Appendix A
Los Angeles River Metals TMDL Basin Plan Amendment

Approved by Los Angeles Regional Water Quality Control Board, September 6, 2006

Attachment A to Resolution No. R2007-014

Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the Los Angeles River and Tributaries Metals TMDL

Adopted by the California Regional Water Quality Control Board, Los Angeles Region on [*insert date*].

Amendments:

Table of Contents
Add:

Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries
7-13 Los Angeles River and Tributaries Metals TMDL

List of Figures, Tables and Inserts
Add:

Chapter 7. Total Maximum Daily Loads (TMDLs)
Tables
7-13 Los Angeles River and Tributaries Metals TMDL
Table 7-13.1 Los Angeles River and Tributaries Metals TMDL: Elements
Table 7-13.2 Los Angeles River and Tributaries Metals TMDL: Implementation Schedule
Table 7-13.3 Los Angeles River and Tributaries Metals TMDL: Jurisdictional Groups

Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries, Section 7-13 (Los Angeles River and Tributaries Metals TMDL)
Add:

This TMDL was adopted by

The Regional Water Quality Control Board on [*insert date*].

This TMDL was approved by:

The State Water Resources Control Board on [*insert date*].
The Office of Administrative Law on [*insert date*].
The U.S. Environmental Protection Agency on [*insert date*].

The following table includes the key elements of this TMDL.

Table 7-13.1 Los Angeles River and Tributaries Metals TMDL: Elements

Element	Key Findings and Regulatory Provisions
Problem Statement	Segments of the Los Angeles River and its tributaries are on the Clean Water Act section 303(d) list of impaired waterbodies for copper, cadmium, lead, zinc, aluminum and selenium. The metals subject to this TMDL are toxic pollutants, and the existing water quality objectives for the metals reflect national policy that the discharge of toxic pollutants in toxic amounts be prohibited. When one of the metals subject to this TMDL is present at levels exceeding the existing numeric objectives, then the receiving water is toxic. The beneficial uses impaired by metals in the Los Angeles River and its tributaries are those associated with aquatic life and water supply, including wildlife habitat, rare, threatened or endangered species, warm freshwater habitat, wetlands, and groundwater recharge. TMDLs are developed for reaches on the 303(d) list and for reaches where recent data indicate additional impairments. Addressing the impairing metals throughout the Los Angeles River watershed will ensure that the metals do not contribute to an impairment elsewhere in the watershed. Metals allocations are therefore developed for upstream reaches and tributaries that drain to impaired reaches. These TMDLs address wet- and dry-weather discharges of copper, lead, zinc and selenium and wet-weather discharges of cadmium. Impairments related to cadmium only occur during wet weather. Impairments related to selenium are confined to Reach 6 and its tributaries. Dry-weather impairments related to zinc only occur in Rio Hondo Reach 1. The aluminum listing was based on water quality objectives set to support the municipal water supply beneficial use (MUN). MUN is a conditional use in the Los Angeles River watershed. The United States Environmental Protection Agency (USEPA) has determined that TMDLs are not required for impairments of conditional uses.
Numeric Target *(Interpretation of the numeric water quality objective, used to calculate the waste load allocations)*	Numeric water quality targets are based on the numeric water quality criteria established by the California Toxics Rule (CTR). The targets are expressed in terms of total recoverable metals. There are separate targets for dry and wet weather because hardness values and flow conditions in the Los Angeles River and tributaries vary between dry and wet weather. The dry-weather targets apply to days when the maximum daily flow in the River is less than 500 cfs. The wet-weather targets apply to days when the maximum daily flow in the River is equal to or greater than 500 cfs. The dry-weather targets for copper and lead are based on chronic CTR criteria. The dry-weather targets for zinc are based on acute CTR criteria. Copper, lead and zinc targets are dependent on hardness to adjust for site specific conditions and conversion factors to convert between dissolved and total recoverable metals. Copper and lead targets are based on 50^{th} percentile hardness values. Zinc targets are based on 10^{th} percentile hardness values. Site-specific copper conversion factors are applied immediately downstream of the Tillman and LA-Glendale

Element	Key Findings and Regulatory Provisions
	water reclamation plants (WRP). CTR default conversion factors are used for copper, lead, and zinc in all other cases. The dry-weather target for selenium is independent of hardness or conversion factors.

Dry-weather conversion factors:

	Default	Below Tillman WRP	Below LA-Glendale WRP
Copper	0.96	0.74	0.80
Lead	0.79		
Zinc	0.61		

Dry-weather numeric targets (μg total recoverable metals/L)

	Cu	**Pb**	**Zn**	**Se**
Reach 5, 6 and Bell Creek	30	19		5
Reach 4	26	10		
Reach 3 above LA-Glendale WRP and Verdugo	23	12		
Reach 3 below LA-Glendale WRP	26	12		
Burbank Western Channel (above WRP)	26	14		
Burbank Western Channel (below WRP)	19	9.1		
Reach 2 and Arroyo Seco	22	11		
Reach 1	23	12		
Compton Creek	19	8.9		
Rio Hondo Reach 1	13	5.0	131	
Monrovia Canyon		8.2		

The wet-weather targets for cadmium, copper, lead and zinc are based on acute CTR criteria and the 50th percentile hardness values for storm water collected at the Wardlow gage station. Conversion factors for copper, lead and zinc are based on a regression of dissolved metals values to total recoverable metals values collected at Wardlow. The CTR default conversion factor is applied to cadmium. The wet-weather target for selenium is independent of hardness or conversion factors.

Wet-weather conversion factors:

Cadmium	0.94
Copper	0.65
Lead	0.82
Zinc	0.61

Wet-weather numeric targets (μg total recoverable metals/L)

Cd	Cu	Pb	Zn	Se
3.1	17	62	159	5

Element	Key Findings and Regulatory Provisions
Source Analysis	There are significant differences in the sources of metals loadings during dry weather and wet weather. During dry weather, most of the metals loadings are in the dissolved form. The three major publicly owned treatment works (POTWs) that discharge to the river (Tillman WRP, LA-Glendale WRP, and Burbank WRP) constitute the majority of the flow and metals loadings during dry weather. The storm drains also contribute a large percentage of the loadings during dry weather because although their flows are typically low, concentrations of metals in urban runoff may be quite high. The remaining portion of the dry weather flow and metals loadings represents a combination of tributary flows, groundwater discharge, and flows from other permitted NPDES discharges within the watershed. During wet weather, most of the metals loadings are in the particulate form and are associated with wet-weather storm water flow. On an annual basis, storm water contributes about 40% of the cadmium loading, 80% of the copper loading, 95% of the lead loading and 90% of the zinc loading. This storm water flow is permitted through two municipal separate storm sewer system (MS4) permits, a separate Caltrans MS4 permit, a general construction storm water permit and a general industrial storm water permit. Nonpoint sources of metals may include tributaries that drain the open space areas of the watershed. Direct atmospheric deposition of metals on the river is also a small source. Indirect atmospheric deposition on the land surface that is washed off during storms is a larger source, which is accounted for in the estimates of storm water loadings. The sources of selenium appear to be related to natural levels of selenium in soils in the upper watershed. Separate studies are underway to evaluate whether selenium levels represent a "natural condition" for this watershed.
Loading Capacity	**Dry Weather** Dry-weather TMDLs are developed for the following pollutant waterbody combinations (allocations are developed for upstream reaches and tributaries to meet TMDLs in downstream reaches): • Copper for the Los Angeles River Reaches 1, 2, 3, 4, and 5, Burbank Channel, Compton Creek, Tujunga Wash, Rio Hondo Reach 1. • Lead for the Los Angeles River Reaches 1, 2, 3, 4, and 5, Burbank Channel, Rio Hondo Reach 1, Compton Creek, Monrovia Canyon Creek. • Zinc for Rio Hondo Reach 1. • Selenium for Reach 6, Aliso Creek, Dry Canyon Creek, McCoy Canyon Creek. For dry weather, loading capacities are equal to reach-specific numeric targets multiplied by reach-specific critical dry-weather flows.

