake and Filipinotown to the west, the Financial and Toy districts to the south, and Chinatown and Exposition Park to the east as shown in Figure 1. The R2-02 subwatershed is serviced by approximately 941 catch basins that drain to a network of both city and county storm drains that discharge to the Los Angeles River, approximately at 2nd Street.

The R2-02 subwatershed (summarized in Table 1) drains to the Los Angeles River, which is on the *Clean Water Act 303(d) List of Water Quality Limited Waterbodies* for ammonia, bacteria, copper, lead, algae, oil, and trash. A Total Maximum Daily Load (TMDL) for metals, nitrogen, and trash for the Los Angeles River have been developed for which the city has developed implementation plans and strategies to address. An additional TMDL for bacteria was recently adopted. This project will support all of the city's TMDL implementation plans for Reach 2 of the LA River, while providing multiple other benefits associated with green infrastructure.

Table 1. Site summary

Site attribute	Value
Watershed	Los Angeles River
Subwatershed	R2-02
Soil Infiltration Rate	0.23 in/hr
Hydrologic Soil Group	D

The drainage area primarily consists of the land use types shown in Table 2. More than half of the drainage area is high-density residential (54 percent), and over a quarter of it is commercial (30 percent). Open space is only 6 percent of the total area, with 10 percent being government buildings.

Table 2. Phase II distribution of land use types

Landuse type	Acres	Percent
Commercial	514.8	30.10%
High-Density Residential	918.0	53.68%
Industrial	7.1	0.42%
Open Space	104.6	6.12%
Other	165.5	9.68%
	1,710	**100%**

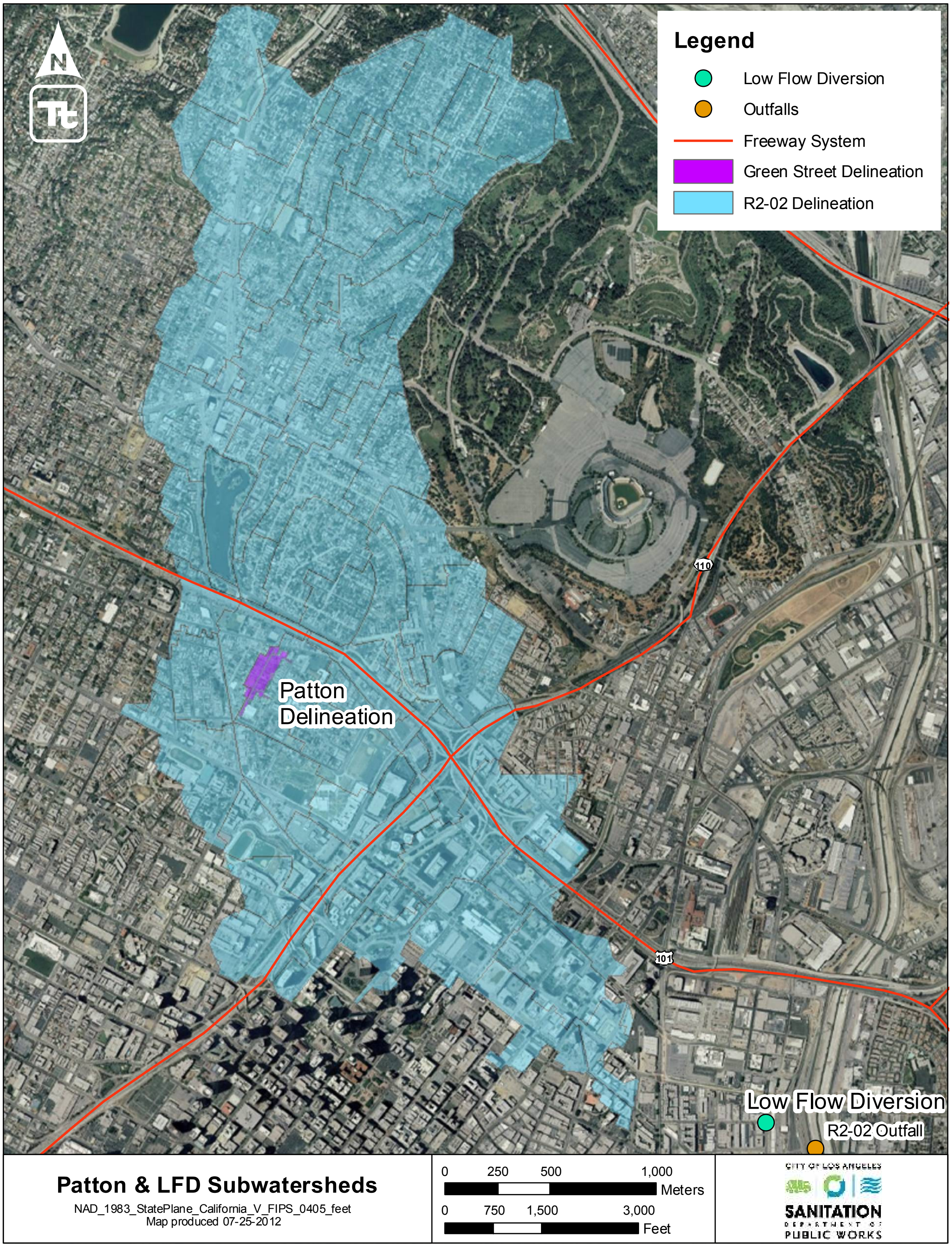


Figure 1. The R2-02 subwatershed.

1.2. Dry-Weather Implementation Strategy

Dry-weather flow from the county-owned 13-foot storm drain at 2nd Street will be intercepted by the installation of a diversion weir sized to minimize any hydraulic head losses to the existing system. This diverted flow will then travel by gravity to the trunk sanitary sewer, Northeast Interceptor Sewer, located approximately at 7th Street and Santa Fe. Figure 2 shows the plan and profile view of the storm drain that will be diverted in Phase II. Figure 3 shows a schematic of the structural elements of the LFD with connection to the R^2UFS diversion system.

1.2.1. LFD Sizing

A total average dry-weather flow rate of approximately 1.77 cfs will be used to size the LFD. Table 3 shows a summary of the flow measurements from the BSI study that were measured at the outfall in the LA River. Flow measurements will be field verified during the Pre- or Design Phase.

Table 3. Dry weather stormwater quality data from BSI study

Date	Site	Flow Rate (cfs)		
		Measured	Average	Maximum
8/7/2007	R2-02	1.77	0.67	1.77
8/14/2007	R2-02	0.54		
8/21/2007	R2-02	0.38		
9/18/2007	R2-02	0.34		
10/2/2007	R2-02	0.66		
10/9/2007	R2-02	0.35		
8/7/2007	R2-J	0.12	0.10	0.17
8/14/2007	R2-J	0.07		
8/21/2007	R2-J	0.11		
9/18/2007	R2-J	0.08		
10/2/2007	R2-J	0.07		
10/9/2007	R2-J	0.17		

1.2.2. Conceptual Layout and Design

The proposed LFD is similar in purpose to those the City has installed along Santa Monica Bay in that it will divert dry weather storm flow to the sanitary sewer for treatment at the Hyperion Treatment Plant. This installation will be unique in that though it is still a "brick and mortar" structural BMP, its energy footprint will be minimal. Essentially, this LFD could be considered a "green" BMP; the proposed installation does not use any pumps but rather relies on gravity flow (passive system) to transport the storm drain flow to the sanitary sewer. The intent is to use appropriate pipe sizing (to be determined during the design phase) as the control to manage the flow entering the sanitary system.

The proposed LFD design incorporates a trash well and a control panel customarily found in typical LFDs. The trash well will primarily serve as a sedimentation tank to capture heavier sediment particles since the online diversion will have a trash rack installed to prevent large floatables from being diverted. It is expected, due to the retrofit of the majority of the upstream catch basins in the watershed with both catch basin inserts and curb opening screens, that the volume of trash entering the storm drain system will be insignificant. The control panel will primarily serve as the means to control and monitor the maintenance sluice gate and flow meters of the structure. Figure 3 shows a schematic of the structural elements of the LFD diversion system.

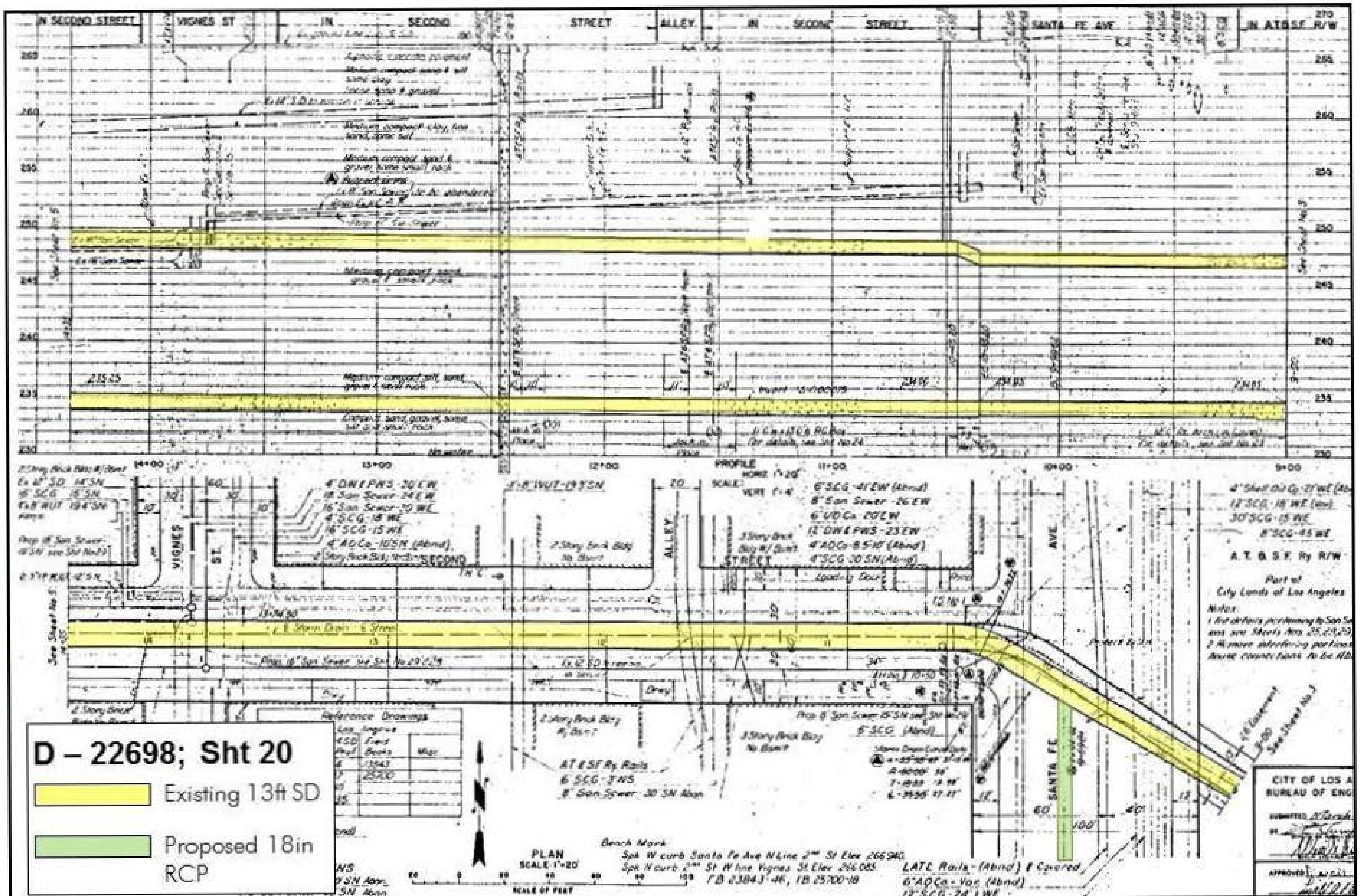


Figure 2. Plan and profile view of existing storm drain for diversion in phase II.

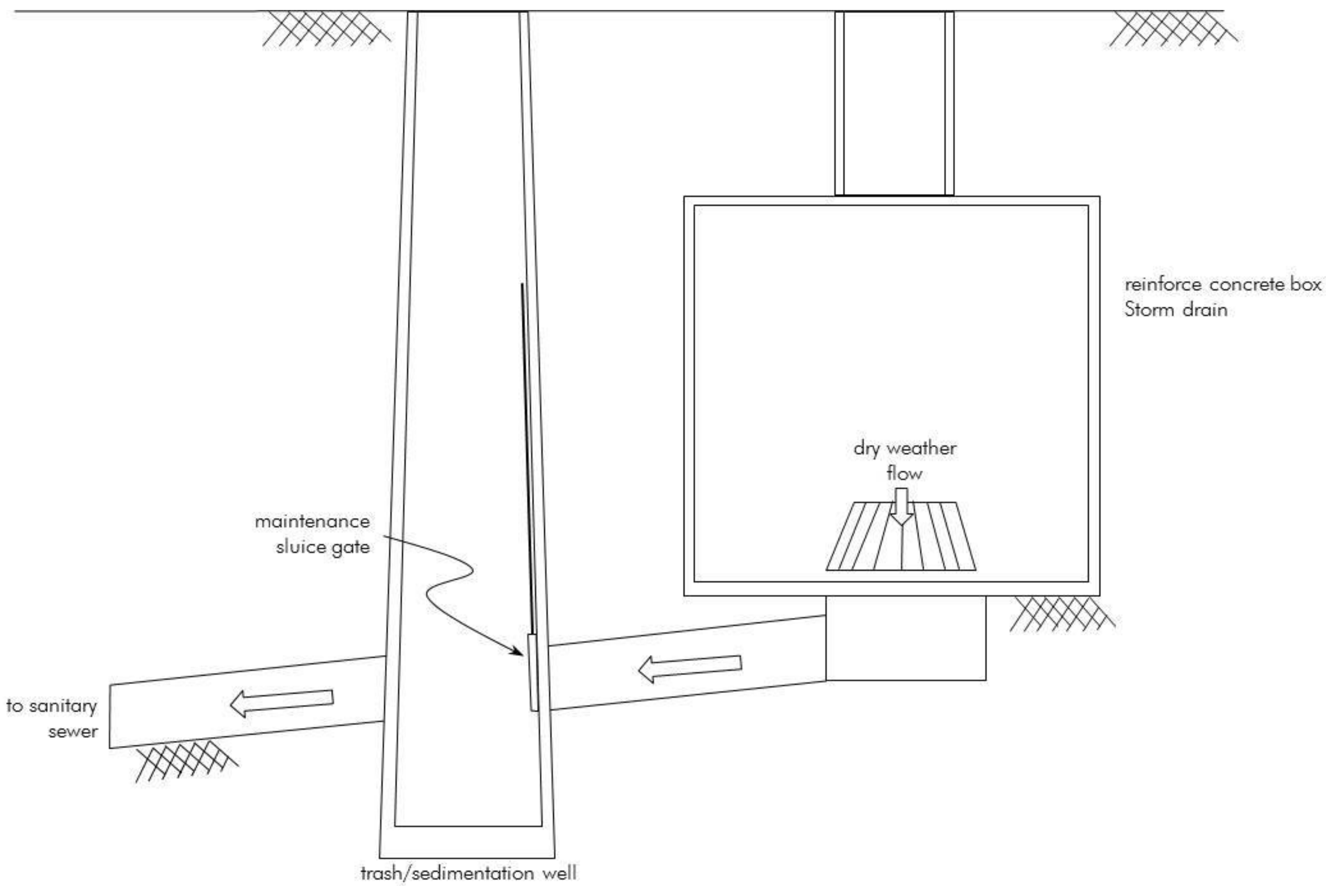


Figure 3. LFD schematic.

1.2.3. Operations and Maintenance

Maintenance activities for the structural elements of the project should be focused on the major system components.

Table 4 outlines the required maintenance tasks, their associated frequency, and notes to expand on the requirements of each task.

Table 4. Operations and maintenance considerations for the LFD and R^2UFS

Task	Frequency	Maintenance notes
Dry Season Inspection	1 time/year	Inspect once during the dry season to ensure volume capacity. Clean if required.
Wet Season Inspection	Monthly during Wet Season	Monthly during wet season to ensure volume capacity.
Trash Well Cleaning	Dry Season – 1 time West Season - 3 times	Dry season cleaning to happen just before start of wet season.
Pump Well Cleaning	Dry Season – 1 time Wet Season - 3 times	Dry season cleaning to happen just before start of wet season.
Pump Maintenance	As needed	
Valve Maintenance	As needed	
Control Panel Maintenance	As needed	

1.2.4. Cost Estimate

The estimated costs of implementing the structural dry-weather components at Patton Street are shown in Table 5.

Table 5. LFD cost estimate

Item no.	Description	Quantity	Unit	Unit cost	Total
	Structures				
1	18" RCP	2600	LF	$575.00	$1,495,000
2	LFD	1	Each	$1,000,000	$1,000,000
Construction Subtotal					$2,495,000
3	Planning (20% of subtotal)				$499,000
4	Mobilization (10% of subtotal)				$249,500
5	Construction contingency (25% of subtotal)				$623,750
Construction Total					$3,867,250
6	Design (30% of Construction Total)				$1,160,175
Total Cost					**$5,027,425**

1.3. Wet-Weather Implementation Strategy

The wet-weather implementation strategy proposes incorporating treatment through green infrastructure best management practices (BMPs). Wet-weather flows will be diverted from the street and the surrounding parcels into permeable pavement and bioretention areas implemented in the right of way. The drainage area contributing to the green street BMP is approximately 6.74 acres and encompasses land uses of transportation, low- and high-density residential, and commercial. A total imperviousness of 70 percent was found for the delineated watershed.