<table>
<tr><th>Element</th><th>Key Findings and Regulatory Provisions</th></tr>
<tr><td></td><td>
Summing the critical flows for each reach and tributary, the critical flow for the entire river is 203 cfs, which is equal to the combined design flow of the three POTWs (169 cfs) plus the median flow from the storm drains and tributaries (34 cfs). The median storm drain and tributary flow is equal to the median flow at Wardlow (145 cfs) minus the existing median POTW flow (111 cfs). The dry-weather loading capacities for each impaired reach include the critical flows for upstream reaches. The dry-weather loading capacity for Reach 5 includes flows from Reach 6 and Bell Creek, the dry-weather loading capacity for Reach 3 includes flows from Verdugo Wash, and the dry-weather loading capacity for Reach 2 includes flows from Arroyo Seco.
Dry-weather loading capacity (total recoverable metals)
<table>
<tr><th></th><th>Critical Flow (cfs)</th><th>Cu (kg/day)</th><th>Pb (kg/day)</th><th>Zn (kg/day)</th></tr>
<tr><td>LA River Reach 5</td><td>8.74</td><td>0.65</td><td>0.39</td><td></td></tr>
<tr><td>LA River Reach 4</td><td>129.13</td><td>8.1</td><td>3.2</td><td></td></tr>
<tr><td>LA River Reach 3</td><td>39.14</td><td>2.3</td><td>1.01</td><td></td></tr>
<tr><td>LA River Reach 2</td><td>4.44</td><td>0.16</td><td>0.084</td><td></td></tr>
<tr><td>LA River Reach 1</td><td>2.58</td><td>0.14</td><td>0.075</td><td></td></tr>
<tr><td>Tujunga Wash</td><td>0.15</td><td>0.007</td><td>0.0035</td><td></td></tr>
<tr><td>Burbank Channel</td><td>17.3</td><td>0.80</td><td>0.39</td><td></td></tr>
<tr><td>Rio Hondo Reach 1</td><td>0.50</td><td>0.015</td><td>0.0061</td><td>0.16</td></tr>
<tr><td>Compton Creek</td><td>0.90</td><td>0.041</td><td>0.020</td><td></td></tr>
</table>
No dry-weather loading capacities are calculated for lead in Monrovia Canyon Creek or selenium in Reach 6 or its tributaries. Concentration-based allocations are assigned for these metals in these reaches.
Wet Weather
Wet-weather TMDLs are calculated for cadmium, copper, lead, and zinc in Reach 1. Allocations are developed for all upstream reaches and tributaries to meet these TMDLs.
Wet-weather loading capacities are calculated by multiplying daily storm volumes by the wet-weather numeric target for each metal. The resulting curves identify the load allowance for a given flow.
Wet-weather loading capacity (total recoverable metals)
<table>
<tr><th>Metal</th><th>Load Duration Curve (kg/day)</th></tr>
<tr><td>Cadmium</td><td>Daily storm volume x 3.1 μg/L</td></tr>
<tr><td>Copper</td><td>Daily storm volume x 17 μg/L</td></tr>
<tr><td>Lead</td><td>Daily storm volume x 62 μg/L</td></tr>
<tr><td>Zinc</td><td>Daily storm volume x 159 μg/L</td></tr>
</table>
</td></tr>
<tr><td>Load Allocations (for nonpoint sources)</td><td>
Dry Weather
Dry-weather nonpoint source load allocations (LAs) for copper and lead apply to open space and direct atmospheric deposition to the river.
</td></tr>
</table>

Element	Key Findings and Regulatory Provisions
	Dry-weather open space load allocations are equal to the critical flow for the upper portion of tributaries that drain open space, multiplied by the numeric targets for these tributaries.

Open space dry-weather LAs (total recoverable metals)

	Critical Flow	Cu (kg/day)	Pb (kg/day)
Tujunga Wash	0.12	0.0056	0.0028
Arroyo Seco	0.33	0.018	0.009

Load allocations for direct atmospheric deposition to the entire river are obtained from previous studies (3 kg/year for copper, 2 kg/year for lead and 10 kg/year for zinc.) Loads are allocated to each reach and tributary based on their length. The ratio of the length of each river segment to the total length of the river is multiplied by the estimates of direct atmospheric loading to the entire river.

Direct air deposition dry-weather LAs (total recoverable metals)

	Cu (kg/day)	Pb (kg/day)	Zn(kg/day)
LA River Reach 6	$3.3x10^{-4}$	$2.2x10^{-4}$	
LA River Reach 5	$3.6x10^{-4}$	$2.4x10^{-4}$	
LA River Reach 4	$8.1x10^{-4}$	$5.4x10^{-4}$	
LA River Reach 3	$6.04x10^{-4}$	$4.03x10^{-4}$	
LA River Reach 2	$1.4\ x10^{-3}$	$9.5x10^{-4}$	
LA River Reach 1	$4.4x10^{-4}$	$2.96x10^{-4}$	
Bell Creek	$2.98x10^{-4}$	$1.99x10^{-4}$	
Tujunga Wash	$7.4x10^{-4}$	$4.9x10^{-4}$	
Verdugo Wash	$4.7x10^{-4}$	$3.2x10^{-4}$	
Burbank Channel	$7.1x10^{-4}$	$4.7x10^{-4}$	
Arroyo Seco	$7.3x10^{-4}$	$4.9x10^{-4}$	
Rio Hondo Reach 1	$6.4x10^{-4}$	$4.2x10^{-4}$	$2.1x10^{-3}$
Compton Creek	$6.5x10^{-4}$	$4.3x10^{-4}$	

A dry-weather concentration-based load allocation for lead equal to the dry-weather numeric target (8.2 μg/L) applies to Monrovia Canyon Creek. The load allocation is not assigned to a particular nonpoint source or group of nonpoint sources.

A dry-weather concentration-based load allocation for selenium equal to the dry-weather numeric target (5 μg/L) is assigned to Reach 6 and its tributaries. The load allocation is not assigned to a particular nonpoint source or group of nonpoint sources.

Wet Weather

Wet-weather load allocations for open space are equal to the percent metals loading from open space (predicted by the wet-weather model) multiplied by the total loading capacity, then by the ratio of open space

Element	Key Findings and Regulatory Provisions
	located outside the storm drain system to the total open space area. There is no load allocation for cadmium because open space is not believed to be a source of the wet-weather cadmium impairment in Reach 1. **Wet-weather open space LAs (total recoverable metals)** **Metal** — **Load Allocation (kg/day)** Copper — $2.6x10^{-10}$ µg /L/day x daily storm volume(L) Lead — $2.4x10^{-10}$ µg /L/day x daily storm volume(L) Zinc — $1.4x10^{-9}$ µg /L/day x daily storm volume(L) Wet-weather load allocations for direct atmospheric deposition are equal to the percent area of the watershed comprised by surface water (0.2%) multiplied by the total loading capacity. **Wet-weather direct air deposition LAs (total recoverable metals)** **Metal** — **Load Allocation (kg/day)** Cadmium — $6.2x10^{-10}$ µg /L/day x daily storm volume(L) Copper — $3.4x10^{-10}$ µg /L/day x daily storm volume(L) Lead — $1.2x10^{-10}$ µg /L/day x daily storm volume(L) Zinc — $3.2x10^{-9}$ µg /L/day x daily storm volume(L) A wet-weather concentration-based load allocation for selenium equal to the dry-weather numeric target (5 µg/L) is assigned to Reach 6 and its tributaries. The load allocation is not assigned to a particular nonpoint source or group of nonpoint sources.
Waste Load Allocations *(for point sources)*	**Dry Weather** Dry-weather point source waste load allocations (WLAs) apply to the three POTWs (Tillman, Glendale, and Burbank). A grouped waste load allocation applies to the storm water permitees (Los Angeles County MS4, Long Beach MS4, Caltrans, General Industrial and General Construction), which is calculated by subtracting load allocations (and waste load allocations for reaches with POTWs) from the total loading capacity. Concentration-based waste load allocations are developed for other point sources in the watershed. Mass- and concentration-based waste load allocations for Tillman, Los Angeles-Glendale and Burbank WRPs are developed to meet the dry-weather targets for copper and lead in Reach 4, Reach 3 and the Burbank Western Channel, respectively.

Element	Key Findings and Regulatory Provisions
	POTW dry-weather WLAs (total recoverable metals):

	Cu	**Pb**
Tillman		
Concentration-based (µg/L)	26	10
Mass-based (kg/day)	7.8	3.03
Glendale		
Concentration-based (µg/L)	26	12
Mass-based (kg/day)	2.0	0.88
Burbank		
Concentration-based (µg/L)	19	9.1
Mass-based (kg/day)	0.64	0.31

Dry-weather waste load allocations for storm water are equal to storm drain flows (critical flows minus median POTW flows minus median open space flows) multiplied by reach-specific numeric targets, minus the contribution from direct air deposition.

Storm water dry-weather WLAs (total recoverable metals)

	Critical Flow (cfs)	**Cu (kg/day)**	**Pb (kg/day)**	**Zn (kg/day)**
LA River Reach 6	7.20	0.53	0.33	
LA River Reach 5	0.75	0.05	0.03	
LA River Reach 4	5.13	0.32	0.12	
LA River Reach 3	4.84	0.06	0.03	
LA River Reach 2	3.86	0.13	0.07	
LA River Reach 1	2.58	0.14	0.07	
Bell Creek	0.79	0.06	0.04	
Tujunga Wash	0.03	0.001	0.0002	
Burbank Channel	3.3	0.15	0.07	
Verdugo Wash	3.3	0.18	0.10	
Arroyo Seco	0.25	0.01	0.01	
Rio Hondo Reach 1	0.50	0.01	0.006	0.16
Compton Creek	0.90	0.04	0.02	

A zero waste load allocation is assigned to all industrial and construction storm water permittees during dry weather. The remaining waste load allocations are shared by the MS4 permittees and Caltrans.

Other NPDES Permits

Concentration-based dry-weather waste load allocations apply to the other NPDES permits* that discharge to the reaches and tributaries in the following table.

* "Other NPDES permits" refers to minor NPDES permits, general non-storm water NDPES permits, and major permits other than the Tillman, LA-Glendale, and Burbank POTWs.

Element	Key Findings and Regulatory Provisions
	Other dry-weather WLAs (µg total recoverable metals/L)

	Cu	Pb	Zn	Se
Reach 5, 6 and Bell Creek	30	19		5
Reach 4	26	10		
Reach 3 above LA-Glendale WRP and Verdugo	23	12		
Reach 3 below LA-Glendale WRP	26	12		
Burbank Western Channel(above WRP)	26	14		
Burbank Western Channel (below WRP)	19	9.1		
Reach 2 and Arroyo Seco	22	11		
Reach 1	23	12		
Compton Creek	19	8.9		
Rio Hondo Reach 1	13	5.0	131	

Wet Weather

During wet-weather, POTW allocations are based on dry-weather in-stream numeric targets because the POTWs exert the greatest influence over in-stream water quality during dry weather. During wet weather, the concentration-based dry-weather waste load allocations apply but the mass-based dry-weather allocations do not apply when influent flows exceed the design capacity of the treatment plants. Additionally, the POTWs are assigned reach-specific allocations for cadmium and zinc based on dry weather targets to meet the wet-weather TMDLs in Reach 1.

POTW wet-weather WLAs (total recoverable metals):

	Cd	Cu	Pb	Zn
Tillman				
Concentration-based (µg/L)	4.7	26	10	212
Mass-based (kg/day)	1.4	7.8	3.03	64
Glendale				
Concentration-based (µg/L)	5.3	26	12	253
Mass-based (kg/day)	0.40	2.0	0.88	19
Burbank				
Concentration-based (µg/L)	4.5	19	9.1	212
Mass-based (kg/day)	0.15	0.64	0.31	7.3

<table>
<tr><th>Element</th><th>Key Findings and Regulatory Provisions</th></tr>
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Wet-weather waste load allocations for the grouped storm water permittees are equal to the total loading capacity minus the load allocations for open space and direct air deposition and the waste load allocations for the POTWs. Wet-weather waste load allocations for the grouped storm water permittees apply to all reaches and tributaries.

Storm water wet-weather WLAs (total recoverable metals):

<table>
<tr><th>Metal</th><th>Waste Load Allocation (kg/day)</th></tr>
<tr><td>Cadmium</td><td>$3.1x10^{-9}$ x daily volume(L) – 1.95</td></tr>
<tr><td>Copper</td><td>$1.7x10^{-8}$ x daily volume (L) – 10</td></tr>
<tr><td>Lead</td><td>$6.2x10^{-8}$ x daily volume (L) – 4.2</td></tr>
<tr><td>Zinc</td><td>$1.6x10^{-7}$ x daily volume (L) – 90</td></tr>
</table>

The combined storm water waste load allocation is apportioned between the different storm water categories by their percent area of the portion of the watershed served by storm drains.

MS4 wet-weather WLAs (total recoverable metals):

<table>
<tr><th>Metal</th><th>Waste Load Allocation (kg/day)</th></tr>
<tr><td>Cadmium</td><td>$2.8x10^{-9}$ x daily volume(L) – 1.8</td></tr>
<tr><td>Copper</td><td>$1.5x10^{-8}$ x daily volume (L) – 9.5</td></tr>
<tr><td>Lead</td><td>$5.6x10^{-8}$ x daily volume (L) – 3.85</td></tr>
<tr><td>Zinc</td><td>$1.4x10^{-7}$ x daily volume (L) – 83</td></tr>
</table>

Caltrans wet-weather WLAs (total recoverable metals):

<table>
<tr><th>Metal</th><th>Waste Load Allocation (kg/day)</th></tr>
<tr><td>Cadmium</td><td>$5.3x10^{-11}$ x daily volume(L) – 0.03</td></tr>
<tr><td>Copper</td><td>$2.9x10^{-10}$ x daily volume (L) – 0.2</td></tr>
<tr><td>Lead</td><td>$1.06x10^{-9}$ x daily volume (L) – 0.07</td></tr>
<tr><td>Zinc</td><td>$2.7x10^{-9}$ x daily volume (L) – 1.6</td></tr>
</table>

General Industrial wet-weather WLAs (total recoverable metals):

<table>
<tr><th>Metal</th><th>Waste Load Allocation (kg/day)</th></tr>
<tr><td>Cadmium</td><td>$1.6x10^{-10}$ x daily volume(L) – 0.11</td></tr>
<tr><td>Copper</td><td>$8.8x10^{-10}$ x daily volume (L) – 0.5</td></tr>
<tr><td>Lead</td><td>$3.3x10^{-9}$ x daily volume (L) – 0.22</td></tr>
<tr><td>Zinc</td><td>$8.3x10^{-9}$ x daily volume (L) – 4.8</td></tr>
</table>

General Construction wet-weather WLAs (total recoverable metals):

<table>
<tr><th>Metal</th><th>Waste Load Allocation (kg/day)</th></tr>
<tr><td>Cadmium</td><td>$5.9x10^{-11}$ x daily volume(L) – 0.04</td></tr>
<tr><td>Copper</td><td>$3.2x10^{-10}$ x daily volume (L) – 0.2</td></tr>
<tr><td>Lead</td><td>$1.2x10^{-9}$ x daily volume (L) – 0.08</td></tr>
<tr><td>Zinc</td><td>$3.01x10^{-}9$ x daily volume (L) – 4.8</td></tr>
</table>

Each storm water permittee under the general industrial and construction storm water permits will receive individual waste load allocations per acre based on the total acres of their facility.