1.3.1. Geotechnical Literature Review

A geotechnical literature review was performed to identify any potential geologic or subsurface issues that could affect BMP implementation or configuration. Soil properties of interest were the soil infiltration capacity, soil type, liquefaction potential, corrosivity, depth to groundwater, and expansion potential. According to the Los Angeles soils GIS layer, the soil infiltration rate is 0.23 inch per hour, and the soil type is Altamont clay loam. A full geotechnical study for the Belmont Learning Center was performed in 1996 to investigate subsurface conditions (Law/Crandall 1996). The center is roughly 0.4 mile to the southeast of the Patton Street location. The surface soil type was identified as alluvium with sandy to silty clay. The liquefaction potential was identified as low, and the soil corrosivity was identified as severely corrosive to ferrous metals and concrete. The depth to groundwater at the site ranged from 16 to 50 feet. The report does not have information on the expansion potential of the soils and additional studies are needed. In addition to the parameters identified above, the site is in an actively producing oil field, resulting in the potential for methane and other volatile gases to occur in the soils. The report concludes that the measured concentrations are below the acceptable threshold and would not be a cause for concern. A full geotechnical study should be performed at the project site before the full design to verify infiltration rates and other subsurface conditions outlined above.

1.3.2. BMP Sizing

Unlike BMPs that are designed and constructed as part of new developments using the 85th percentile requirement outlined in the Standard Urban Stormwater Mitigation Plan (SUSMP), these green infrastructure BMPs are being implemented as a retrofit to meet regulatory requirements by improving the overall water quality of the watershed. As a result, the 85th percentile requirement is not necessarily appropriate to size these BMPs. Instead, it is more helpful to assess the water quality benefits that the BMPs will provide over a range of possible alternative designs and identify the sizes that achieve the most cost-effective pollutant load reductions. Such an approach maximizes the city's total pollutant load reduction mass per dollar spent.

To conduct this analysis, the U.S. Environmental Protection Agency's (EPA) System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) model was configured for the site to simulate the hydrology of the contributing drainage area and the hydraulics of the green infrastructure. SUSTAIN was developed by the EPA Office of Research and Development to facilitate selection and placement of BMPs and green infrastructure techniques at strategic locations in urban watersheds. It assists to develop, evaluate, and select optimal BMP combinations at various watershed scales on the basis of cost and effectiveness. In this study, the BMP's effectiveness was measured by its ability to remove total copper. Total copper was determined to be the limiting pollutant in the *Los Angeles River Metals TMDL Implementation Plan* prepared by the city's Bureau of Sanitation (City of Los Angeles 2009) indicating that if total copper is controlled, other pollutants would have similar or greater removal rates. To optimize the impacts of the BMPs, SUSTAIN simulates thousands of implementation scenarios by varying design dimensions of multiple BMPs resulting in a cost and an average annual pollutant removal percentage for each scenario. When all resulting scenarios are plotted, a threshold curve of cost versus effectiveness is generated and assists in selecting the cost-optimal BMP size. For this study, the cost-effectiveness curve was generated using 10 years of rainfall and runoff data from 1996 to 2006 (Figure 4). Using a regression analysis, the point of diminishing returns was identified as the most cost-effective solution, which corresponds to a total reduction in total copper of 0.219 lb/year (39 percent), BMPs size of 7,140 square feet (assuming vertical side walls), a retention volume of 8,734 cubic feet, and a BMPs cost of $305,643. This is the most cost-effective size of the BMP and is recommended as the target design size for implementation. The costs shown in Figure 4 are relative planning estimates and are not necessarily reflective of the actual design and construction costs. They do not account for the specific components or other aspects of a retrofit project such as asphalt removal, sediment and erosion control, curb cuts, curb replacement, pavement striping, and such. However, they are useful for comparing cost and effectiveness among different sizing options. A full cost estimate is provided in

Table 10.

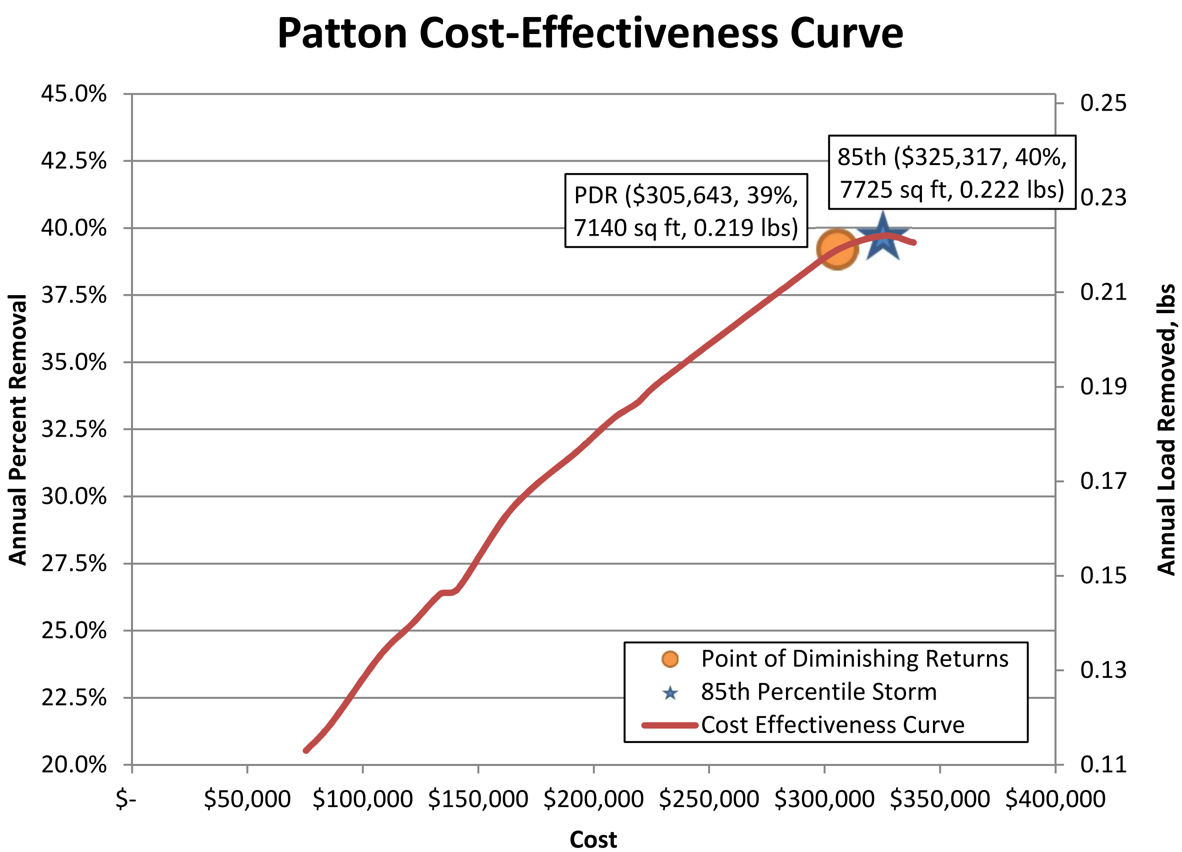


Figure 4. Cost-effectiveness curve.

1.3.3. Expected Watershed Impacts

In addition to the sizing calculations, SUSTAIN was used to quantify potential water quality benefits that could be achieved by implementing the BMP at the recommended size. The simulations were run for the 10-year period from October 1, 1996 through September 30, 2006. Table 6 and Figure 5 highlight the annual pollutant removal percentages and total average annual load reduction for TSS, total nitrogen, total phosphorus, copper, lead, zinc, and fecal coliform for the design solution. Time series data for the water quality impairments were available from previous modeling efforts performed in developing the *Multi-Pollutant TMDL Implementation Plans for the Unincorporated County Areas of the Los Angeles River Watershed*. Data for the remaining 303(d) listings were not readily available for this study. Water quality benefits are realized through loss of pollutant mass through infiltration and decay during residence time in the BMPs.

Table 6. Average annual expected pollutant reductions

Constituent	Average annual loads		Average annual reduction	
	Pre-BMP	Post-BMP	Percentage	Reduction
Volume, (ft^3)	368,031	282,231	23.3%	85,800
TSS, (lbs)	1,329	793	40.3%	535
Total nitrogen,(lbs)	45.95	29.98	34.8%	15.97
Total phosphorus, (lbs)	40.06	27.22	32.0%	12.84
Copper, (lbs)	0.560	0.340	39.2%	0.219
Lead, (lbs)	0.548	0.337	38.5%	0.211
Zinc, (lbs)	5.205	3.081	40.8%	2.124
Fecal counts	9.02E+11	6.43E+11	28.7%	2.58E+11

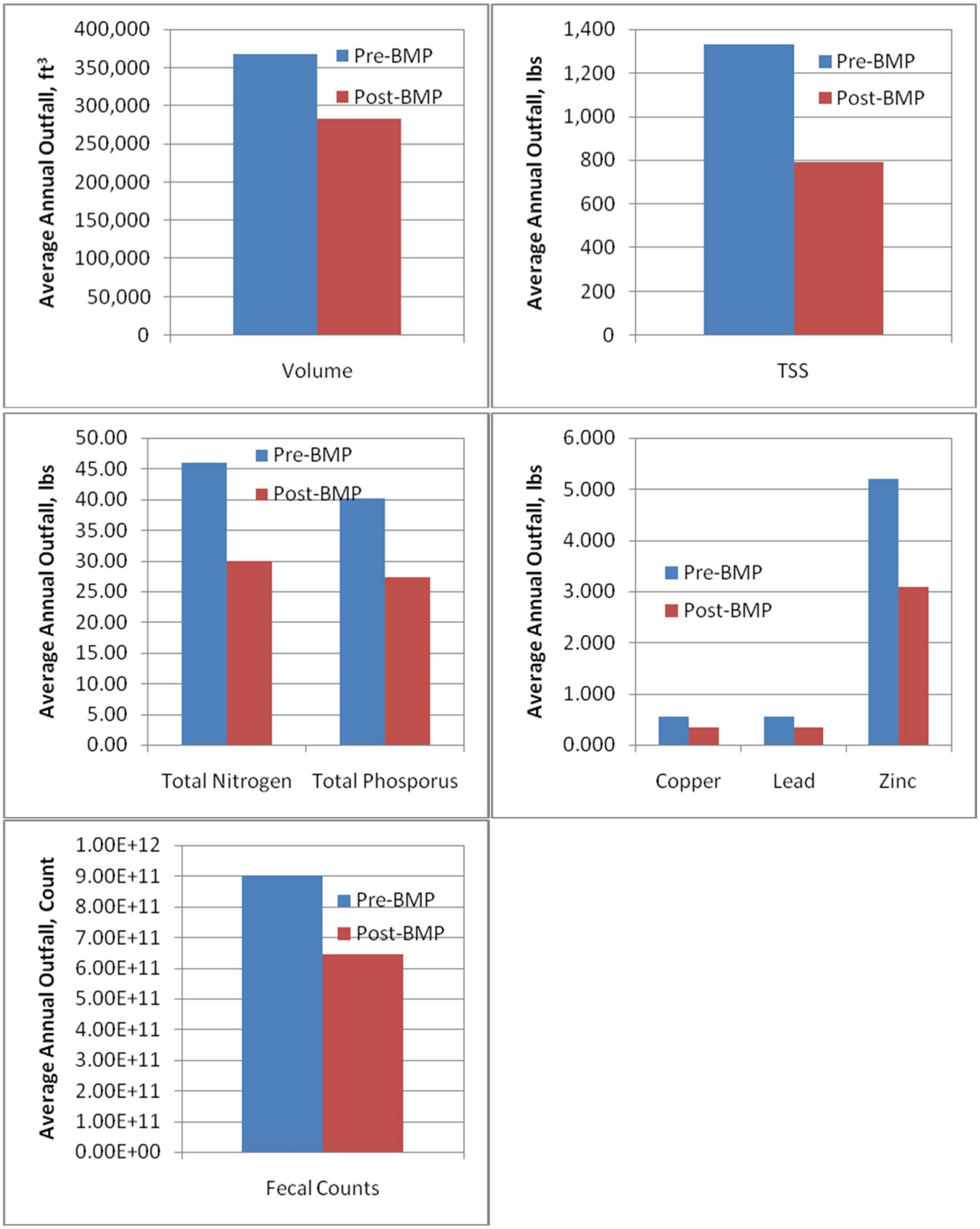


Figure 5. Average annual flow volume and pollutant loading.

1.3.4. BMP Conceptual Layout, Design, and Performance Specifications

The conceptual configuration of the BMPs, providing the optimum level of treatment, is intended to divert and treat water flowing from the street and surrounding parcels. Standard asphalt in the parking lanes should be converted to permeable pavement to treat runoff from Patton Street. Runoff from the parcels adjacent to Patton Street and overflow from the permeable pavement should be treated in bioretention areas implemented between the curb and the sidewalk in the right of way. The bioretention areas should be delineated with a vertical curb 6 inches above the pavement and extending 3 inches above the sidewalk, as shown in Figure 7. To accomplish the targeted treatment, 4,710 square feet of permeable pavement and 2,430 square feet of bioretention are required.

Figure 6. Patton Street current right-of-way configuration.

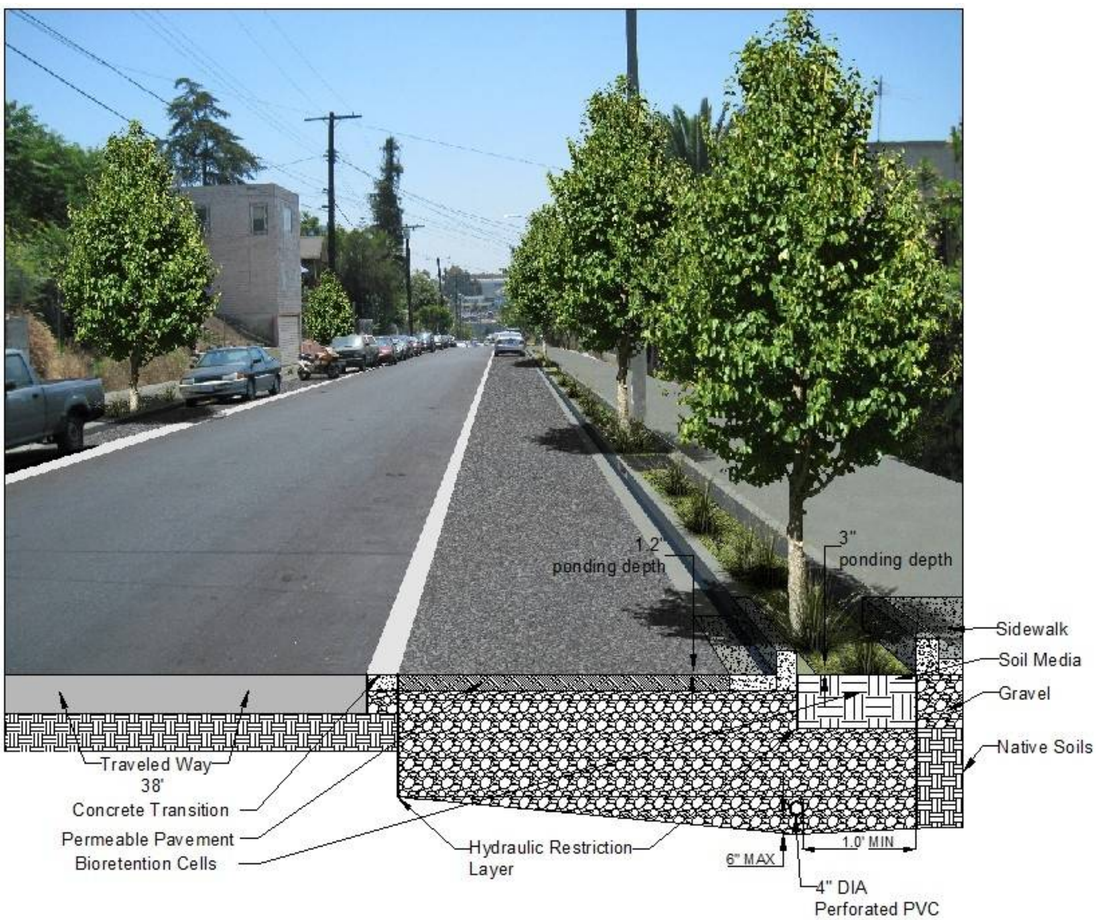


Figure 7. Greet street configuration for wet-weather treatment.