</td></tr>
</table>

Element	Key Findings and Regulatory Provisions
	Individual General Construction or Industrial Permittees WLAs (total recoverable metals): **Metal** — **Waste Load Allocation (g/day/acre)** Cadmium — $7.6x10^{-12}$ x daily volume(L) – $4.8x10^{-6}$ Copper — $4.2x10^{-11}$ x daily volume (L) – $2.6x10^{-5}$ Lead — $1.5x10^{-10}$ x daily volume (L) – $1.04x10^{-5}$ Zinc — $3.9x10^{-10}$ x daily volume (L) – $2.2x10^{-4}$ **Other NPDES Permits** Concentration-based wet-weather waste load allocations apply to the other NPDES permits* that discharge to all reaches of the Los Angeles River and its tributaries. **Wet-weather WLAs for other permits (total recoverable metals)** **Cadmium (µg /L)** — **Copper (µg /L)** — **Lead (µg /L)** — **Zinc (µg /L)** 3.1 — 17 — 62 — 159 * "Other NPDES permits" refers to minor NPDES permits, general non-storm water NDPES permits, and major permits other than the Tillman, LA-Glendale, and Burbank POTWs.
Margin of Safety	There is an implicit margin of safety that stems from the use of conservative values for the translation from total recoverable to the dissolved fraction during the dry and wet periods. In addition, the TMDL includes a margin of safety by evaluating wet-weather conditions separately from dry-weather conditions, which is in effect, assigning allocations for two distinct critical conditions. Furthermore, the use of the wet-weather model to calculate load allocations for open space can be applied to the margin of safety because it tends to overestimate loads from open spaces, thus reducing the available waste load allocations to the permitted discharges.
Implementation	The regulatory mechanisms used to implement the TMDL will include the Los Angeles County Municipal Storm Water NPDES Permit (MS4), the City of Long Beach MS4, the Caltrans storm water permit, major NPDES permits, minor NPDES permits, general NPDES permits, general industrial storm water NPDES permits, and general construction storm water NPDES permits. Nonpoint sources will be regulated through the authority contained in sections 13263 and 13269 of the Water Code, in conformance with the State Water Resources Control Board's Nonpoint Source Implementation and Enforcement Policy (May 2004). Each NPDES permit assigned a WLA shall be reopened or amended at reissuance, in accordance with applicable laws, to incorporate the applicable WLAs as a permit requirement. The Regional Board shall reconsider this TMDL by January 11, 2011 based on additional data obtained from special studies. Table 7-13-2 presents the implementation schedule for the responsible permittees.

Element	Key Findings and Regulatory Provisions
	Non storm water NPDES permits (including POTWs, other major, minor, and general permits): Permit writers may translate applicable waste load allocations into effluent limits for the major, minor and general NPDES permits by applying the effluent limitation procedures in Section 1.4 of the State Water Resources Control Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (2000) or other applicable engineering practices authorized under federal regulations. Compliance schedules may be established in individual NPDES permits, allowing up to 5 years within a permit cycle to achieve compliance. Compliance schedules may not be established in general NPDES permits. A discharger that can not comply immediately with effluent limitations specified to implement waste load allocations will be required to apply for an individual permit in order to demonstrate the need for a compliance schedule. If a POTW demonstrates that advanced treatment (necessitating long design and construction timeframes) will be required to meet final waste load allocations, the Regional Board will consider extending the implementation schedule to allow the POTW up to January 11, 2016 to achieve compliance with the final WLAs. Permittees that hold individual NPDES permits and solely discharge storm water may be allowed (at Regional Board discretion) compliance schedules up to January 11, 2016 to achieve compliance with final WLAs. **General industrial storm water permits:** The Regional Board will develop a watershed-specific general industrial storm water permit to incorporate waste load allocations. <u>Dry-weather implementation</u> Non-storm water flows authorized by Order No. 97-03 DWQ, or any successor order, are exempt from the dry-weather waste load allocation equal to zero. Instead, these authorized non-storm water flows shall meet the reach-specific concentration-based waste load allocations assigned to the "other NPDES permits". The dry-weather waste load allocation equal to zero applies to unauthorized non-storm water flows, which are prohibited by Order No. 97-03 DWQ. It is anticipated that the dry-weather waste load allocations will be implemented by requiring improved best management practices (BMPs) to eliminate the discharge of non-storm water flows. However, permit writers must provide adequate justification and documentation to demonstrate that specified BMPs are expected to result in attainment of the numeric waste load allocations.

<table>
<tr><th>Element</th><th>Key Findings and Regulatory Provisions</th></tr>
<tr><td></td><td>
<u>Wet-weather implementation</u>

General industrial storm water permittees are allowed interim wet-weather concentration-based waste load allocations based on benchmarks contained in EPA's Storm Water Multi-sector General Permit for Industrial Activities. The interim waste load allocations apply to all industry sectors and apply until no later than January 11, 2016.

Interim wet-weather WLAs for general industrial storm water permittees (total recoverable metals)*
<table>
<tr><th>Cd (µg/L)</th><th>Cu(µg/L)</th><th>Pb(µg/L)</th><th>Zn(µg/L)</th></tr>
<tr><td>15.9</td><td>63.6</td><td>81.6</td><td>117</td></tr>
</table>
*Based on USEPA benchmarks for industrial storm water sector

Until January 11, 2011, interim waste load allocations will not be interpreted as enforceable permit conditions. If monitoring demonstrates that interim waste load allocations are being exceeded, the permittee shall evaluate existing and potential BMPs, including structural BMPs, and implement any necessary BMP improvements. It is anticipated that monitoring results and any necessary BMP improvements would occur as part of an annual reporting process. After January 11, 2011, interim waste load allocations shall be translated into enforceable permit conditions. Compliance with permit conditions may be demonstrated through the installation, maintenance, and monitoring of Regional Board-approved BMPs. If this method of compliance is chosen, permit writers must provide adequate justification and documentation to demonstrate that BMPs are expected to result in attainment of interim waste load allocations.

The general industrial storm water permits shall achieve final wet-weather waste load allocations no later than January 11, 2016, which shall be expressed as NPDES water quality-based effluent limitations. Effluent limitations may be expressed as permit conditions, such as the installation, maintenance, and monitoring of Regional Board-approved BMPs if adequate justification and documentation demonstrate that BMPs are expected to result in attainment of waste load allocations.

General construction storm water permits:

Waste load allocations will be incorporated into the State Board general permit upon renewal or into a watershed-specific general permit developed by the Regional Board.

<u>Dry-weather implementation</u>

Non-storm water flows authorized by the General Permit for Storm Water Discharges Associated with Construction Activity (Water Quality Order No. 99-08 DWQ), or any successor order, are exempt from the dry-weather waste load allocation equal to zero as long as they comply with the provisions of sections C.3.and A.9 of the Order No. 99-08 DWQ, which state that these authorized non-storm discharges
</td></tr>
</table>

Element	Key Findings and Regulatory Provisions
	shall be (1) infeasible to eliminate (2) comply with BMPs as described in the Storm Water Pollution Prevention Plan prepared by the permittee, and (3) not cause or contribute to a violation of water quality standards, or comparable provisions in any successor order. Unauthorized non-storm water flows are already prohibited by Order No. 99-08 DWQ. <u>Wet-weather implementation</u> By January 11, 2013, the construction industry will submit the results of BMP effectiveness studies to determine BMPs that will achieve compliance with the final waste load allocations assigned to construction storm water permittees. Regional Board staff will bring the recommended BMPs before the Regional Board for consideration by January 11, 2014. General construction storm water permittees will be considered in compliance with final waste load allocations if they implement these Regional Board approved BMPs. All permittees must implement the approved BMPs by January 11, 2015. If no effectiveness studies are conducted and no BMPs are approved by the Regional Board by January 11, 2014, each general construction storm water permit holder will be subject to site-specific BMPs and monitoring requirements to demonstrate compliance with final waste load allocations. **MS4 and Caltrans permits** Applicable CTR limits are being met most of the time during dry weather, with episodic exceedances. Due to the expense of obtaining accurate flow measurements required for calculating loads, concentration-based permit limits may apply during dry weather. These concentration-based limits would be equal to dry-weather reach-specific numeric targets. Each municipality and permittee will be required to meet the storm water waste load allocations shared by the two MS4s and Caltrans permittees at the designated TMDL effectiveness monitoring points. A phased implementation approach, using a combination of non-structural and structural BMPs may be used to achieve compliance with the waste load allocations. The administrative record and the fact sheets for the MS4 and Caltrans storm water permits must provide reasonable assurance that the BMPs selected will be sufficient to implement the waste load allocations. The implementation schedule for the MS4 and Caltrans permittees consists of a phased approach. The watershed is divided into five jurisdictional groups based on the subwatersheds of the tributaries that drain to each reach of the river, as presented in Table 7-13-3. Each jurisdictional group shall achieve compliance in prescribed percentages of its subwatershed(s), with total compliance to be achieved within 22 years. Jurisdictional groups can be reorganized or subdivided upon approval by the Executive Officer.