The BMPs should be designed to meet the following specifications:

- Bioretention Cells
  - Ponding depth should be maintained at a minimum of 3 inches.
  - Infiltration rate in existing soils should be a minimum of 0.5 in/hr.
  - If the infiltration rate is less than 0.5 in/hr, an engineered soil media should be used within 2 feet of the surface of the bioretention areas, requiring underdrains and should meet the following criteria:
    - Soil media consists of 85 percent washed course sand, 10 percent fines (range: 8–12 percent, and 5 percent organic matter. The expected infiltration rate should range from 1 to 2 in/hr.
    - The sand portion should consist of concrete sand (passing a one-quarter-inch sieve). Mortar sand (passing a one-eighth-inch sieve) is acceptable as long as it is thoroughly washed to remove the fines.
    - Fines should pass a # 270 (screen size) sieve.
    - Soil media must have an appropriate amount of organic material to support plant growth. Organic matter is considered an additive to help vegetation establish and contributes to sorption of pollutants but should generally be minimized (5 percent). Organic materials will oxidize over time, causing an increase in ponding that could adversely affect the performance of the bioretention area. Organic material should consist of aged bark fines, or similar organic material. Organic material should not consist of manure or animal compost. Newspaper mulch has been shown to be an acceptable additive.
    - pH should be between 6–8, cation exchange capacity (CEC) should be greater than 5 milliequivalent (meq)/100 g soil.
    - High levels of phosphorus in the media have been identified as the main cause of bioretention areas exporting nutrients. All bioretention media should be analyzed for background levels of nutrients. Total phosphorus should not exceed 15 ppm.
  - An underdrain will be required in areas where existing soils have an infiltration rate less than 0.5 in/hr and should meet the following criteria:
    - Minimum 4-inch slotted, PVC pipe conforming to ASTM D 3034 or equivalent or corrugated, HDPE pipe conforming to AASHTO 252M or equivalent.
    - The type of perforated pipe is not critical to the function of the BMP as long as the total opening area exceeds the expected flow capacity of the underdrain and does not limit infiltration through the soil media. The perforations can be placed close to the invert of the pipe to achieve maximum potential for draining the facility. If an anaerobic zone is intended, the perforation can be placed at the top of the pipe.
    - Place the underdrain on a minimum 3-foot-wide bed of drainage stone 6 inches deep and cover with the same drainage stone to provide a 16-inch minimum depth around the bottom, sides, and top of the slotted pipe.
    - The drainage stone should be a washed no. 57 stone, or similar alternative that has been washed to remove all fines.
    - A barrier should be incorporated to separate the soil media from the drainage layer and should include 2 to 4 inches of pure sand followed by a thin layer (nominally 2 inches) of choking stone (such as no. 8).
    - The underdrain must drain freely and discharge to the existing stormwater infrastructure.
    - Rigid, unperforated observation pipes with a diameter equal to the underdrain diameter should be connected to the underdrain every 250 to 300 feet to provide a cleanout port and an observation well to monitor dewatering rates.
- Permeable Pavement
  - Bedding material should be a 1- to 2-inch layer of choker course (single-sized crushed aggregate, one-half inch). It must be completely free of fines.

- The structural layer below the permeable pavement must have a porosity of 40 percent. A washed no. 57 stone at a depth of at least 6 inches is recommended.
- System should not be placed on compacted fill.
- Installation must have a slope of less than 0.5 percent.
- An underdrain will be required in areas where the infiltration rate of the existing soils is less than 0.5 in/hr and should meet the following criteria:
  - Minimum 4-inch slotted, PVC pipe conforming to ASTM D 3034 or equivalent or corrugated, HDPE pipe conforming to AASHTO 252M or equivalent.
  - The type of perforated pipe is not critical to the function of the BMP as long as the total opening area exceeds the expected flow capacity of the underdrain and does not limit infiltration through the soil media. The perforations can be placed close to the invert of the pipe to achieve maximum potential for draining the facility. If an anaerobic zone is intended, the perforation can be placed at the top of the pipe.
  - Place the underdrain on a minimum 3-foot-wide bed of drainage stone 6 inches deep and cover with the same drainage stone to provide a 16-inch minimum depth around the bottom, sides, and top of the slotted pipe.
  - The drainage stone should be a washed no. 57 stone, or similar alternative that has been washed to remove all fines.
  - The underdrain must drain freely and discharge to the existing stormwater infrastructure.
  - Rigid, unperforated observation pipes with a diameter equal to the underdrain diameter should be connected to the underdrain every 250 to 300 feet to provide a cleanout port and an observation well to monitor dewatering rates.
- Permeable pavement should be lined on all sides with a 30 mil liner to protect the surrounding infrastructure.

1.3.5. Plant Selection

For the BMPs to function properly for stormwater treatment and blend into the landscape, vegetation selection is crucial. Appropriate vegetation will have the following characteristics:

1. Plant materials must be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 10 to 48 hours.
2. It is recommended that a minimum of three trees, three shrubs, and three herbaceous groundcover species be incorporated to protect against facility failure from disease and insect infestations of a single species.
3. Native plant species or hardy cultivars that are not invasive and do not require chemical inputs are recommended to be used to the maximum extent practicable.

A selection of recommended plant species, along with additional details including the recommended landscape position, size at maturity, and light requirements, is provided in Table 7.

Table 7. Recommended plant list

		Los Angeles Native - SD California Native - CA Non-Native - X	Landscape Position: 1 - Low[a], 2 - Mid[b],3 - High[c]	Mature Size (height x width)	Irrigation Demands: High - H - M Low - L - N	Light Requirements Sun - SU - SH Part Shade - PS Sun or Shade - SS	Season Evergreen - E, Deciduous - D Semi-Evergreen - SE
Trees							
***Cercisoccidentalis*[d]**	**Western redbud**	**LA**	**1**	**10-18' x 10-18'**	**M**	**SU, PS**	**D**
***Chilopsislinearis*[d]**	**Desert willow**	**LA**	**1**	**15-30' x 10-20'**	**L-M**	**SU**	**D**
***Salix gooddingii*[d]**	**Western black willow**	**LA**	**1**	**20-40'x20-30'**	**H**	**SU**	**D**
***Sambucusmexicana*[d]**	**Mexican elderberry**	**LA**	**1**	**10-30' x 8-20'**	**M-H**	**SU, PS**	**SE**
Umbellulariacalifornica	California bay	LA	1	20-25' x 20-25'	L-H	SU, PS, SH	E
Shrubs							
Baccharispilularis 'Pigeon Point'	Dwarf coyote bush	LA	3	1-2' x 6'	L-M	SU	E
Rhamnuscalifornica 'Little Sur'	Dwarf California coffeeberry	LA	2	3-4' x 3'	N-M	SU, PS	E
Heteromelesarbutifolia	Toyon	LA	3	6-10' x 6-10'	M	SU, PS	E
***Baccharissalicifolia*[d]**	**Mulefat**	**LA**	**1**	**4-10'x8'**	**M-H**	**SU,PS,SH**	**SE**
***Rosa californica*[d]**	**California rose**	**LA**	**1**	**3-6' x 6'**	**M-H**	**SU, PS, SH**	**SE**
Grasses and grass like plants							
***Elymusglaucus*[d]**	**Blue Wild Rye**	**LA**	**1**	**2-4'x5'**	**L-M**	**SU, PS**	**SE**
***Muhlenbergiarigens*[d]**	**Deer Grass**	**LA**	**1**	**2-4' x 3-4'**	**L**	**SU**	**E**
***Juncuspatens*[d]**	**California Gray Rush**	**CA**	**1**	**2' x 2'**	**L-H**	**SU, PS**	**E**

Notes

The Landscape position is the lowest area recommended for each species. Plants in areas 1 and 2 might also be appropriate for higher locations. When specifying plants, availability should be confirmed by local nurseries. Some species might need to be contract-grown, and it could be necessary for the contractor to contact the nursery well before planting because some species might not be available on short notice.

[a]Landscape Position 1 (Low): These areas experience seasonal flooding. Seasonal flooding for bioretention areas is typically 9" deep, for up to 72 hours (the design infiltration period for a bioretention area). If parts of the bioretention area are to be inundated for longer durations or greater depth, the designer should develop a plant palette with longer term flooding in mind. Several of the species listed as tolerant of seasonal flooding might be appropriate, but the acceptability of each species considered should be researched and evaluated case by case.

[b]Landscape Position 2 (Mid): These areas are low but are not expected to flood. However, they are likely to have saturated soils for extended periods.

[c]Landscape Position 3 (High): These areas are generally on well-drained slopes adjacent to stormwater BMPs. Soils typically dry out between storm events.

[d]Bolded species have been observed in the City and are known to be suitable for the recommended landscape position.

1.3.6. Operations and Maintenance

Maintenance activities for the BMP should be focused on the major system components, especially landscaped areas. Landscaped components should blend over time through plant and root growth and organic decomposition and develop a natural soil horizon. The biological and physical processes over time will lengthen the facility's life span and reduce the need for extensive maintenance.

Irrigation might be needed, especially during plant establishment or in periods of extended drought. Irrigation frequency will depend on the season and type of vegetation. Native plants will require less irrigation than nonnative plants.

Table 8 and Table 9 outline the required maintenance tasks, their associated frequency, and notes to expand on the requirements of each task.

Table 8. Bioretention operations and maintenance considerations

Task	Frequency	Maintenance notes
Monitor infiltration and drainage	1 time/year	Inspect drainage time (12–24 hours). Might have to determine the infiltration rate (every 2–3 years). Turning over or replacing the media (top 2–3 inches) might be necessary to improve infiltration (at least 0.5 in/hr).
Pruning	1 time/year	Nutrients in runoff often cause bioretention vegetation to flourish.
Mulching	1 time/year	Recommend maintaining 1- to 3-inch uniform mulch layer.
Mulch removal	1 time/3–4 years	Biodegraded mulch accumulation reduces available water storage volume. Removing mulch also increases surface infiltration rate of fill soil.
Watering	1 time/2–3 days for first 1–2 months; sporadically after establishment	If drought conditions exist, watering after the initial year might be required.
Fertilization	1 time initially	One-time spot fertilization for first year vegetation.
Remove and replace dead plants	1 time/year	In the first year, 10% of plants can die. Survival rates increase with time.
Inlet inspection	Once after first rain of the season, then monthly during the rainy season	Check for sediment accumulation to ensure that flow into the retention area is as designed. Remove any accumulated sediment.
Outlet inspection	Once after first rain of the season, then monthly during the rainy season	Check for erosion at the outlet and remove any accumulated mulch or sediment.
Miscellaneous upkeep	2 times/year	Tasks include trash collection, plant health, spot weeding, and removing mulch from the overflow device.

Table 9. Permeable pavement operations and maintenance considerations

Task	Frequency	Maintenance notes
Impervious to pervious interface	Once after first rain of the season, then monthly during the rainy season	Check for sediment accumulation to ensure that flow onto the permeable pavement is not restricted. Remove any accumulated sediment. Stabilize any exposed soil.
Vacuum street sweeper	Twice a year as needed	Portions of pavement should be swept with a vacuum street sweeper at least twice per year or as needed to maintain infiltration rates.
Replace void fill materials (applies to pervious pavers only)	1-2 times per year (and after any vacuum truck sweeping)	Fill materials will need to be replaced after each sweeping and as needed to keep interstitial bedding material even with the paver surface.
Miscellaneous upkeep	4 times per year or as needed for aesthetics	Tasks include trash collection, sweeping, and spot weeding.

1.3.7. Monitoring Plan

Performance monitoring of stormwater BMPs is an important component of a BMP implementation program. Monitoring provides the BMP designer a mechanism to validate certain design assumptions and to quantify compliance with pollutant-removal performance objectives. A monitoring approach using an inlet/outlet sample location setup is recommended.

1.3.8. Public Education and Outreach

The green infrastructure BMPs will provide learning opportunities for community residents who frequent the area. A demonstration project will provide an example of how BMPs can be implemented in existing infrastructure and serve as a consistent reminder of their effect on stormwater quality. When the project is completed, a sign describing the BMPs and indicating the BMP's role in maintaining healthy water quality should remain on-site. Parklets have also been implemented in several areas of the City and could be incorporated in the design for Patton Street to provide additional open space and opportunities for community interaction. Opportunities to include the parklet concepts should be considered in the next phase of the design.

1.3.9. Cost Estimate

The estimated costs of implementing the BMP along Patton Street are in Table 10. The estimates include the cost of meeting the performance specifications for the retention volume.

Table 10. Green street cost estimate

Item no.	Description	Quantity	Unit	Unit Cost	Total
	Preparation				
1	Traffic Control	15	Day	$1,000.00	$15,000.00
2	Temporary Construction Fence	1,620	LF	$2.50	$4,050.00
3	Silt Fence	1,620	LF	$3.00	$4,860.00
	Site Preparation				
4	Curb and Gutter Removal	810	LF	$3.30	$2,673.00
5	Saw Cut Existing Asphalt	1,598	LF	$5.12	$8,182.00
6	Asphalt Removal	5,495	SF	$3.36	$18,463.00
7	Excavation and Removal	827	CY	$45.00	$37,215.00
	Structures				
8	Curb and Gutter	810	LF	$22.00	$17,820.00
9	Permeable Pavement	4,710	SF	$12.00	$56,520.00
10	Structural Layer (washed no 57 or no 2 stone)	305	CY	$50.00	$15,250.00
11	Concrete Transition Strip	800	LF	$4.00	$3,200.00
12	Underdrains (4" perforated PVC pipe)	800	LF	$5.00	$4,000.00
13	Drainage Stone (washed no 57 stone)	265	CY	$50.00	$13,250.00
14	Connect to Existing Storm Drain	1	LS	$10,000.00	$10,000.00
15	Utility Conflicts	1	LS	$10,000.00	$10,000.00
	Bioretention				
16	Fine Grading	2,430	SF	$0.72	$1,750.00
17	Underdrains (4" perforated PVC pipe)	810	LF	$5.00	$4,050.00
18	Drainage Stone (washed no 57 stone)	117	CY	$50.00	$5,850.00
19	Hydraulic Restriction Layer (30 mil liner)	1,620	LF	$0.60	$972.00
20	Soil Media Barrier (washed sand)	30	CY	$40.00	$1,200.00
21	Soil Media Barrier (choking stone, washed no 8)	15	CY	$45.00	$675.00
	Landscaping				
22	Soil Media	225	CY	$45.00	$10,125.00
23	Vegetation	2,430	SF	$4.00	$9,720.00
24	Mulch	23	CY	$55.00	$1,238.00
Construction Subtotal					$256,060.00
25	Planning (20% of subtotal)				$51,210.00
26	Mobilization (10% of subtotal)				$25,610.00
27	Construction contingency (25% of subtotal)				$64,020.00
Construction Total					$396,900.00
28	Design (30% of Construction Total)				$119,070.00
Total Cost					**$515,970.00**

APPENDIX F:
CONCEPT DESIGN TO ADDRESS PRIORITY OUTFALL R2-04
(County of Los Angeles)

Load Reduction Strategy for Los Angeles River Segment B

Conceptual Design and Modeling Details for a Potential Structural BMP to Eliminate Dry Weather Flow for the R2-04 Subwatershed

Submitted to:

County of Los Angeles
Department of Public Works
Watershed Management Division
900 South Fremont Avenue, 11th Floor
Alhambra, CA 91803-1331

Submitted by:

Tetra Tech
9444 Balboa Avenue, Suite 215
San Diego, CA 92123

April 23, 2015

R2-04 Subwatershed

The conceptual design addresses dry weather flow for the entire R2-04 subwatershed. The structural best management practice (BMP) proposed for priority outfall R2-04 must eliminate 100% of the dry weather runoff from the Unincorporated County area and the City of Los Angeles (it does not need to address runoff from areas outside the ULAR EWMP Group).

Subwatershed Characteristics

The R2-04 subwatershed comprises a total area of approximately 2,037 acres (3.2 square miles). Approximately two-thirds of the subwatershed is located within Los Angeles County and just over 20% is located within Los Angeles city limits. The remainder is within Vernon (~10%) and Commerce (<2%). The land use distribution for the R2-04 subwatershed is summarized in Table 1.

Table 1. Land use summary for R2-04 subwatershed

Land Use Type	Acres	Percent
Multifamily residential	555.7	27%
Secondary Roads	403.1	20%
Industrial	272.0	13%
Transportation	241.7	12%
High density single family residential	176.6	9%
Low density single family residential	145.9	7%
Commercial	109.4	5%
Institutional	83.1	4%
Vacant	49.2	2%
Total	**2,036.8**	

Project Location and Site Description

The R2-04 outfall is located adjacent to a large utility easement that is 100 feet wide, owned by the City of Los Angeles Department of Water and Power (DWP), along the bank of the Los Angeles River. This location has been identified as a feasible site for a regional BMP to eliminate dry weather runoff from the R2-04 drainage area.

The utility easement is in close proximity to a highly developed industrial area and railroad tracks, and is occupied by large electrical towers with overhead electric wires. These site factors present unique design considerations. The main area of this site under consideration is shown in Figure 1.

Figure 1. Proposed conceptual design location (image from Bing Maps ©2015 Microsoft Corporation).

Per information provided by Los Angeles County, specific constraints apply when constructing stormwater projects within power line easements. In particular, maintenance of a 70-foot radius is recommended around 250 kV towers. Unobstructed vehicle access must also be provided to allow for continued maintenance of utility structures. These constraints apply specifically to stormwater infiltration basins and may not necessarily be identical for constructed wetlands; therefore, additional verification will be required.

Based on preliminary site visits combined with a desktop level (GIS-based) screening analysis, the maximum available area for BMP implementation at this location is estimated to be approximately 1.5 acres consisting of four discontinuous areas. This includes the area on either side of the R2-04 outfall bounded by the electric towers, as well as the area on the opposite sides of the towers. This 1.5 acre area is roughly represented by the green rectangles in Figure 2. Additional site visits and more detailed investigations of the site constraints will be required in order to develop a more complete estimate of the area feasible for BMP implementation.

Figure 2. Approximate maximum area available for structural BMP implementation (green rectangles).

Preliminary soil characteristics identified at the proposed wetland site are summarized in Table 2. Hanford fine sandy loam soils are described as well-drained, and are typically found on floodplains and alluvial fans. Slopes are typically 0 to 15 percent. Clay content is about 12.5 percent. These soils have negligible to low runoff characteristics, high saturated hydraulic conductivity, and rapid permeability.

Table 2. Soils characteristics at proposed wetland site.

Soil Series	Saturated Hydraulic Conductivity (in/hr)	Hydrologic Soil Group
Hanford fine sandy loam	2.59	A

This preliminary soil analysis was performed using a desktop (GIS-based) analysis only, based on the methods used in the Preliminary Draft Enhanced Watershed Management Program (EWMP) for the Upper Los Angeles River Watershed (Black & Veatch 2015) and, therefore, may not be an accurate representation of true soil conditions at the proposed wetland site. Detailed geotechnical investigations will be necessary when moving the design beyond the conceptual stage.

Another key characteristic is the site's location relative to local and regional groundwater resources, since the BMP is intended to store and infiltrate dry weather flows rather than returning them to the LA River following treatment. A spatial dataset identifying locations of groundwater basins for Los Angeles

County was obtained from the Los Angeles County GIS Data Portal (http://egis3.lacounty.gov/dataportal/). Groundwater basins are defined by the California Department of Water Resources. The project site is located within the north-central area of the Central groundwater basin. The screen capture below shows the groundwater basins dataset overlaid by the Los Angeles River and outfall R2-04 for reference.

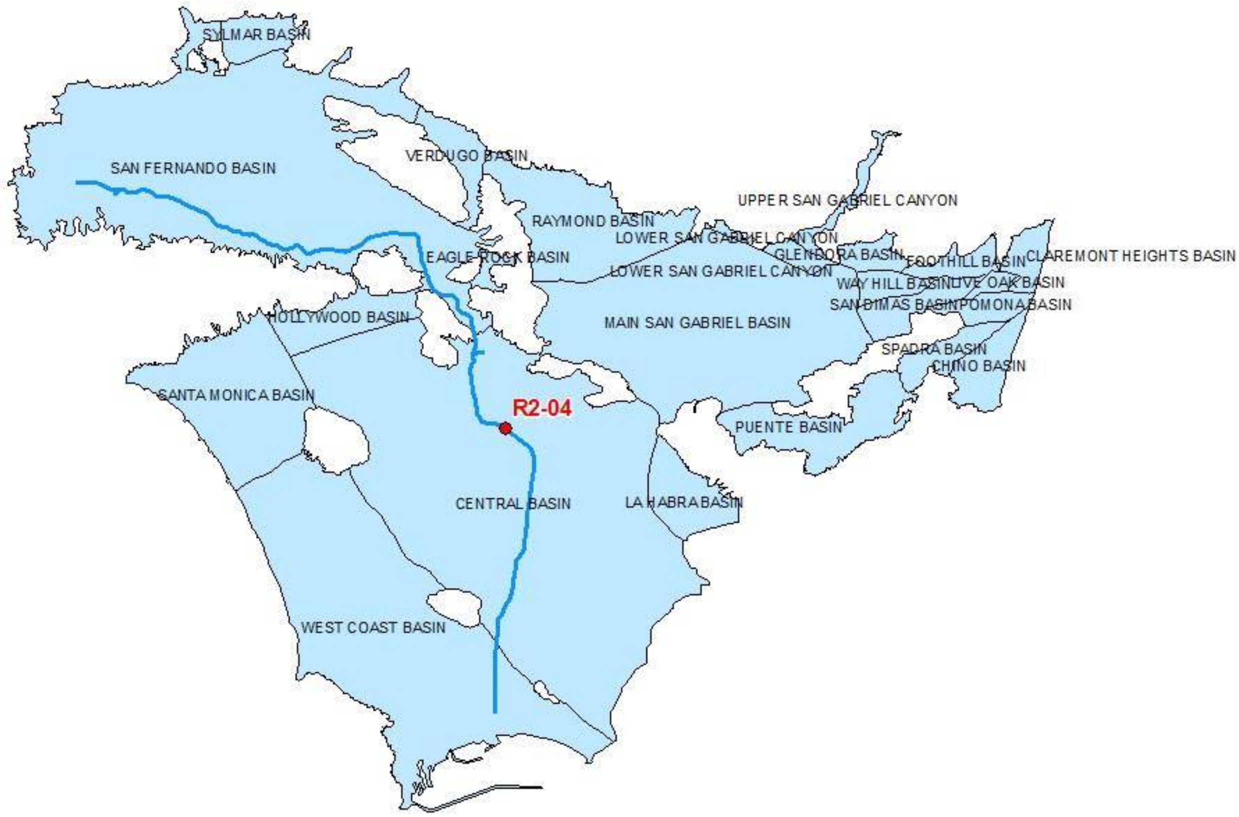


Figure 3. Groundwater basins of Los Angeles County (California Department of Water Resources)

In 2012, the U.S. Geological Survey (USGS) and the California State Water Resources Control Board (State Water Board) completed a study of groundwater quality in the Coastal Los Angeles Basin study unit, which includes the Central groundwater basin (Fram and Belitz 2012). The study includes delineation of the forebay zone and pressure zone. The forebay zone represents the area of unconfined aquifers (consisting primarily of unconsolidated coarse sediment) where surface water is able to percolate into the deep aquifers to replenish groundwater basins. The pressure zone represents a confined aquifer system that receives minimal recharge from surface water (WRD 2005).

Spatial data defining the geographic locations of the forebay zone and pressure zone were not found. However, the USGS/State Water Board publication included a map delineating these areas. Using GIS, a screen capture of the map presented in the 2012 study (Fram and Belitz 2012) was georeferenced with the existing groundwater basins spatial dataset obtained from the Los Angeles County GIS Data Portal in order to determine whether the R2-04 project site is located within the forebay area or pressure area. This process is shown below, with the yellow outline representing the same groundwater basin boundaries presented in the previous figure. Through this process, it was determined that the project site is located within the forebay area, close to the boundary with the pressure area.

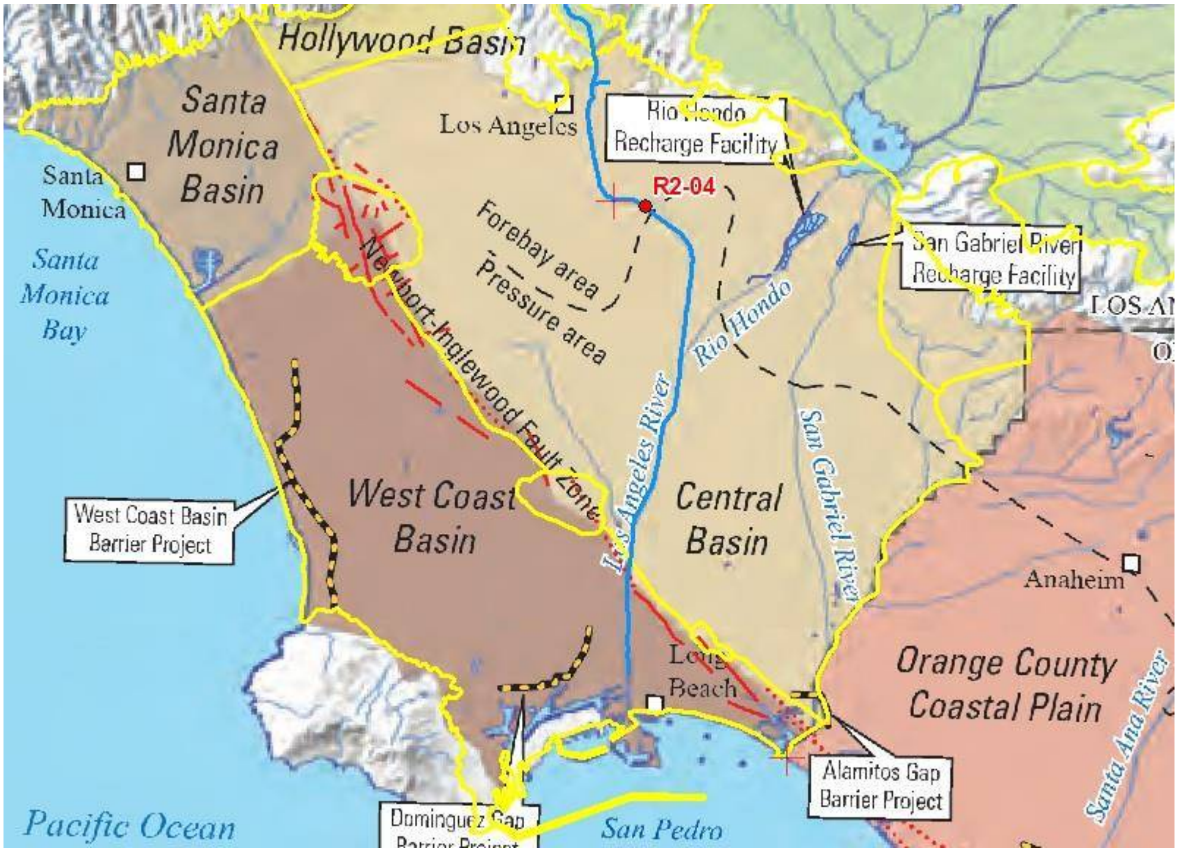


Figure 4. Georeferencing of USGS forebay and pressure area map with groundwater basin boundaries using GIS

Bacteria Source Identification (BSI) Study

The R2-04 outfall was monitored as part of a study in 2007 which focused on the characterization of dry weather flow and water quality conditions. Over the study period, six sampling events occurred at R2-04. Dry weather flow monitoring data collected and summary statistics for outfall R2-04 are presented in Table 3 and Table 4, respectively.

Table 3. Dry weather flow monitoring data from 2007 BSI study.

Event	Site	Site Type	Zone	Reach	Sample Date	Sample Time (00:00)	Flow Rate (cfs)
1A	R2-04	Drain	4	2	8/7/2007	9:30	0.17
2A	R2-04	Drain	4	2	8/14/2007	14:15	0.11
3A	R2-04	Drain	4	2	8/21/2007	8:00	0.08
4A	R2-04	Drain	4	2	9/18/2007	8:10	0.09
5A	R2-04	Drain	4	2	10/2/2007	12:30	0.12
6A	R2-04	Drain	4	2	10/9/2007	8:50	0.15

Table 4. Summary statistics for dry weather flow.

Measurement	Units	Statistic	R2-04
Flow Rate	cfs	Mean	0.122
		Median	0.116
		Maximum	0.170

The use of the BSI dry weather flow monitoring data for the conceptual design is described further in the following sections.

R2-04 Subwatershed Conceptual Modeling

The existing LA County LSPC model (Tetra Tech 2010) served as the basis for providing unit area runoff and pollutant loading time series for SUSTAIN. The R2-04 drainage area is comprised of five LSPC model sub-basins as shown in Figure 5.

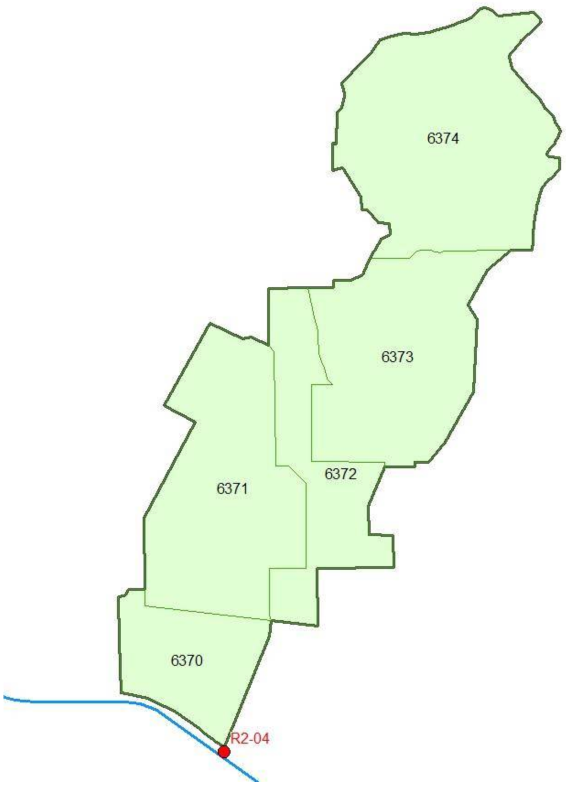


Figure 5. LSPC model sub-basins comprising the R2-04 drainage area.

The LSPC model HRUs were developed using the land use classifications, impervious/pervious conditions, slope ranges, and soil groups (for pervious classes only) presented in Table 5. Table 6 summarizes the HRU categories, as numbered in the LSPC model.

Table 5. Preliminary HRUs for LA County regional watersheds (Tetra Tech 2010)

HRU	Land use categories	Impervious/pervious	Slope	Soil group
Urban grass (irrigated)	Includes pervious portions of HD single-family residential, LD single-family residential, Multifamily residential, Commercial, Institutional, Industrial, Transportation, and Open recreational	Pervious portion only	0%–10%	D
Urban grass (non-irrigated)		Pervious portion only	0%–10%	D

HRU	Land use categories	Impervious/pervious	Slope	Soil group
HD single-family residential	HD single-family residential	Impervious portion only	0%–10%	n/a
LD single-family residential moderate slope	LD single-family residential and Open recreational	Impervious portion only	0%–10%	n/a
LD single-family residential steep slope			> 10%	
Multifamily residential	Multifamily residential	Impervious portion only	0%–10%	n/a
Commercial	Commercial	Impervious portion only	0%–10%	n/a
Institutional	Institutional	Impervious portion only	0%–10%	n/a
Industrial	Industrial	Impervious portion only	0%–10%	n/a
Transportation	Transportation	Impervious portion only	0%–10%	n/a
Secondary Roads	Secondary roads	Impervious portion only	0%–10%	n/a
Agriculture moderate slope B	Agriculture	Pervious	0%–10%	B
Agriculture moderate slope D			0%–10%	D
Vacant steep slope A	Vacant	Pervious	> 10%	A
Vacant moderate slope B			0%–10%	B
Vacant steep slope B			> 10%	B
Vacant steep slope C			> 10%	C
Vacant moderate slope D			0%–10%	D
Vacant steep slope D			> 10%	D
Water	Water	n/a	n/a	n/a

Table 6. HRU categories represented in LA County LSPC model.

HRU category #	HRU category detail
1	High Density Single-Family Residential
2	Low Density Single-Family Residential
3	Low Density Single-Family Residential (Steep)
4	Multi-Family Residential
5	Commercial
6	Institutional
7	Industrial
8	Transportation

HRU category #	HRU category detail
9	Secondary Roads
10	Urban Grass Irrigated
11	Urban Grass Non-Irrigated
12	Agriculture Moderate B
13	Agriculture Moderate D
14	Vacant Moderate B
15	Vacant Moderate D
16	Vacant Steep A
17	Vacant Steep B
18	Vacant Steep C
19	Vacant Steep D
20	Water
21	Water Reuse

Because the HRU classifications differ from the land use layer (21 HRU classes compared to 18 land use classes), pre-processing and reclassification were required in order to consistently quantify areas of the R2-04 drainage area in the SUSTAIN and LSPC model. As a result, pre-processing and reclassification allowed LSPC output to be used directly as input to SUSTAIN. The final reclassified areas are presented in Table 7 where WSID refers to the R2-04 LSPC sub-basin and categories 1-19 represent the unique "land types" that make up each sub-basin.

Table 7. Summary of acres within each LSPC model HRU by sub-basin (WSID).

	Impervious									Pervious		
WSID	1	2	3	4	5	6	7	8	9	10	17	19
6370	0	0	0	0	0.04	0	69.57	123.60	5.41	16.53	0	0
6371	3.77	2.64	0.01	70.05	33.07	12.93	88.35	45.41	114.35	117.91	0	0
6372	7.63	0.24	0	49.97	20.68	9.44	29.31	22.19	59.89	66.35	0	0
6373	25.37	9.27	0.80	68.02	23.38	16.31	1.91	31.56	91.37	185.24	0.24	3.00
6374	36.78	1.04	0.66	92.23	21.03	28.73	46.29	18.94	132.05	187.27	4.91	41.07
TOTAL	**73.54**	**13.19**	**1.46**	**280.27**	**98.20**	**67.41**	**235.43**	**241.70**	**403.06**	**573.30**	**5.15**	**44.06**

Land types 11-16, 18, 20, and 21 (defined in Table 6) are not present in the R2-04 drainage area and are, therefore, not included in Table 7. As shown, processing and reclassification resulted in 48 unique SUSTAIN "land types" (not including zero areas).

Conceptual SUSTAIN Modeling

A generic wetland type BMP was developed in SUSTAIN to evaluate the approximate wetland area that would be required to manage 100 percent of dry weather flows from the R2-04 drainage area.

The constructed stormwater wetland simulated in SUSTAIN is intended to be purely conceptual. Additional detailed investigations of site characteristics and constraints will be required in order to validate existing soil characteristics, drainage pathways, topography, and elevations of existing storm drainage structures in order to construct a complete and feasible design.