Element	Key Findings and Regulatory Provisions
Seasonal Variations and Critical Conditions	Seasonal variations are addressed by developing separate waste load allocations for dry weather and wet weather. For dry weather, critical flows for each reach are established from the long-term flow records (1988-2000) generated by stream gages located throughout the watershed and in selected reaches. The median dry-weather urban runoff plus the combined design capacity of the three major POTWs is selected as the critical flow since most of the flow is from effluent which results in a relatively stable dry-weather flow condition. In areas where there are no flow records, an area-weighted approach is used to assign flows to these reaches. Wet-weather allocations are developed using the load-duration curve concept. The total wet-weather waste load allocation for wet weather varies by storm. Given this variability in storm water flows, no justification was found for selecting a particular sized storm as the critical condition.
Compliance Monitoring and Special Studies	Effective monitoring will be necessary to assess the condition of the Los Angeles River and its tributaries and to assess the on-going effectiveness of efforts by dischargers to reduce metals loading to the Los Angeles River. Special studies may also be appropriate to provide further information about new data, new or alternative sources, and revised scientific assumptions. Below the Regional Board identifies the various goals of monitoring efforts and studies. The programs, reports, and studies will be developed in response to subsequent orders issued by the Executive Officer. **Ambient Monitoring** An ambient monitoring program is necessary to assess water quality throughout the Los Angeles River and its tributaries and the progress being made to remove the metals impairments. The MS4 and Caltrans storm water NPDES permittees in each jurisdictional group are jointly responsible for implementing the ambient monitoring program. The responsible agencies shall sample for total recoverable metals, dissolved metals, including cadmium and zinc, and hardness once per month at each ambient monitoring location at least until the TMDL is re-considered at year 5. The reported detection limits shall be below the hardness adjusted CTR criteria. Eight ambient monitoring points currently exist in the Los Angeles River and its tributaries as part of the City of Los Angeles Watershed Monitoring Program. These monitoring points could be used to assess water quality.

Element	Key Findings and Regulatory Provisions
	Ambient Monitoring Points — **Reaches and Tributaries** White Oak Avenue — LA River 6, Aliso Creek, McCoy Creek, Bell Creek Sepulveda Boulevard — LA River 5, Bull Creek Tujunga Avenue — LA River 4, Tujunga Wash Colorado Boulevard — LA River 3, Burbank Western Channel, Verdugo Wash Figueroa Street — LA River 3, Arroyo Seco Washington Boulevard — LA River 2 Rosecrans Avenue — LA River 2, Rio Hondo (gage just above Rio Hondo) Willow Street — LA River 1, Compton Creek (gage at Wardlow) **TMDL Effectiveness Monitoring** The MS4 and Caltrans storm water NPDES permittees in each jurisdictional group are jointly responsible for assessing progress in reducing pollutant loads to achieve the TMDL. Each jurisdictional group is required to submit for approval by the Executive Officer a coordinated monitoring plan that will demonstrate the effectiveness of the phased implementation schedule for this TMDL (See Table 7-13.2), which requires attainment of the applicable waste load allocations in prescribed percentages of each subwatershed over a 22-year period. The monitoring locations specified for the ambient monitoring program may be used as effectiveness monitoring locations. The MS4 and Caltrans storm water NPDES permittees will be found to be effectively meeting dry-weather waste load allocations if the in-stream pollutant concentration or load at the first downstream monitoring location is equal to or less than the corresponding concentration- or load-based waste load allocation. Alternatively, effectiveness of the TMDL may be assessed at the storm drain outlet based on the waste load allocation for the receiving water. For storm drains that discharge to other storm drains, the waste load allocation will be based on the waste load allocation for the ultimate receiving water for that storm drain system. The MS4 and Caltrans storm water NPDES permittees will be found to be effectively meeting wet-weather waste load allocations if the loading at the downstream monitoring location is equal to or less then the wet-weather waste load allocation. The general industrial storm water permit shall contain a model monitoring and reporting program to evaluate BMP effectiveness. A permittee enrolled under the general permit shall have the choice of conducting individual monitoring based on the model program or participating in a group monitoring effort. MS4 permittees are

Element	Key Findings and Regulatory Provisions
	encouraged to take the lead in group monitoring efforts for industrial facilities within their jurisdiction because compliance with waste load allocations by these facilities will in many cases translate to reductions in metals loads to the MS4 system. The Tillman, LA-Glendale, and Burbank POTWs, and the remaining permitted discharges in the watershed will have effluent monitoring requirements to ensure compliance with waste load allocations. **Special Studies** The implementation schedule (see Table 7-13.2) allows time for special studies that may serve to refine the estimate of loading capacity, waste load and/or load allocations, and other studies that may serve to optimize implementation efforts. The Regional Board will re-consider the TMDL by January 11, 2011 in light of the findings of these studies. Studies may include: • Refined flow estimates for the Los Angeles River mainstem and tributaries where there presently are no flow gages and for improved gaging of low-flow conditions. • Water quality measurements, including a better assessment of hardness, water chemistry data (e.g., total suspended solids and organic carbon) that may refine the use of metals partitioning coefficients. • Effects studies designed to evaluate site-specific toxic effects of metals on the Los Angeles River and its tributaries. • Source studies designed to characterize loadings from background or natural sources • Review of water quality modeling assumptions including the relationship between metals and total suspended solids as expressed in the potency factors and buildup and washoff and transport coefficients. • Evaluation of aerial deposition and sources of aerial deposition. • POTWs that are unable to demonstrate compliance with final waste load allocations must conduct source reduction audits by January 11, 2008. • POTWs that will be requesting the Regional Board to extend their implementation schedule to allow for the installation of advanced treatment must prepare work plans, with time schedules to allow for the installation advanced treatment. The work plan must be submitted January 11, 2010.

Table 7-13.2 Los Angeles River and Tributaries Metals TMDL: Implementation Schedule

Date	Action
January 11, 2006	Regional Board permit writers shall incorporate waste load allocations into NPDES permits. Waste load allocations will be implemented through NPDES permit limits in accordance with the implementation schedule contained herein, at the time of permit issuance, renewal, or re-opener.
January 11, 2010	Responsible jurisdictions and agencies shall provide to the Regional Board results of the special studies. POTWs that will be requesting the Regional Board to extend their implementation schedule to allow for the installation of advanced treatment must submit work plans.
January 11, 2011	The Regional Board shall reconsider this TMDL to re-evaluate the waste load allocations and the implementation schedule.
NON-STORM WATER NPDES PERMITS (INCLUDING POTWS, OTHER MAJOR, MINOR, AND GENERAL PERMITS)	
Upon permit issuance, renewal, or re-opener	The non-storm water NPDES permits shall achieve waste load allocations, which shall be expressed as NPDES water quality-based effluent limitations specified in accordance with federal regulations and state policy on water quality control. Compliance schedules may allow up to 5 years in individual NPDES permits to meet permit requirements. Compliance schedules may not be established in general NPDES permits. If a POTW demonstrates that advanced treatment will be required to meet final waste load allocations, the Regional Board will consider extending the implementation schedule to allow the POTW up to January 11, 2016 to achieve compliance with the final WLAs. Permittees that hold individual NPDES permits and solely discharge storm water may be allowed (at Regional Board discretion) compliance schedules up to January 11, 2016 to achieve compliance with final WLAs.
GENERAL INDUSTRIAL STORM WATER PERMITS	
Upon permit issuance, renewal, or re-opener	The general industrial storm water permitees shall achieve dry-weather waste load allocations, which shall be expressed as NPDES water quality-based effluent limitations specified in accordance with federal regulations and state policy on water quality control. Effluent limitations may be expressed as permit conditions, such as the installation, maintenance, and monitoring of Regional Board-approved BMPs. Permittees shall begin to install and test BMPs to meet the interim wet-weather WLAs. BMP effectiveness monitoring will be implemented to determine progress in achieving interim wet-weather waste load allocations.