Dry Weather Flow Simulation

Continuous dry weather flow monitoring data were not available for the R2-04 outfall, but a total of six discrete grab samples were taken between August and October 2007 (Table 3). In lieu of continuous flow data, a typical 24-hour dry weather flow distribution can be estimated using the six grab samples enabling a conceptual-level dry weather simulation in SUSTAIN to evaluate potential wetland performance in R2-04.

To estimate a typical 24-hour dry weather pattern representative of R2-04, continuous dry-weather monitoring for a watershed of similar land use within the City of Los Angeles was used as a template for a baseline dry-weather pattern. The baseline was shifted and scaled to match the six observed grab samples. The final 24-hour dry-weather distribution is shown in Figure 6 below. This distribution is developed using a 5-minute time series and served as the dry weather input to the SUSTAIN model.

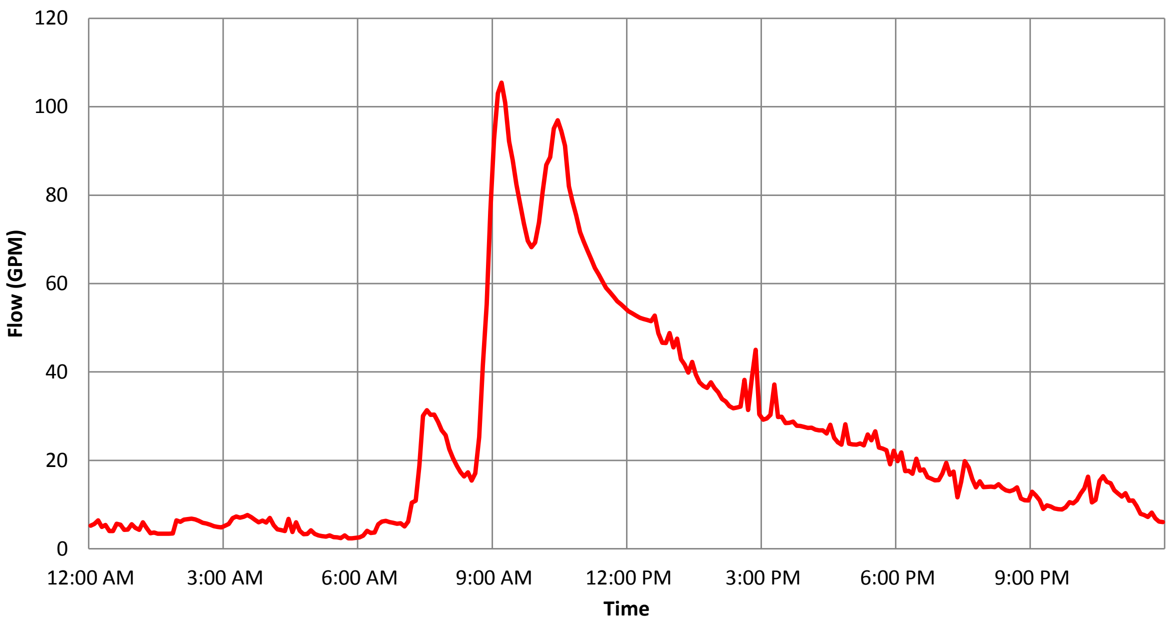


Figure 6. Estimated 24-hour dry weather flow for R2-04 outfall.

SUSTAIN Results

For dry weather SUSTAIN simulations, three possible wetland depths were simulated based upon specific depth distribution recommendations provided in the County of Los Angeles Department of Public Works Low Impact Development Standards Manual (February 2014) as shown in Table 8. Adopting these recommendations, the minimum, average, and maximum mean wetland depths were calculated to be 1.47 ft., 2.38 ft., and 3.30 ft., respectively (for example, 1.47 ft. = 0.15 x 0.1 ft. + 0.55 x 1 ft. + 0.30 x 3 ft.).

Table 8. Constructed Wetland Depth Distribution

Depth Range (ft)	Percent by Area
0.1 – 1	15%
1 – 3	55%
3 – 5	30%

Dry Weather
Initial simulation of dry weather flows in SUSTAIN suggests that a relatively small constructed wetland, approximately 0.1 acre in surface area, may be sufficient to achieve 100 percent reduction of dry weather flows, both in terms of peak runoff rate and total runoff volume. This was true for all three simulated mean wetland depths (Table 9).

Table 9. Initial SUSTAIN results for dry weather flow simulation.

Simulation	Parameter	Units	Pre-BMP	Post-BMP	Percent Reduction[2]
Dry Weather	Average Annual Flow Volume[1]	ft^3/yr	1.75E+06	0	100.0%
		ac-ft/yr	40.3		
Dry Weather	Peak Discharge Flow	cfs	0.235	0	100.0%

[1] Average annual flow volume reported above reflects dry weather flow volume that would occur over a one-year period. To determine 24-hour flow volume, divide this value by 365.
[2] Percent reduction of 100% was the result for all three simulated wetland depths.

Constructed Wetland Conceptual Design
The County of Los Angeles Department of Public Works Low Impact Development Standards Manual (February 2014) provides guidance for constructed wetland design. A brief summary of the pertinent standards and recommendations is bulleted below followed by a conceptual cross-section in Figure 7.

- At a minimum, constructed wetlands must consist of at least two cells including a sediment forebay and wetland basin.
- Sufficient base flow is required to maintain the permanent water pool (wetland basin must retain water for at least 10 months of the year).
- Periodic sediment and vegetation removal may be necessary to preserve wetland health.
- In areas with porous, high-permeability soils (i.e., >0.3 in/hr), an impermeable liner may be required under the deep pools to maintain a permanent pool level of at least 1 foot.
- The sediment forebay must retain at least 3 feet of water year-round for effective pre-settling.
- The sediment forebay volume should equal 10-20 percent of total wetland volume, and depth should be 4-8 feet.
- The sediment forebay must provide 1 foot of sediment storage.
- Interior side slopes of the wetland basin must be no greater than 3:1 (H:V), and exterior side slopes no greater than 2:1.
- The recommended depth distribution suggests that 15 percent of the wetland area have a depth between 0.1 and 1 foot, 55 percent between 1 and 3 feet, and 30 percent between 3 and 5 feet.
- The length-to-width ratio of the flow path should be a minimum of 3:1.
- The dry weather hydraulic residence time for wetland pools should be less than 7 days to minimize vector breeding and stagnation.
- A minimum 25-foot buffer must be provided along the wetland's top perimeter to prevent potential impact to overhead power lines.
- An outlet pipe and structure must be sized to pass flows above the mitigation volume.
- An overflow spillway or riser must be provided, designed to pass the maximum storm size diverted to the wetland with a minimum 1 foot freeboard.

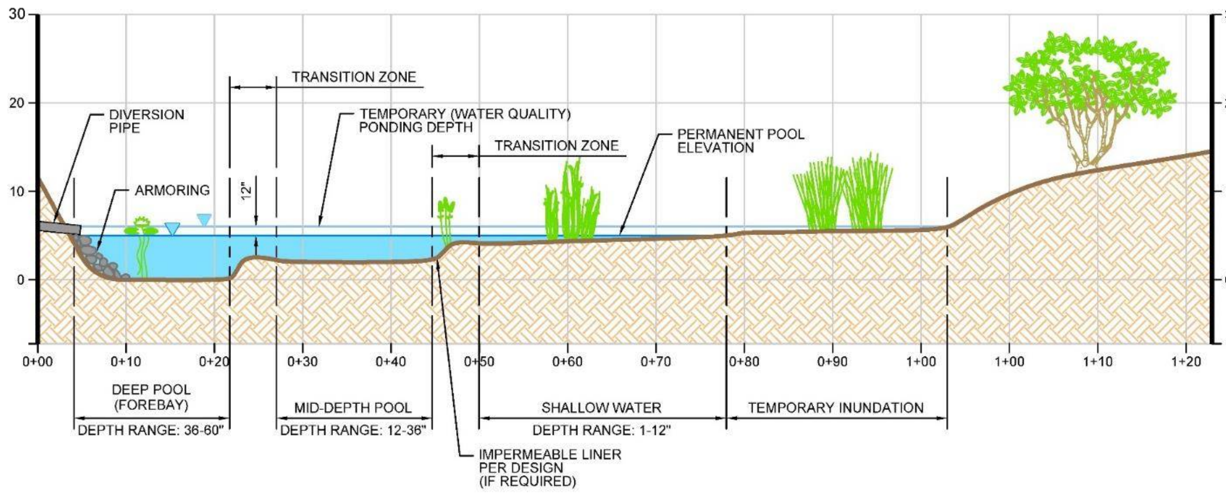


Figure 7. Typical stormwater wetland cross section.

Key Conceptual Design Components

Dry Weather Wetland Design

Assuming an average wetland depth of 2.38 ft. (see "Sustain Results") and a required surface area of 0.1 acre (4,356 sq. ft., as determined from preliminary SUSTAIN modeling), the required storage volume provided by the wetland basin(s) for management of dry weather runoff is approximately 10,346 cu. ft. (0.24 acre-ft.). Per the LA County LID Manual, the sediment forebay volume should equal 10-20 percent of the total wetland volume. Assuming 15 percent, the forebay volume should be approximately 1,552 cu. ft. Figure 8 is an illustration of what a stormwater wetland constructed to the aforementioned specifications and implemented in the City of Los Angeles DPW easement could look like. Additional details are included in Exhibit A.

Figure 8. Potential constructed wetland to treat dry weather flows.

Dry Weather Diversion

One-hundred percent of dry weather flow will be diverted from the existing storm drain to the wetland for capture and treatment. There are two options for diversion into the wetland: through a diversion structure similar to the one shown in Figure 9 or by pumping the flow into a constructed wetland. Gravity flow through the diversion structure would require that the permanent pool depth be approximately 11 feet below the ground surface. Assuming 2 to 1 side slopes, this would allow a wetland surface of approximately 25 feet wide by 175 feet long. There is sufficient space in the easement for the gravity flow option. Pumping would allow a shallow wetland surface that could be approximately 40 feet wide by 110 feet long. The pumping diversion option would require an approximately 5 HP pump capable of pumping 250 gpm.

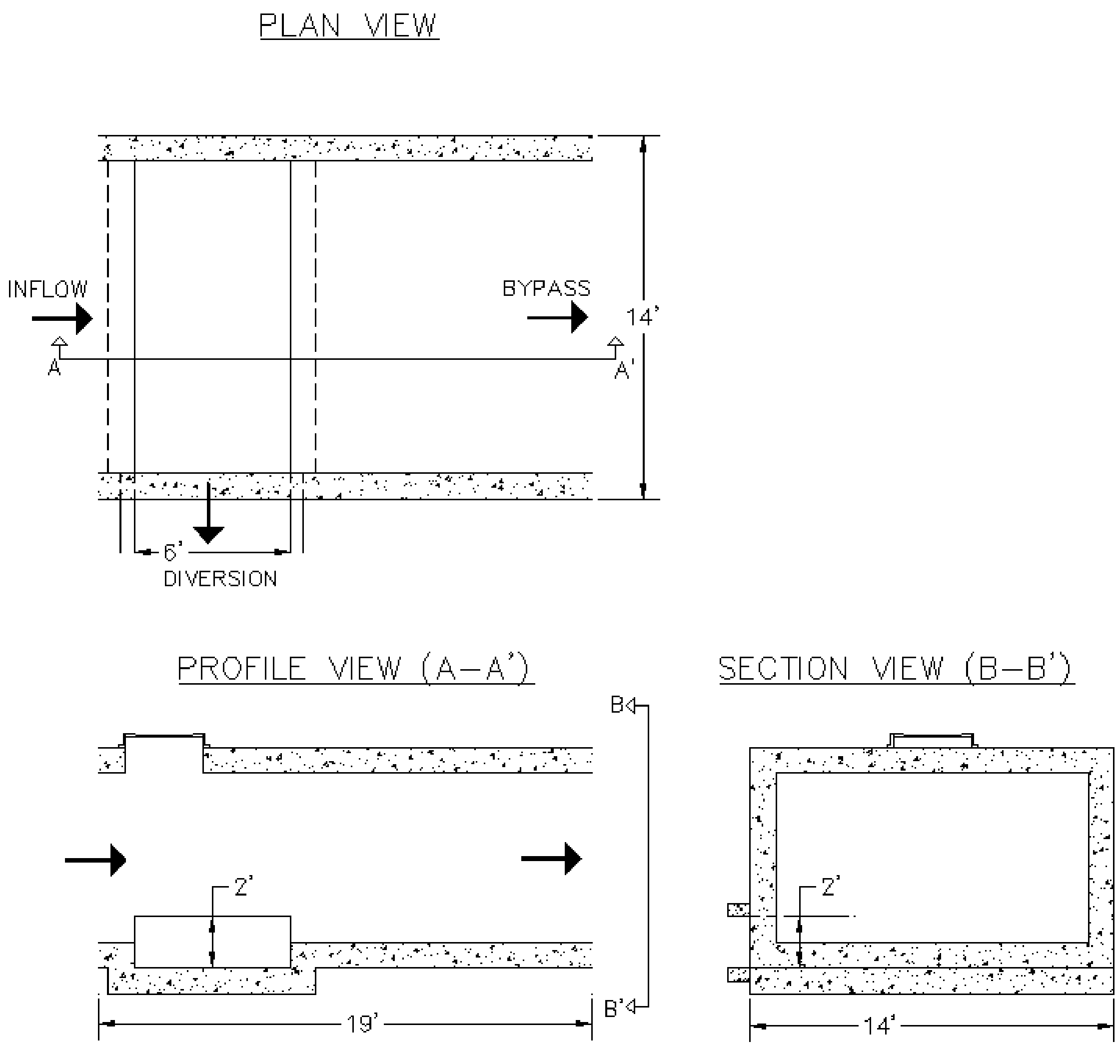


Figure 9. Diversion structure for dry weather flows.

For the constructed wetland design, the need for an impermeable liner must be assessed through detailed geotechnical investigations at the site. Where native soils of high permeability occur (>0.3 in/hr., per LA County LID Manual guidelines), an impermeable liner under the deep pools is recommended in order to maintain the permanent pool and/or micropools. A water balance will be performed in the design phase to evaluate the flow into the wetland and the infiltration rate of the underlying soils. If the water balance does not result in the recommended permeant pool depth, the hydrology of the wetland will be evaluated for the necessity of a permeable liner or further evaluation of the appropriate vegetation in the wetland. Areas around the deep pools should remain unlined to allow for infiltration. Constructed wetlands differ from infiltration-type BMPs in that they require maintenance of a permanent pool of water to support wetland plants that enhance pollutant removal and overall wetland function.

Operations and Maintenance

Maintenance activities for wetlands involve removing accumulated sediments and ensuring that plant distribution and flow paths remain as designed. Constructed wetlands built for the express purpose of stormwater treatment are typically not considered jurisdictional wetlands in most regions of the country, but designers should check with their wetland regulatory authorities to ensure this is the case. Bedload sediment tends to be concentrated in pretreatment areas and forebays; it is important that this sediment does not enter the rest of the wetland, because accumulated coarse sediments can affect the growing conditions of the wetland plants or change flow paths and wetland depths. If excessive sediment is found outside designated areas, sediment removal should be performed more frequently or pretreatment and forebay areas should be resized. Sediment removal in vegetated areas should be performed carefully to prevent damage to plants. Depending on the land use of contributing areas, sediment testing might be necessary to determine if accumulated pollutants require special disposal.

Wetlands should be inspected according to the schedule provided in Table 10 or as-needed after storm events. Inspectors should refer to a map of the wetland as designed to determine if the types and distribution of plants are as intended. Undesirable species should be identified and removed as needed. If plant die-off has occurred, reevaluate growing conditions and select replacement plants appropriate for or adaptable to those conditions. Site inspectors should verify that design depths and flow paths are maintained and remove trash and debris that has accumulated in or around the wetland.

Table 10. Inspection and maintenance tasks for constructed wetlands

Task	Frequency	Indicator maintenance is needed	Maintenance notes
Forebay inspection	Once after first rain of the season, then monthly during the rainy season	Internal erosion or excessive sediment, trash, or debris accumulation	Check for sediment accumulation to ensure that forebay capacity is as designed. Remove any accumulated sediment.
Basin inspection	1 time/year	Excessive sediment, trash, and/or debris accumulation in the wetland	Remove any accumulated sediment. Adjacent pervious areas might need to be regraded.
Diversion inspection	Once after first rain of the season, then monthly during the rainy season	Accumulation of litter and debris in diversion channel	Remove litter, leaves, and debris to reduce the risk of clogging.
Mowing	2–12 times/year	Overgrown vegetation on embankment or adjacent areas	Frequency depends on location and desired aesthetic appeal.
Embankment inspection	1 time/year	Erosion at embankment	Repair eroded areas and revegetate.
Remove and replace dead vegetation	1 time/year	Dead plants or excessive open areas in wetland	Within the first year, 10% of plants can die. Survival rates increase with time.
Temporary watering	1 time/2–3 days for first 1–2 months	Until establishment and in severe drought	Watering after the initial year might be required.
Nuisance wildlife management	Monthly or as needed	Animals, feces, or burrows evident in or around wetland. Excessive mosquitos.	Maintain diverse vegetated shelf around entire basin. Eliminate monocultures and replace with diverse, flowing vegetation. Employ qualified wildlife management professionals if needed.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

Supplemental Information: Local Case Study

The municipality of Laguna Niguel implemented the Wetland Capture and Treatment (WetCAT) network to treat low-flow urban runoff from a residential neighborhood in the Aliso Creek watershed. The WetCAT consists of three separate wetland treatment areas along the J03P02 storm drainage area: north, west, and south. The total area of the three wetlands is approximately 2.1 acres. Overall, the project treats 538 acres of the 22,315 total acres in the Aliso Creek watershed. The wetlands capture all of the dry weather low flows and then release them back into the main storm drain after treatment, with the goal of removing fecal bacteria and other pollutants, increasing warmwater aquatic and riparian habitat, and attenuating flow rates to downstream Sulphur Creek and Aliso Creek.

The WetCAT site was designed to treat flows of approximately 0.2 cfs, with measured flows at 0.15 cfs in the summer and 0.12 cfs in the fall of 2003. The estimated hydraulic residence time is three days. The wetlands utilize residence time and native wetland plants to conduct biofiltration. Based on collected monitoring data, the estimated dry weather bacteria removal efficiency for the WetCAT is 95%.

References

Black & Veatch Team. 2015. Preliminary Draft Enhanced Watershed Management Program (EWMP) for the Upper Los Angeles River Watershed. Prepared for Upper Los Angeles River Watershed Management Group. March 2015.

Brown, J. and S. Bay. 2006. Assessment of best management practice (BMP) effectiveness for reducing toxicity in urban runoff. *Southern California Coastal Water Research Project Biennial Report*, 207.

County of Los Angeles Department of Public Works. 2014. *Low Impact Development Standards Manual*. February 2014.

Fram, M.S. and K. Belitz. 2012. Groundwater Quality in the Coastal Los Angeles Basin, California. U.S. Geological Survey Fact Sheet 2012-3096. September 2012.

Hunt, W.F., C.S. Apperson, and W.G. Lord. 2005. Mosquito Control for Stormwater Facilities. Urban Waterways. http://www.bae.ncsu.edu/stormwater/PublicationFiles/Mosquitoes2005.pdf

Hunt, W., M. Burchell, J. Wright and K. Bass. 2007. Stormwater Wetland Design Update: Zones, Vegetation, Soil and Outlet Guidance. Urban Waterways. North Carolina State Cooperative Extension Service, Raleigh, NC. http://www.bae.ncsu.edu/stormwater/PublicationFiles/WetlandDesignUpdate2007.pdf

San Diego Regional Water Quality Control Board. 2014. *Aliso Creek Watershed Comprehensive Load Reduction Plan*. Original Release October 2012, Updated July 2014.

State Water Resources Control Board. 2002. Contract summary for project “Wetland Capture and Treatment Network”, May 31, 2002.

Tetra Tech. 2010. Los Angeles County Watershed Model Configuration and Calibration – Part I: Hydrology. Prepared for County of Los Angeles Department of Public Works, Watershed Management Division.

Water Replenishment District of Southern California (WRD). 2005. An Introduction to the Central and West Coast Groundwater Basins. WRD Technical Bulletin Volume 4, Summer 2005.

Exhibit A – Load Reduction Strategy for Los Angeles River Segment B Conceptual Plan

EXHIBIT A: LOAD REDUCTION STRATEGY FOR LOS ANGELES RIVER SEGMENT B
CONCEPTUAL PLAN – DRY WEATHER
SITE: PRIORITY OUTFALL R2-04 SUBWATERSHED

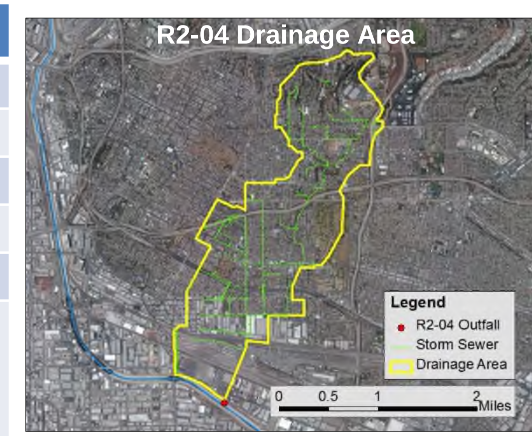
Site Location			
Date of Field Visit	2/11/2015	Latitude	34° 0′ 16.28″ N
Major Watershed	LA River	Longitude	118° 11′ 47.36″ W
Outfall ID	R2-04	Landowner	City of LA DWP
Street Address	Bandini Blvd	Site Type	Utility easement

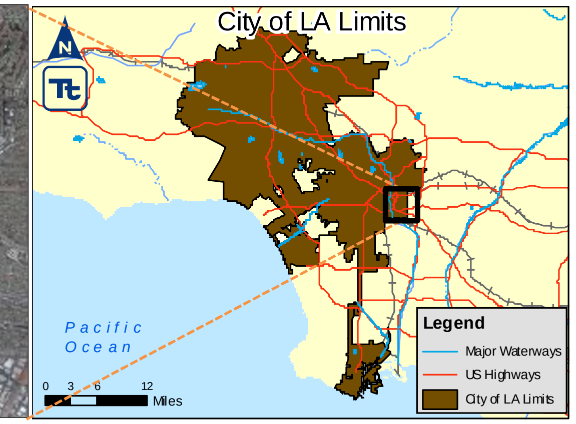
Existing Site Description: The R2-04 outfall is located adjacent to a large utility easement along the bank of the LA River. This location has been identified as a feasible site for a regional best management practice to eliminate dry weather runoff from the R2-04 drainage area. Approximately two-thirds of the drainage area is located within Los Angeles County and just over 20% is located within The City of Los Angeles city limits. The remainder is within Vernon (~10%) and Commerce (<2%). The utility easement is in close proximity to a highly developed industrial area and railroad tracks, and is occupied by large electrical towers with overhead electric wires. These site factors present unique design considerations.

Watershed Characteristics	
Watershed Area, acres	2,037
Total Impervious, %	60
Hydrologic Soil Group	B (73%)
Peak Dry Weather Flow, cfs	0.235

Retrofit Characteristics*	
Proposed Retrofit	Stormwater wetland
BMP Footprint, acre	0.1
Basin Volume, ft³	10,346
Forebay Volume, ft³	1,552
Design HRT, days	<7

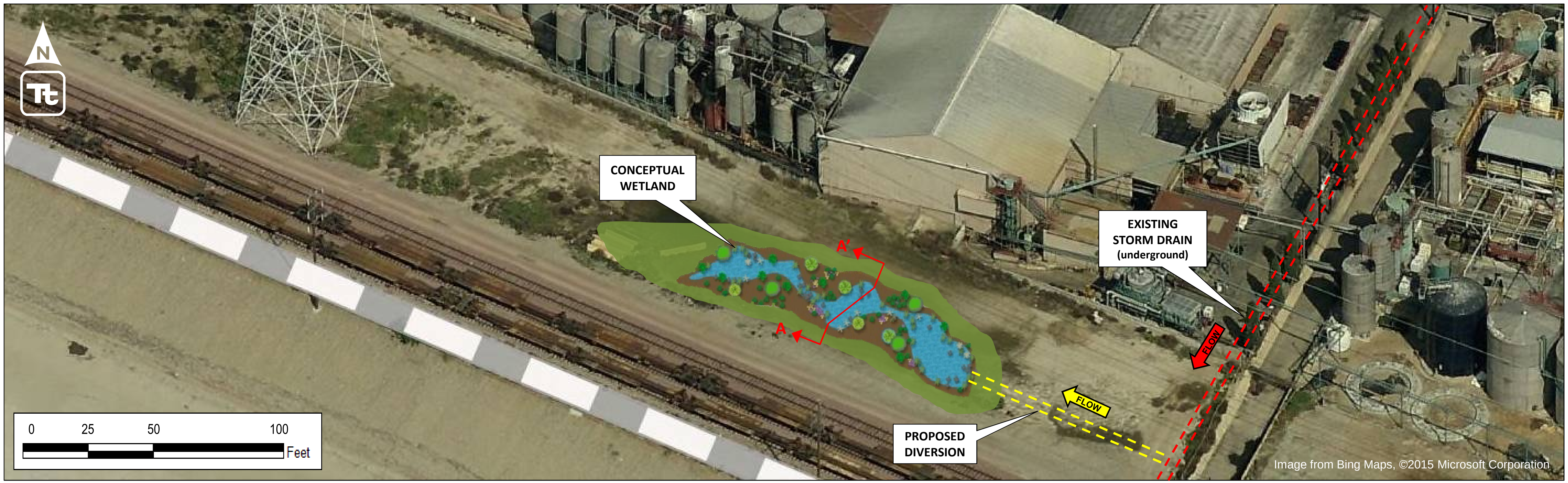
Proposed Retrofit Description: A constructed low-flow stormwater wetland is proposed along the bank of the LA River in the utility easement near the R2-04 outfall. Initial conceptual level modeling results suggest that a 0.1 acre wetland will be capable of reducing dry weather flow volume and peak discharge by 100 percent. Because this design is conceptual in nature, additional site investigations will be required in order to facilitate a complete and feasible design, including additional flow monitoring, geotechnical investigations, verification of existing drainage pathways and storm structures, and more.



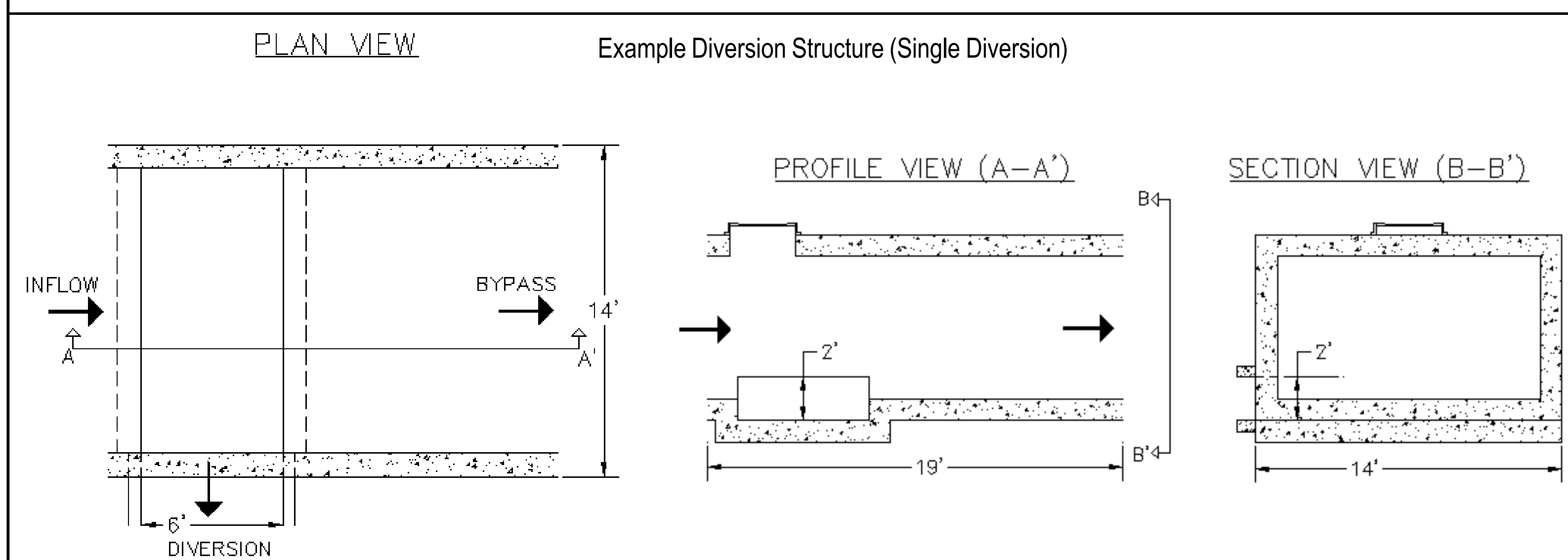


*Retrofit characteristics are based on field observations and GIS data resources available at the time of conceptual design analysis. Note that final design characteristics will be dependent on a detailed site survey and could vary from conceptual design characteristics.

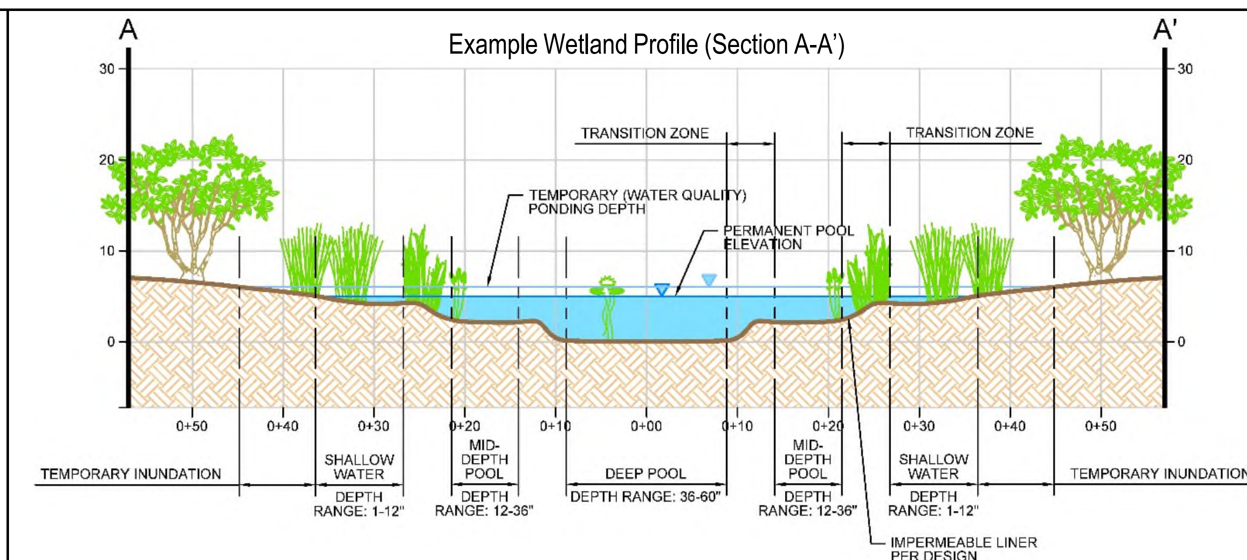
Graphical site rendering presented below is for illustrative purposes only.



Example Diversion Structure (Single Diversion)

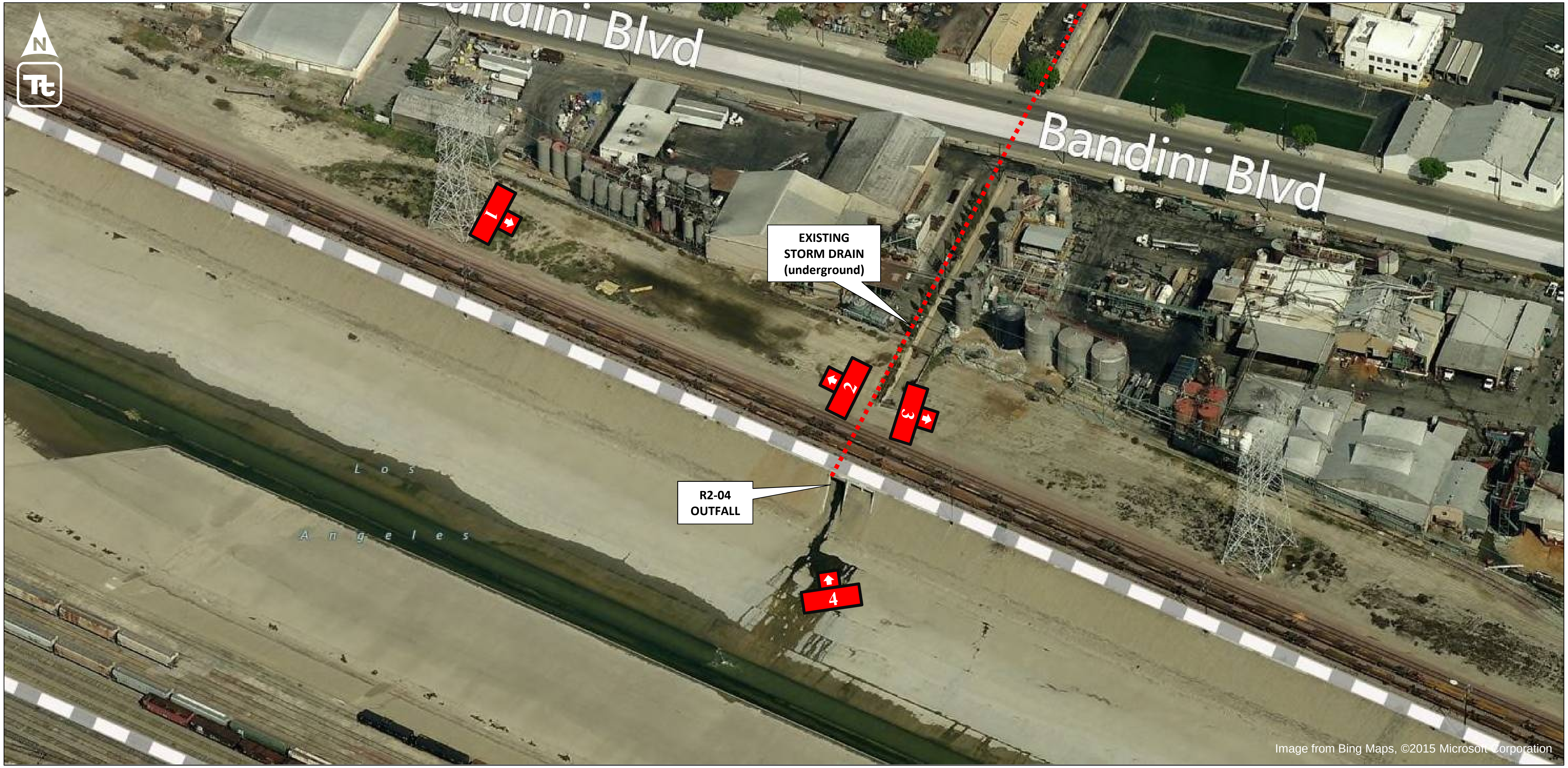


Example Wetland Profile (Section A-A')