Date	Action
January 11, 2011	The general industrial storm water permits shall achieve interim wet-weather waste load allocations, which shall be expressed as NPDES water quality-based effluent limitations. Effluent limitations may be expressed as permit conditions, such as the installation, maintenance, and monitoring of Regional Board-approved BMPs. Permittees shall begin an iterative BMP process including BMP effectiveness monitoring to achieve compliance with final waste load allocations.
January 11, 2016	The general industrial storm water permits shall achieve final wet-weather waste load allocations, which shall be expressed as NPDES water quality-based effluent limitations. Effluent limitations may be expressed as permit conditions, such as the installation, maintenance, and monitoring of Regional Board-approved BMPs.
GENERAL CONSTRUCTION STORM WATER PERMITS	
Upon permit issuance, renewal, or re-opener	Non-storm water flows not authorized by Order No. 99-08 DWQ, or any successor order, shall achieve dry-weather waste load allocations of zero. Waste load allocations shall be expressed as NPDES water quality-based effluent limitations specified in accordance with federal regulations and state policy on water quality control. Effluent limitations may be expressed as permit conditions, such as the installation, maintenance, and monitoring of Regional Board-approved BMPs.
January 11, 2013	The construction industry will submit the results of wet-weather BMP effectiveness studies to the Regional Board for consideration. In the event that no effectiveness studies are conducted and no BMPs are approved, permittees shall be subject to site-specific BMPs and monitoring to demonstrate BMP effectiveness.
January 11, 2014	The Regional Board will consider results of the wet-weather BMP effectiveness studies and consider approval of BMPs.
January 11, 2015	All general construction storm water permittees shall implement Regional Board-approved BMPs.
MS4 AND CALTRANS STORM WATER PERMITS	
April 11, 2007	In response to an order issued by the Executive Officer, each jurisdictional group must submit a coordinated monitoring plan, to be approved by the Executive Officer, which includes both TMDL effectiveness monitoring and ambient monitoring. Once the coordinated monitoring plan is approved by the Executive Officer ambient monitoring shall commence within 6 months.

Date	Action
January 11, 2010 (Draft Report) July 11, 2010 (Final Report)	Each jurisdictional group shall provide a written report to the Regional Board outlining the how the subwatersheds within the jurisdictional group will achieve compliance with the waste load allocations. The report shall include implementation methods, an implementation schedule, proposed milestones, and any applicable revisions to the TMDL effectiveness monitoring plan.
January 11, 2012	Each jurisdictional group shall demonstrate that 50% of the group's total drainage area served by the storm drain system is effectively meeting the dry-weather waste load allocations and 25% of the group's total drainage area served by the storm drain system is effectively meeting the wet-weather waste load allocations.
January 11, 2020	Each jurisdictional group shall demonstrate that 75% of the group's total drainage area served by the storm drain system is effectively meeting the dry-weather WLAs.
January 11, 2024	Each jurisdictional group shall demonstrate that 100% of the group's total drainage area served by the storm drain system is effectively meeting the dry-weather WLAs and 50% of the group's total drainage area served by the storm drain system is effectively meeting the wet-weather WLAs.
January 11, 2028	Each jurisdictional group shall demonstrate that 100% of the group's total drainage area served by the storm drain system is effectively meeting both the dry-weather and wet-weather WLAs.

Table 7-13.3 Los Angeles River and Tributaries Metals TMDL: Jurisdictional Groups

Jurisdictional Group	Responsible Jurisdictions & Agencies	Subwatershed(s)
1	Carson County of Los Angeles City of Los Angeles Compton Huntington Park Long Beach Lynwood Signal Hill Southgate Vernon	Los Angeles River Reach 1 and Compton Creek
2	Alhambra Arcadia Bell Bell Gardens Bradbury Carson Commerce Compton County of Los Angeles Cudahy Downey Duarte El Monte Glendale Huntington Park Irwindale La Canada Flintridge Long Beach City of Los Angeles Lynwood Maywood Monrovia Montebello Monterey Park Paramount Pasadena Pico Rivera Rosemead San Gabriel San Marino Sierra Madre South El Monte South Pasadena Southgate Temple City Vernon	Los Angeles River Reach 2, Rio Hondo, Arroyo Seco, and all contributing sub watersheds
3	City of Los Angeles County of Los Angeles Burbank Glendale La Canada Flintridge Pasadena	Los Angeles River Reach 3, Verdugo Wash, Burbank Western Channel
4-5	Burbank Glendale City of Los Angeles County of Los Angeles San Fernando	Los Angeles River Reach 4, Reach 5, Tujunga Wash, and all contributing subwatersheds
6	Calabasas City of Los Angeles County of Los Angeles Hidden Hills	Los Angeles River Reach 6, Bell Creek, and all contributing subwatersheds

Appendix B
Los Angeles River Watershed Metals and Hardness Water Quality Data

City of Los Angeles Status & Trends Monitoring Program Data (2001 - 2008)

Cadmium Dissolved (ug/L)

		Station								
		LAR - REACH 6	LAR - REACH 6	LAR - REACH 4	LAR - REACH 4	LAR - REACH 3	LAR - REACH 3	LAR - REACH 2	LAR - REACH 2	LAR - REACH 1
		LA River at Winnetka Ave.	*LA River at White Oak Ave.*	*LA River at Sepulveda Blvd.*	*LA River at Tujunga Ave.*	*LA River at Colorado Blvd.*	*LA River at Figueroa St.*	*LA River at Washington Blvd.*	*LA River at Rosecrans Ave.*	*LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	2	5	5	4	5	4	6	5	4
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	1
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	0.40	0.18	0.09	0.40	0.43	0.07	0.70	1.10	0.27
	Max	0.90	0.80	0.70	0.80	0.80	0.70	0.70	1.10	0.80
	Mean	0.65	0.46	0.43	0.60	0.62	0.30	0.70	1.10	0.53
	Standard Deviation	0.35	0.31	0.31	0.20	0.26	0.35			0.38
	Coefficient of Variaton	0.54	0.68	0.72	0.33	0.42	1.18			0.71
	Numeric Target (ug/L)	3	3	3	3	3	3	3	3	3
	Number of Exceedences	0	0	0	0	0	0	0	0	0
Dry Weather	Number of Samples	39	83	83	75	94	83	83	83	83
	Number of Samples with ND	13	56	52	56	65	61	61	57	58
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	3	1	6	2	3	1	3	2	2
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	0.15	0.18	0.10	0.09	0.08	0.10	0.1	0.08	0.09
	Max	2.12	1.63	2.12	1.95	1.08	1.20	1.29	1.60	1.38
	Mean	0.60	0.59	0.60	0.59	0.48	0.47	0.46	0.51	0.41
	Standard Deviation	0.43	0.41	0.54	0.50	0.26	0.23	0.29	0.37	0.29
	Coefficient of Variaton	0.71	0.69	0.89	0.85	0.54	0.50	0.63	0.73	0.71
	Numeric Target (ug/L)									
	Number of Exceedences									