PUBLIC WORKS

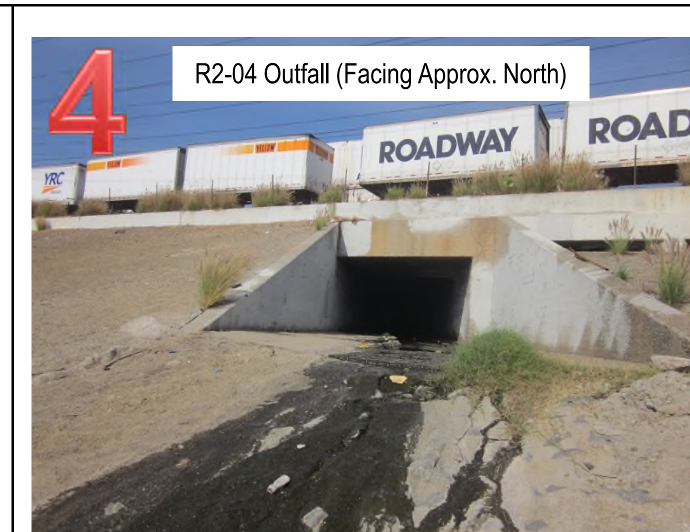
EXHIBIT A: LOAD REDUCTION STRATEGY FOR LOS ANGELES RIVER SEGMENT B
CONCEPTUAL PLAN - DRY WEATHER
SITE: PRIORITY OUTFALL R2-04 SUBWATERSHED



Current Site View (Facing Southeast)

Current Site View (Facing Northwest)

Current Site View (Facing Southeast)



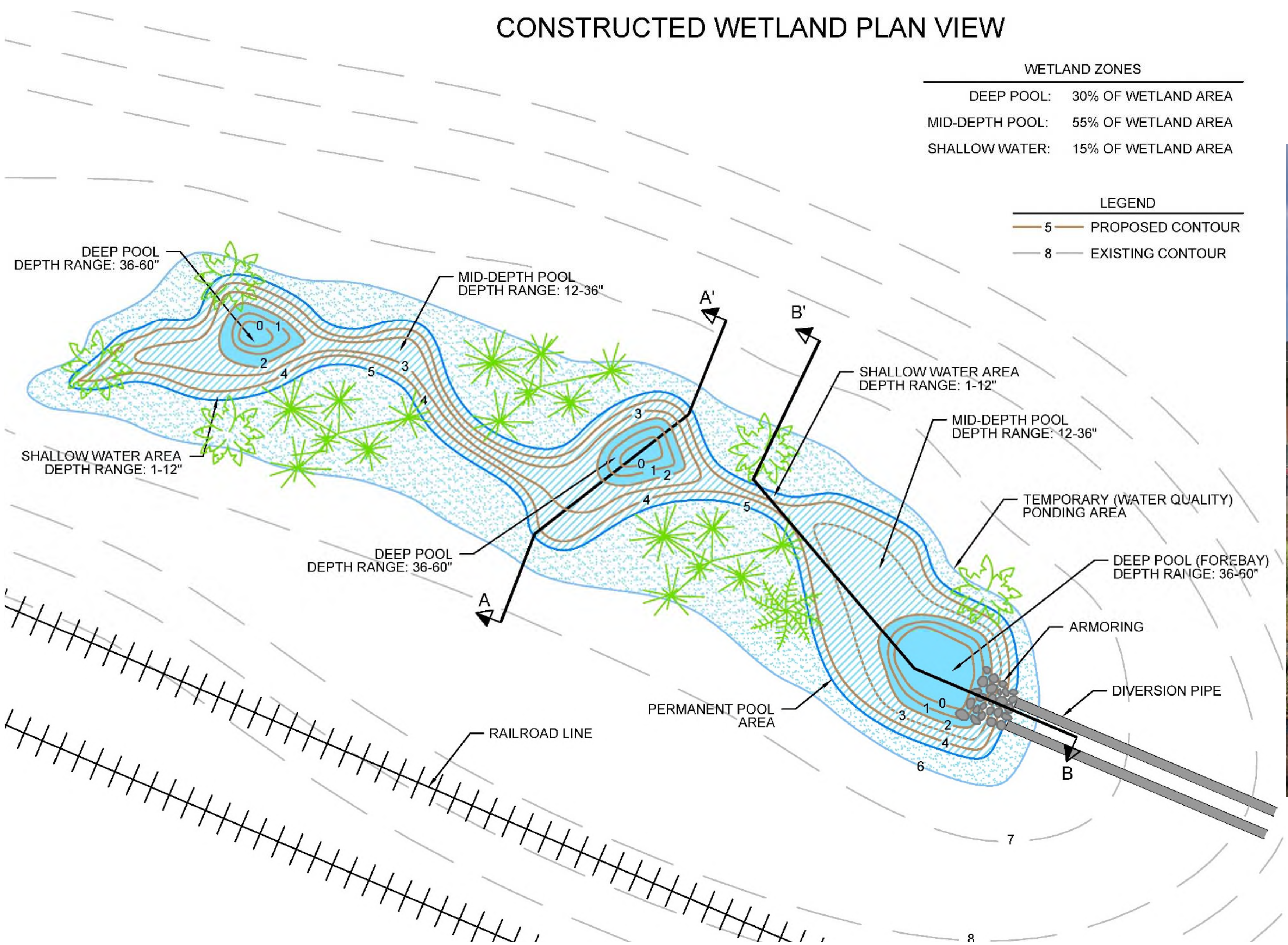
R2-04 Outfall (Facing Approx. North)

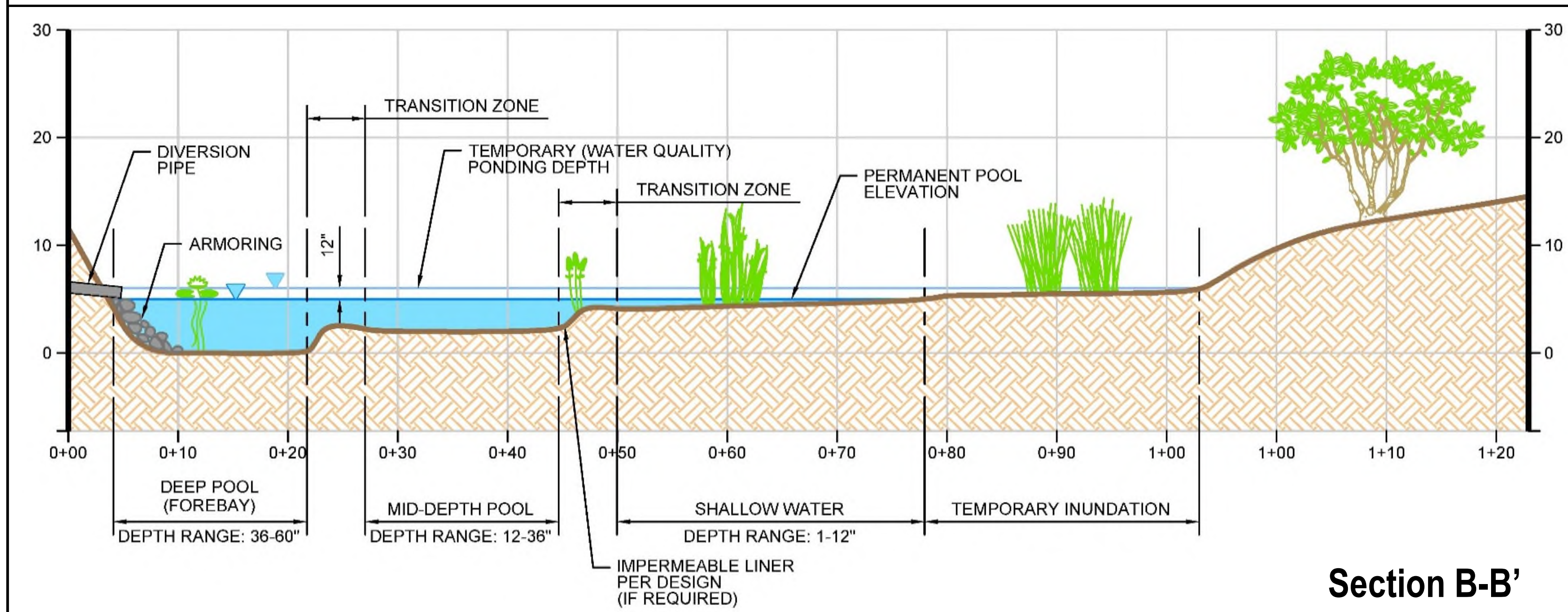
EXHIBIT A: LOAD REDUCTION STRATEGY FOR LOS ANGELES RIVER SEGMENT B
CONCEPTUAL PLAN – DRY WEATHER
SITE: PRIORITY OUTFALL R2-04 SUBWATERSHED

CONSTRUCTED WETLAND PLAN VIEW

WETLAND ZONES	
DEEP POOL:	30% OF WETLAND AREA
MID-DEPTH POOL:	55% OF WETLAND AREA
SHALLOW WATER:	15% OF WETLAND AREA

LEGEND
- 5 PROPOSED CONTOUR
- 8 EXISTING CONTOUR





Section B-B'

Additional Design Considerations

- ✓ Main constructed wetland components include sediment forebay and permanent pool planted with emergent aquatic vegetation.
- ✓ The stormwater wetland requires sufficient dry weather baseflow to maintain a permanent pool of water.
- ✓ Sediment forebay volume will equal between 10 and 20 percent of total wetland volume, with a depth between 4 and 8 ft.
- ✓ Approximately 15% of wetland area will have depth 0.1-1 ft, 55% will have depth 1-3 ft, and 30% will have depth 3-5 ft.
- ✓ Dry weather hydraulic residence time will be less than 7 days to minimize vector breeding and stagnation issues.
- ✓ The flow path length-to-width ratio will be a minimum of 3:1.
- ✓ A 25 ft buffer will be maintained around the top perimeter.
- ✓ Project design must adhere to City of LA DWP's requirements for construction in ROWs.

Reference: LA County Low Impact Development Standards Manual

PUBLIC WORKS

Appendix 7.E
Evaluation of the Effectiveness of Enhancements to the City of Burbank Minimum Control Measures

DRAFT Memorandum

Paul Hartman, Senior Scientist
Chris Minton, Vice President
785 Grand Avenue, Suite 200
Carlsbad, CA 92008
760.730.9446

DATE: May 1, 2015

TO: Daniel Rynn, City of Burbank
Alvin Cruz, City of Burbank

SUBJECT: Evaluation of the Effectiveness of Enhancements to the City of Burbank Minimum Control Measures

Cc:

1. Introduction

The 2012 Permit includes requirements for the continuation of existing minimum control measures (MCMs) as well as implementing new MCM requirements that represent enhancements to previous elements of the MS4 Permit. These required enhancements to the City of Burbank's (City) current programs as well as enhancements to the City's street sweeping program were evaluated to determine whether the expected level of pollutant reduction can reasonably be assured to be equivalent to the 10% reduction assigned to the City's institutional controls in the ULAR EWMP.

Identification of the potential effectiveness of MCMs and other source control BMPs in addressing Water Quality Priorities usually cannot be measured by direct water quality metrics like structural control measures. As a result, other methods of developing estimated effectiveness information were utilized. For the City's enhanced street sweeping program, the Source Loading and Management Model for Windows (WinSLAMM) was used to estimate load reductions. For the remaining MCMs, 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 is equal to the product of a participation factor and a loading factor for each 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). For MCMs over which the City has complete control (e.g., changing maintenance practices at a municipal facility) the participation factor would be 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 enhanced MCMs are often multi-benefit in nature and address a range of pollutants and associated sources. As presented in **Attachment A**, MCMs were evaluated for their ability to address the following pollutants: salts, trash, nutrients, metals, selenium, organophosphate and pyrethroid pesticides, cyanide, bis-2, and bacteria. However, specific attention was provided in the analysis to expected reductions in total zinc as demonstrating a 10% load reduction in zinc was necessary to support the RAA which assumes that the City will reduce loading of total zinc by 10% via the implementation of institutional control measures /MCMs (including enhanced street sweeping). RAA modeling was conducted to identify the remaining capacity needed to address total zinc after the 10% reduction is achieved and subsequently to identify additional control measures to address *E. coli*.

The following section describes the elements of the MCM program that have been modified/enhanced to meet the requirements of the new Permit and how these elements are expected to improve effectiveness of the program while presenting the estimated effectiveness rating.

2. MCM Programs

The Permit identifies seven MCM programs that are to be implemented by the City. These include:

- A progressive enforcement program (across multiple MCMs),
- A public information and participation program (PIPP),
- An industrial/commercial program,
- A planning and land development program,
- A construction program,
- A public agencies activities program, and
- An illicit connections and illicit discharges elimination program.

Each of the programs contains multiple BMPs applicable to sources within those seven programs, many of which have been modified since the last permit term. In general, the modifications, or enhancements, are expected to improve effectiveness of the MCM programs. The City will implement the enhanced MCMs as described in the Permit. In addition to the programs prescribed in the Permit, the City has enhanced its existing street sweeping program to increase load reductions for key pollutants. The enhancements to the MCM programs to be implemented by the City are summarized in Table 1.

Each of the enhanced MCMs was evaluated to estimate the load reductions that will be achieved through implementation. The estimated load reductions are applicable to a range of pollutants addressed by the particular MCM. Note that control measures implemented as part of the planning and land development program and residential LID retrofits were included in the RAA modeling. As such, a discussion on the changes is included in this document; however, the expected effectiveness is not quantified in the analysis of the enhanced MCMs. With the exception of planning and land development related BMPs and the enhanced street sweeping program, all other MCMs were evaluated by developing an effectiveness rating as described in Section 1. The street sweeping program was evaluated using WinSLAMM. The methods, rationale, supporting literature, and modeling used to estimate the load reductions from the MCM programs are described in the following subsections.

Table 1. Summary of Enhancements to MCMs

Minimum Control Measures (New 2012 Permit Requirement or Enhancement from 2001 Permit Requirement)
D.2. Progressive Enforcement (Applies to D.6, D.7, D.8, and D.10)
• Develop and maintain a Progressive Enforcement Policy
• Conduct follow-up inspection within 4 weeks of date of initial inspection
D.5. Public Information and Participation Program (PIPP)
Residential Outreach (Individually or with group):
• 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
• 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, and pet shops/feed stores, as appropriate
D.6. Industrial/Commercial
• 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
• Track critical sources - include nurseries/nursery centers and other facilities determined to contribute substantial pollutant load
• Enhanced Business Assistance Program
D.7. Planning and Land Development
• Update ordinance/design standards to conform with new requirements (LID and Hydromodification)
• 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 Operations and Maintenance plan for LID, treatment and hydromodification BMPs
• Implement tracking and enforcement program for LID, treatment and hydromodification BMPs
• Inspect all development sites upon completion and prior to occupancy certificates
• Verify Operations and Maintenance of BMPs operated by Permittee through inspection
• Develop maintenance inspection checklist
• Require private parties that operate BMPs to submit verification of Operations and Maintenance; enforce as needed
D.8. Construction
• Update erosion and sediment control ordinance/procedures to conform with new requirements
• Sites < 1 acre; inspect based upon water quality threat
• Establish priority inspection process based on the potential for a site to be a source of pollutants identified as water quality priorities
• Develop/implement Standard Operating Procedures/inspection checklist
D.9 Public Agency Activities
• Maintain an updated inventory of all Permittee-owned or operated facilities within its jurisdiction that are potential sources of stormwater pollution
• Implement activity specific BMPs (Table 18 of Permit) or equivalent BMPs for all applicable facilities and field activities (municipal and contracted activities)
• Integrated Pest Management Program
• Develop retrofit opportunity inventory; evaluate and rank
• Where opportunities arise, cooperate with private land owners to encourage site specific retrofitting; includes pilot projects and outreach
• Develop procedures to assess impact of flood management projects on water quality of receiving waters; evaluate to determine if retrofitting is feasible

Table 1. Summary of Enhancements to MCMs

Minimum Control Measures (New 2012 Permit Requirement or Enhancement from 2001 Permit Requirement)
• Evaluate existing structural flood control facilities to determine if retrofitting facility to provide additional pollutant removal is feasible
• Update list of catch basins or map, add GPS locations and update priority
• Implement controls to limit infiltration of seepage from sanitary sewers to the storm drains
• Implement routine preventative maintenance for sanitary sewer system and MS4. May use SSO General WDR to fulfill this requirement
• Implement inspection and maintenance program for Permittee owned BMPs
• Manage residual water in treatment control BMPs removed during maintenance
• Implement road construction maintenance BMPs (e.g., restrict paving activity to exclude periods of rain)
• Add contractors to existing training program
• Enhance current street sweeping program with improved equipment and sweeping of alleys
D.10 Illicit Connections and Illicit Discharges Elimination
• Written procedures for receiving and tracking reports and conducting investigations and eliminations
• Signage adjacent to prioritized open channels provide info re: public reporting
• Create list of relevant staff and contractors for training; provide enhanced training to a subset of field staff

2.1. Progressive Enforcement

Permittees are required to develop and implement a progressive enforcement policy as part of their industrial/commercial, planning and land 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. While progressive enforcement programs increase participation, they are not generally expected to have an effect on the loading factors; meaning that increased participation drives the reduction in loading rather than improving on the loading factor.

2.2 Public Information and Participation (PIPP)

Enhancements to the PIPP programs focus on outreach programs for residential target audiences and are expected to address a range of pollutants including salts, trash, nutrients, metals, pesticides, and bacteria. 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 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., points of purchase such as automotive parts stores and home improvement centers). The loading factors also generally increased with the specificity of the outreach program. With the added specifics required under the Permit, targeted outreach programs were assigned overall effectiveness ratings of 3-20%. Organized events, such as creek cleanups were assigned a 5% participation factor based on areas for cleanup and a mid-range loading factor resulting in a relatively low effectiveness rating (2-4%).

2.2. Industrial/Commercial

The proposed industrial/commercial programs will be implemented as required to address key sources contributing to the priority water quality conditions in the watershed. It is anticipated that these MCMs will address pollutants such as salts, trash, nutrients, metals, pyrethroids pesticides, cyanide, bis-2, and bacteria. New or enhanced industrial commercial 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, the only significant new aspect includes tracking of increased numbers of critical sources (e.g., nurseries will be added to the inventories), thereby increasing the number of required inspections. When paired with the progressive enforcement program, annual participation factors were assumed to be 40%, based on the projected number of business inspections to be performed (each business twice per permit term, i.e. 40% 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. It was estimated that new Permit requirements represent a 10% increase over previous permit requirements; therefore the overall effectiveness of the enhancement to the industrial commercial program was multiplied by 0.1.

2.3. Planning and Land Development

New planning and land development requirements will be met through the implementation of non-structural (e.g., planning, inspection, verification, enforcement) and structural (e.g., LID) components. When post construction BMPs that are properly designed and approved in the planning stages of projects are coupled with an inspection and verification program 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 high loading factors resulting from these programs, the effectiveness ratings for the planning and land development program are expected to be relatively high. However, as noted previously, the structural benefits of this program element were evaluated under the RAA, therefore the effectiveness ratings were not further developed and are not included in this MCM analysis.

2.4. Construction

In estimating the effectiveness ratings, the construction program was considered to be similar to other inspections programs. Construction related MCMs are expected to address a range of pollutants including trash, nutrients, metals, selenium, pesticides, and bacteria. New aspects of the construction program include implementing target training for municipal and contract staff as well as inspections on an as needed basis for sites less than one acre, targeting sites with a higher potential to contribute pollutants that are water quality priorities. Inspection requirements for sites greater than one acre increased to a minimum of monthly inspections. 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 construction program as a whole in the range of 20-72%, consistent with findings from other programs such as the Sacramento Stormwater Program (Larry Walker Associates, 1998) and with assumptions used in the Center for Watershed Protection's Watershed Treatment Model (Caraco, 2013).

2.5. Public Agency Activities

New and enhanced activities to be implemented under the public agencies activities programs span a range of measures, from implementing better MS4 maintenance and trash programs to improving street sweeping measures. As the MCMs target a multitude of sources, pollutants to be addressed include salts, trash, nutrients, metals, selenium, pesticides, cyanide, and bacteria. These activities vary in effectiveness and are further discussed below.

2.5.1. Retrofits

Agencies will develop and implement retrofit programs to assess existing infrastructure for opportunities to improve pollutant reduction. Additionally, where opportunities arise, agencies will cooperate with private land owners to encourage site specific retrofitting. Because of the targeted nature of the retrofit program, it is expected that the loading factors would be high, consistent with other focused programs. Loading factors ranging from 50-80% were assumed. However, with limited opportunities and low participation assumed in the early stages, the participation factors were assumed to be only 5-10%, resulting in effectiveness ratings in the range of 2-4%. Although retrofits were not specifically addressed in the literature, these assumptions are consistent with other programs in the literature.

2.5.2. Infrastructure Maintenance Programs

Several of the infrastructure maintenance programs have been enhanced under the Permit 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. 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)

2.5.3. Street Sweeping

The Source Loading and Management Model for Windows (WinSLAMM) was utilized to estimate the stormwater benefits derived from street sweeping efforts within the City that have been enhanced since the adoption of the MS4 Permit (December 2012). WinSLAMM is a standalone licensed software product developed and marketed by PV & Associates, LLC. Version 10.1.6 is the most recent iteration of the Source Loading and Management Model (SLAMM) developed in the 1970s on behalf of USEPA to evaluate the effectiveness of early street sweeping projects. WinSLAMM is currently the only urban stormwater model capable of simulating runoff volumes and associated pollutants from discrete areas within a given land use class (e.g., streets, alleys, driveways, etc.) for each storm within a precipitation record.

The software modeling package is delivered with a series of southwest region default parameter files and templates to develop inputs based on site-specific data where possible. Regional parameter files include:

- A pollutant probability distribution file containing pollutant event mean concentrations (EMCs) and coefficients of variation for each land use subclass (e.g., streets, alleys, roofs, etc.);
- A particle size parameter file representing a typical particle size distribution for sediment and sediment associated pollutants;
- A street delivery parameter file representing pollutant washoff yield by rain event depth for different textured street surfaces; and
- A runoff coefficient file representing impervious cover and soil hydraulics for a given region.

Street sweeping is expected to address multiple metals, as well as sediments and trash. In focusing on the limiting pollutants in the watershed, City specific pollutant probability distribution files were created for total zinc, copper, and lead consistent with the parameterization of the calibrated Watershed Management Modeling System (WMMS) developed under the ULAR EWMP. A City specific particle size parameter file was developed using pre-sweeping average mass-fraction data presented by particle size group for Burbank from the February 2012 *Draft Enhanced Street Sweeping Pilot Program Report* developed by the cities of Burbank and Glendale. Southwest region-specific street delivery and runoff coefficient files were utilized in the absence of site-specific data. Hourly precipitation records for the period between January 2001 and December 2011 were obtained for Los Angeles County Department of Public Works precipitation gage 449B at Eaton Wash Dam and were reformatted to drive WinSLAMM model hydrology. The 2008 water year (October 1, 2007 through September 30, 2008) was modeled as the critical condition to maintain consistency with the existing ULAR EWMP pollutant evaluation approach.

Street sweeping scenarios were modeled reflecting the composition of the Burbank street sweeper fleet in 2012 (pre-2012 Permit) and 2013 (post-2012 Permit). These scenarios also reflect the period modeled for the ULAR EWMP (October 2001 to September 20, 2011) and subsequent to modeling. Prior to the adoption of the 2012 Permit, Burbank's street sweeping fleet was primarily comprised of Schwarze M-6000 broom sweepers that were largely phased out and replaced by Elgin Broom Bear broom sweepers by 2013. Sweeper productivity for the 2010 Schwarze M-6000 and 2013 Elgin Broom Bear scenarios were modeled in WinSLAMM for single family residential, commercial, industrial, and arterial road land uses. Efficiency for each sweeper type was set to values consistent with observed performance in the *Draft Enhanced Street Sweeping Pilot Program Report.* Roads were assumed to be of intermediate roughness with medium parking densities. Street sweeping was set at one pass per week with parking controls enforced street miles presented in the *Draft Enhanced Street Sweeping Pilot Program Report*.

Additional WinSLAMM modeling was carried out to estimate the load reductions derived from sweeping 50 miles of alleys. The City began sweeping alleys in 2013 as part of an enhancement to their program. The distribution of single-family residential, commercial, and industrial road curb miles presented in the *Draft Enhanced Street Sweeping Pilot Program Report* was assumed to be representative of the distribution of alley miles. Pollutant concentrations for the assumed surrounding land use from the calibrated WMMS model were applied to the alley area and sweeping was simulated using the current Elgin Broom Bear fleet scenario in a manner consistent with modeling for sweeping streets.

Within the model framework, pollutants accumulate and are either swept up, remain on the road surface, or washed off to a theoretical outfall during rain events. Load reductions reflect the difference between the mass of pollutants reaching the outfall in parallel model scenarios simulated in the presence or absence of various sweeping controls. Total zinc, copper, and lead load reductions in each street or alley sweeping scenario were compared to baseline loads to estimate reductions in loads.

Modeling estimated that transitioning the City's sweeper fleet from pre-2012 Permit Schwarze M-6000s to the post-2012 Permit Elgin Broom Bears achieved reductions in total copper, lead, and zinc, from the City's streets when compared to baseline. Sweeping the estimated 50 miles of alleys within the City achieved an additional reduction in total copper, lead, and zinc loading. The load reductions from the baseline condition are included for each metal in **Table 2**.

Table 2. Estimated Increase in Pollutant Load Removal Based on Enhancements to the Street Sweeping Program

Pollutant	Baseline Load[a]	Increase in Pollutant Load Removal from Improved Equipment		Increase in Pollutant Load Removal from Initiation of Alley Sweeping		Total Increase in Pollutant Load Removal	
	Lbs/Yr	Lbs/Yr	% of Baseline	Lbs/Yr	% of Baseline	Lbs/Yr	% of Baseline
Total Copper	700	16	2.3%	14	2.0%	30	4.3%
Total Lead	540	11	2.0%	10	1.9%	21	3.9%
Total Zinc	2700	53	2.0%	48	1.8%	100	3.7%

a. Baseline load is based on the Upper Los Angeles River Enhanced Watershed Management Program critical year and incorporates the effectiveness of the City of Burbank's street sweeping fleet prior to the enhancements implemented in the past three years (i.e., change in sweeper fleet and initiation of alley sweeping).

2.6. 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. Due to the varied nature of illicit discharges, these programs have the potential to address a range of pollutants including salts, trash, nutrients, metals, pesticides, cyanide, and bacteria. The ICID program will be more formalized, with documented procedures and focused training for key staff. 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 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 5-15%.

3. Load Reductions

The effectiveness rating is approximately equivalent to the percent reduction that could be achieved by a structural BMP. In order to estimate how much the implementation of a MCM will reduce the loading to the receiving water, the effectiveness rating is 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. As such, the effectiveness ratings in **Attachment A** can be multiplied by the source loads to estimate the load reductions.

The MCM effectiveness ratings were combined by program element to provide an overall range and average effectiveness value for each program element. In addition, the City's enhanced street sweeping program was evaluated as described above. The analysis produced a set of program effectiveness ranges as shown in **Table 3**.

Table 3. Effectiveness Ratings by Program Element

Program Element	Low	High	Average
Public Information and Participation	2%	20%	11%
Industrial Commercial	1%	18%	9.5%
Construction	20%	72%	46%
Public Agency Activities	2%	72%	37%
ICID	5%	45%	25%
Enhanced Street Sweeping	-	-	3.7%

Program elements were then assigned to land uses, based on their target audiences and land uses to be affected (**Table 4**). The enhanced street sweeping program was evaluated to account for pollutant load reductions from each of the land use areas.

Table 4. Program Elements by Land Use

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

The planning and land development, construction, and ICID 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 included in the RAA modeling and are therefore not included in this analysis of the enhanced MCMs. For the construction program, it is unclear how it will be distributed among land uses within the watershed, so it was also not included in the load reduction analysis. This is also true for the ICID program; however, discharges reduced or eliminated under this program should be addressed under other program elements, therefore the ICID reductions were not independently accounted for in the total load reduction analysis. Because these programs are estimated to have high effectiveness ratings, the exclusion of these programs adds an element of conservatism to the overall load reduction estimates.

Rather than estimate reductions for all pollutants, load reductions for total zinc were calculated for each program element. Total zinc was emphasized because zinc is one of the limiting pollutants for the ULAR EWMP, and the RAA assumes that Burbank will reduce loading of total zinc by 10% via the implementation of institutional control measures /MCMs (including the enhanced street sweeping program using improved equipment and servicing alleys). The 10% reduction is beyond the "standard" 5% reduction attributed to implementation of the default MCMs in the 2012 Permit (which are more intensive than the 2001 Permit). RAA modeling was conducted to identify the remaining capacity needed to address total zinc after the 10% reduction is achieved by institutional control measures. Subsequently RAA modeling was conducted to identify additional control measures to address *E. coli*. The purpose of this analysis was to demonstrate that the expected level of pollutant reduction can reasonably be assured to achieve at least the 10% reduction assigned to the City's institutional control measures in the ULAR EWMP.

Land use based model results from the ULAR EWMP model were used, providing the estimated percentages of the total MS4 load that would be attributable to each land use. 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 in the EWMP using high and low density as well as multi-family residential – these categories were combined into an overall residential category for this analysis. ULAR EWMP model results for total zinc are presented in Table 5 for each land use as a percentage of the load for the City.

Table 5. Upper Los Angeles River EWMP Zinc Model Results by Percent of Land Use for the City of Burbank

Pollutant	Land Use					
	Residential	Commercial	Industrial	Transportation	Other Urban[a]	Total MS4[b]
Total Zinc (lbs/year)	13.9%	18.0%	17.1%	42.3%	3.5%	94.9%

a. Includes institutional land use only.
b. Vacant land and urban grass lands are not included.

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. The effectiveness of the enhanced street sweeping program was included as its own "element" as land uses were accounted for in the modeling. The land use based load reduction estimates were then summed to provide the range of expected load reductions for total zinc resulting from the implementation of new and enhanced MCMs. The estimated range of potential load reductions for total zinc is shown in Figure 1. The dark gray represents the lower half of the range, the lighter gray the upper half, with the average of the range represented by the location where the two shades of gray meet. The average expected load reduction for total zinc is well above the 10% assumed in the EWMP (27%).

As presented in Attachment A, the enhanced MCMs address a wide range of sources and pollutants and it can be expected that most of the potential MS4 sources of pollutants will be addressed by an enhanced MCM in some capacity. Because several of the MCMs have much higher effectiveness ratings, the load reductions from implementing enhanced MCMs are expected to be higher than the low end range, and it is reasonable to expect that a 10% reduction in total zinc loadings to receiving waters can be achieved through implementing the enhanced MCMs presented herein. As noted previously, demonstrating a 10% load reduction in zinc was reasonably assured was necessary because the RAA assumes that the City will reduce loading of total zinc by 10% via the implementation of institutional control measures / MCMs (including enhanced street sweeping). RAA modeling was conducted to identify the remaining capacity needed to address total zinc after the 10% reduction is achieved by institutional control measures and subsequently to identify additional control measures to address *E. coli*. The analysis presented herein demonstrates that the expected level of pollutant reduction can reasonably be assured to achieve at least the 10% total zinc reduction assigned to the City's institutional control measures in the ULAR EWMP.

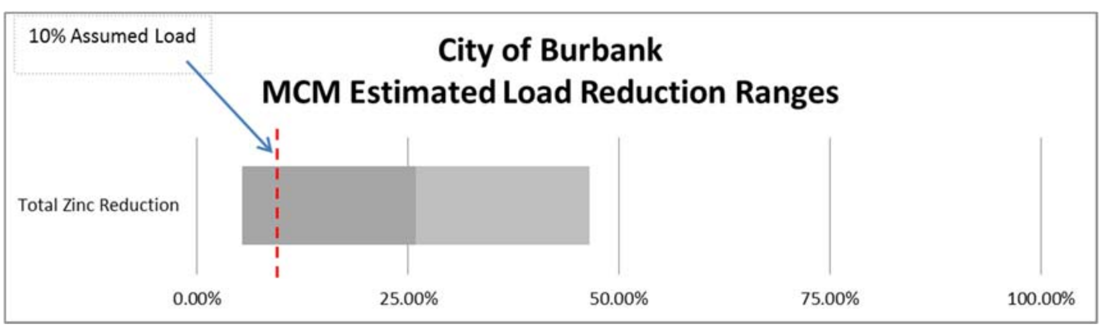


Figure 1. Estimated Load Reductions, City of Burbank

4. References

Battiata, J., K. Collins, D. Hirschman, G. Hoffmann (Center for Watershed Protection). 2010. The Runoff Reduction Method. Universities Council on Water Resources Journal of Contemporary Water Research & Education.146: 11-21.

Brosseau, G., 1997 summary report – vehicle service facility waste minimization program. Prepared for the Regional Water Quality Control Plant, Palo Alto. California.

Caraco, D., Watershed Treatment Model (WTM) 2013 Documentation. Center for Watershed Protection, Ellicott City, MD.

Larry Walker Associates, *Draft Enhanced Street Sweeping Pilot Program Report.* Prepared for the Cities of Burbank and Glendale. February 2012.

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

Water Environment Research Federation, 2000. Tools to Measure Source Control Program Effectiveness. By Betsy Elzufon, Larry Walker Associates. Project 98-WSM-2.