Cadmium Dissolved (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	4	4
	Number of Samples with ND	3	1	2	3	3	3	3	3	3
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	1
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	0.30	0.30	0.30		0.30				
	Max	0.30	0.50	0.30		0.30				
	Mean	0.30	0.40	0.30		0.30				
	Standard Deviation		0.10	0.00						
	Coefficient of Variaton		0.25	0.00						
	Numeric Target (ug/L)	3	3	3	3	3	3	3	3	3
	Number of Exceedences	0	0	0	0	0	0	0	0	0
Dry Weather	Number of Samples	39	39	39	35	50	39	39	35	39
	Number of Samples with ND	22	21	28	20	25	30	27	14	26
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	1	1	1	1	0	0	2	1
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	0.13	0.01	0.01	0.30	0.18	0.04	0.07	0.16	0.11
	Max	1.80	1.36	1.53	1.69	2.00	0.76	0.94	1.00	0.94
	Mean	0.57	0.52	0.70	0.64	0.56	0.42	0.48	0.57	0.47
	Standard Deviation	0.39	0.38	0.55	0.42	0.38	0.21	0.24	0.23	0.21
	Coefficient of Variaton	0.69	0.73	0.79	0.66	0.68	0.51	0.50	0.40	0.45
	Numeric Target (ug/L)									
	Number of Exceedences									

Note:

Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Cadmium Total (ug/L)

		Station								
		LAR - REACH 6 *LA River at Winnetka Ave.*	LAR - REACH 6 *LA River at White Oak Ave.*	LAR - REACH 4 *LA River at Sepulveda Blvd.*	LAR - REACH 4 *LA River at Tujunga Ave.*	LAR - REACH 3 *LA River at Colorado Blvd.*	LAR - REACH 3 *LA River at Figueroa St.*	LAR - REACH 2 *LA River at Washington Blvd.*	LAR - REACH 2 *LA River at Rosecrans Ave.*	LAR - REACH 1 *LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	1	1	2	2	4	3	4	2	2
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	1
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	0.11	0.11	0.60	0.08	0.10	0.21	0.45	0.20	0.23
	Max	1.20	5.00	5.30	4.20	0.80	4.90	5.00	4.40	4.80
	Mean	0.80	1.45	1.77	1.44	0.47	1.61	2.08	1.54	1.59
	Standard Deviation	0.60	1.74	1.77	1.61	0.35	2.20	2.53	1.95	2.15
	Coefficient of Variaton	0.75	1.20	1.00	1.12	0.75	1.36	1.22	1.27	1.36
	Numeric Target (ug/L)	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	Number of Exceedences	0	1	1	1	0	1	1	1	1
Dry Weather	Number of Samples	39	83	83	75	94	83	83	83	83
	Number of Samples with ND	10	44	48	47	54	55	59	54	48
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	4	4	4	3	5	4	3	3	3
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	0.15	0.00	0.00	0.00	0.00	0.00	0.002	0.00	0.00
	Max	4.66	3.60	2.21	2.95	4.56	1.65	2.17	2.34	1.60
	Mean	1.02	0.68	0.67	0.68	0.60	0.53	0.57	0.53	0.43
	Standard Deviation	0.95	0.70	0.53	0.61	0.75	0.44	0.50	0.54	0.34
	Coefficient of Variaton	0.93	1.03	0.80	0.88	1.25	0.83	0.88	1.02	0.81
	Numeric Target (ug/L)									
	Number of Exceedences									

Cadmium Total (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	4	4
	Number of Samples with ND	3	1	0	3	2	2	2	2	2
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	1
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	0.41	0.40	0.30		0.25	0.13	0.04	0.02	0.09
	Max	0.41	1.00	2.59		0.40	0.13	0.04	0.02	0.09
	Mean	0.41	0.67	0.95		0.32	0.13	0.04	0.02	0.09
	Standard Deviation		0.31	1.10		0.11				
	Coefficient of Variaton		0.46	1.17		0.34				
	Numeric Target (ug/L)	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	Number of Exceedences	0	0	0	0	0	0	0	0	0
Dry Weather	Number of Samples	39	39	39	35	50	39	39	35	39
	Number of Samples with ND	14	18	18	13	22	26	21	11	20
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	3	1	3	1	2	2	2	4	3
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	0.13	0.01	0.01	0.30	0.12	0.16	0.30	0.28	0.30
	Max	2.19	24.90	1.42	10.60	1.90	1.42	1.34	1.51	0.95
	Mean	0.70	2.36	0.61	1.28	0.57	0.53	0.58	0.69	0.46
	Standard Deviation	0.45	5.55	0.43	2.27	0.37	0.34	0.29	0.31	0.19
	Coefficient of Variaton	0.64	2.35	0.70	1.77	0.65	0.63	0.50	0.45	0.41
	Numeric Target (ug/L)									
	Number of Exceedences									

Note:

Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Copper Dissolved (ug/L)

		Station								
		LAR - REACH 6	LAR - REACH 6	LAR - REACH 4	LAR - REACH 4	LAR - REACH 3	LAR - REACH 3	LAR - REACH 2	LAR - REACH 2	LAR - REACH 1
		LA River at Winnetka Ave.	*LA River at White Oak Ave.*	*LA River at Sepulveda Blvd.*	*LA River at Tujunga Ave.*	*LA River at Colorado Blvd.*	*LA River at Figueroa St.*	*LA River at Washington Blvd.*	*LA River at Rosecrans Ave.*	*LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	0	1	1	1	1	1	1	1	1
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	4.00	4.00	7.19	6.00	5.00	7.00	5.00	7.00	7.00
	Max	13.40	18.00	25.60	49.90	43.70	18.00	16.60	26.00	12.10
	Mean	8.35	10.06	13.74	18.93	15.81	10.82	11.02	12.34	9.35
	Standard Deviation	4.19	5.72	6.27	15.64	13.19	3.94	4.27	6.93	2.36
	Coefficient of Variaton	0.50	0.57	0.46	0.83	0.83	0.36	0.39	0.56	0.25
	Numeric Target (ug/L)	11	11	11	11	11	11	11	11	11
	Number of Exceedences	1	3	4	5	4	3	4	2	2
Dry Weather	Number of Samples	39	83	83	75	94	83	83	83	83
	Number of Samples with ND	4	12	6	10	7	9	11	10	11
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	1	0	0	0	0	1	3	0	1
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	4.00	1.70	2.00	6.00	3.60	4.00	4	4.00	4.70
	Max	18.00	57.00	35.00	32.60	30.00	23.00	23	25.00	20.00
	Mean	8.68	10.87	15.98	14.14	12.95	11.67	11.66	11.67	10.76
	Standard Deviation	3.23	8.14	6.58	4.38	4.77	4.18	4.05	4.50	3.20
	Coefficient of Variaton	0.37	0.75	0.41	0.31	0.37	0.36	0.35	0.39	0.30
	Numeric Target (ug/L)	29	29	19	19	22	21	21	21	22
	Number of Exceedences	0	2	23	5	5	1	1	2	0

Copper Dissolved (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	4	4
	Number of Samples with ND	0	0	0	0	0	0	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	8.00	5.00	4.00	4.00	12.00	5.00	3.57	6.00	8.00
	Max	10.10	12.40	17.00	6.00	40.00	8.00	8.00	12.90	11.80
	Mean	9.28	7.85	8.70	5.33	21.84	6.51	5.96	8.99	9.66
	Standard Deviation	0.98	3.57	5.70	1.15	11.64	1.31	1.95	3.50	1.65
	Coefficient of Variaton	0.11	0.45	0.66	0.22	0.53	0.20	0.33	0.39	0.17
	Numeric Target (ug/L)	11	11	11	11	11	11	11	11	11
	Number of Exceedences	0	1	1	0	5	0	0	1	1
Dry Weather	Number of Samples	39	39	39	35	50	39	39	35	39
	Number of Samples with ND	2	2	2	2	0	6	5	0	4
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	2	1	2	0	1	0	0	1	1
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	5.00	3.00	5.00	6.00	10.00	2.96	2.00	8.00	3.00
	Max	24.00	17.00	21.00	49.00	57.00	23.00	17.00	68.90	19.00
	Mean	13.64	8.79	11.43	22.92	29.41	9.03	6.15	22.13	8.05
	Standard Deviation	4.95	3.30	4.09	10.59	10.70	3.82	3.62	13.53	4.79
	Coefficient of Variaton	0.36	0.38	0.36	0.46	0.36	0.42	0.59	0.61	0.59
	Numeric Target (ug/L)				19	18	22	21	12	18
	Number of Exceedences				18	43	1	0	28	2

Note:

Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Copper Total (ug/L)

		Station								
		LAR - REACH 6	LAR - REACH 6	LAR - REACH 4	LAR - REACH 4	LAR - REACH 3	LAR - REACH 3	LAR - REACH 2	LAR - REACH 2	LAR - REACH 1
		LA River at Winnetka Ave.	*LA River at White Oak Ave.*	*LA River at Sepulveda Blvd.*	*LA River at Tujunga Ave.*	*LA River at Colorado Blvd.*	*LA River at Figueroa St.*	*LA River at Washington Blvd.*	*LA River at Rosecrans Ave.*	*LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	0	1	0	1	1	1	0	1	1
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	7.00	4.00	16.90	18.00	6.00	12.00	10.00	9.00	10.00
	Max	29.00	39.90	48.70	112.00	78.40	63.00	66.00	72.00	86.00
	Mean	14.00	22.59	31.04	42.72	24.83	28.27	25.13	29.62	28.52
	Standard Deviation	10.10	13.51	11.00	37.85	24.62	17.70	20.30	24.43	28.54
	Coefficient of Variaton	0.72	0.60	0.35	0.89	0.99	0.63	0.81	0.82	1.00
	Numeric Target (ug/L)	17	17	17	17	17	17	17	17	17
	Number of Exceedences	1	4	7	6	4	5	4	3	3
Dry Weather	Number of Samples	39	83	83	75	94	83	83	83	83
	Number of Samples with ND	1	6	3	5	3	7	9	7	9
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	1	0	0	0	0	0	1	0	0
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	4.00	1.70	4.00	8.00	5.00	4.00	4	4.00	5.10
	Max	126.00	61.00	49.00	82.00	38.00	26.00	39	32.00	27.20
	Mean	16.35	15.63	21.43	21.47	16.96	14.66	15.06	14.48	13.67
	Standard Deviation	19.98	10.70	7.60	12.44	5.90	4.96	6.12	5.74	4.30
	Coefficient of Variaton	1.22	0.68	0.35	0.58	0.35	0.34	0.41	0.40	0.31
	Numeric Target (ug/L)	30	30	26	26	23	26	22	22	23
	Number of Exceedences	3	6	15	14	14	0	9	7	3

Copper Total (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	4	4
	Number of Samples with ND	0	0	0	0	0	0	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	7.00	6.00	5.00	4.00	15.00	7.85	4.33	7.33	13.00
	Max	27.10	15.60	77.60	10.00	44.00	12.80	15.00	18.10	21.10
	Mean	14.28	9.40	26.40	7.33	25.86	10.41	9.85	12.11	17.18
	Standard Deviation	8.89	4.54	34.33	3.06	11.63	2.06	4.65	4.62	3.48
	Coefficient of Variaton	0.62	0.48	1.30	0.42	0.45	0.20	0.47	0.38	0.20
	Numeric Target (ug/L)	17	17	17	17	17	17	17	17	17
	Number of Exceedences	1	0	1	0	3	0	0	1	2
Dry Weather	Number of Samples	39	39	39	35	50	39	39	35	39
	Number of Samples with ND	0	1	1	1	0	1	1	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	4.00	4.00	6.00	9.00	4.00	4.00	2.00	11.00	4.00
	Max	99.00	1120.00	38.00	207.00	177.00	108.00	29.00	85.50	28.00
	Mean	23.57	54.63	15.61	38.26	36.05	14.41	9.01	29.48	11.20
	Standard Deviation	17.92	189.00	7.66	36.92	24.24	16.40	5.50	16.61	6.30
	Coefficient of Variaton	0.76	3.46	0.49	0.96	0.67	1.14	0.61	0.56	0.56
	Numeric Target (ug/L)				20	19	23	22	13	19
	Number of Exceedences				23	43	1	1	33	6

Note:
Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Lead Dissolved (ug/L)

		Station								
		LAR - REACH 6	LAR - REACH 6	LAR - REACH 4	LAR - REACH 4	LAR - REACH 3	LAR - REACH 3	LAR - REACH 2	LAR - REACH 2	LAR - REACH 1
		LA River at Winnetka Ave.	*LA River at White Oak Ave.*	*LA River at Sepulveda Blvd.*	*LA River at Tujunga Ave.*	*LA River at Colorado Blvd.*	*LA River at Figueroa St.*	*LA River at Washington Blvd.*	*LA River at Rosecrans Ave.*	*LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	3	5	5	6	5	5	5	4	3
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	1
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	0.96	1.00	1.00	8.30	6.51	0.67	0.63	0.49	1.73
	Max	0.96	7.20	8.00	8.30	11.00	12.00	14.00	16.00	12.00
	Mean	0.96	3.09	3.51	8.30	8.76	6.34	7.32	8.25	5.58
	Standard Deviation		3.56	3.90		3.17	8.01	9.45	10.97	5.60
	Coefficient of Variaton		1.15	1.11		0.36	1.26	1.29	1.33	1.00
	Numeric Target (ug/L)	51	51	51	51	51	51	51	51	51
	Number of Exceedences	0	0	0	0	0	0	0	0	0
Dry Weather	Number of Samples	39	83	83	75	94	83	83	83	83
	Number of Samples with ND	18	58	47	46	51	47	51	52	50
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	7	9	9	6	8	7	6	7	6
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	0.44	0.52	0.94	1.00	0.61	0.84	0.67	0.52	0.88
	Max	8.80	6.00	18.00	24.00	36.00	16.20	31	8.00	17.00
	Mean	2.34	2.30	3.86	4.67	3.85	3.53	3.84	2.59	3.99
	Standard Deviation	2.39	1.82	4.70	5.85	6.50	3.99	5.94	2.12	4.29
	Coefficient of Variaton	1.02	0.79	1.21	1.25	1.69	1.13	1.55	0.82	1.07
	Numeric Target (ug/L)	11	11	6.6	6.6	7.6	7.5	7.3	7.3	7.6
	Number of Exceedences	0	0	3	5	4	3	2	2	4

Lead Dissolved (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	4	4
	Number of Samples with ND	3	3	1	3	3	2	2	2	1
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	1
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	1.02	0.89	1.00		0.96	0.64	0.44	1.94	1.00
	Max	1.02	0.89	1.71		0.96	0.64	0.44	1.94	1.57
	Mean	1.02	0.89	1.24		0.96	0.64	0.44	1.94	1.29
	Standard Deviation			0.41						0.40
	Coefficient of Variaton			0.33						0.31
	Numeric Target (ug/L)	51	51	51	51	51	51	51	51	51
	Number of Exceedences	0	0	0	0	0	0	0	0	0
Dry Weather	Number of Samples	39	39	39	35	50	39	39	35	39
	Number of Samples with ND	17	18	20	10	16	20	19	10	2
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	7	6	8	6	7	7	4	3	4
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	0.77	0.39	1.00	1.00	0.98	0.53	0.29	1.00	1.00
	Max	10.40	9.80	8.10	8.40	5.00	3.70	8.20	15.20	7.00
	Mean	2.99	2.90	3.37	3.02	2.35	1.51	2.65	3.76	2.99
	Standard Deviation	3.00	2.57	2.57	2.17	1.25	0.88	2.38	4.24	1.62
	Coefficient of Variaton	1.00	0.88	0.76	0.72	0.53	0.58	0.90	1.13	0.54
	Numeric Target (ug/L)				6.6	6.1	7.6	7.3	3.7	6
	Number of Exceedences				2	0	0	2	4	2

Note:

Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Lead Total (ug/L)

		Station								
		LAR - REACH 6 *LA River at Winnetka Ave.*	LAR - REACH 6 *LA River at White Oak Ave.*	LAR - REACH 4 *LA River at Sepulveda Blvd.*	LAR - REACH 4 *LA River at Tujunga Ave.*	LAR - REACH 3 *LA River at Colorado Blvd.*	LAR - REACH 3 *LA River at Figueroa St.*	LAR - REACH 2 *LA River at Washington Blvd.*	LAR - REACH 2 *LA River at Rosecrans Ave.*	LAR - REACH 1 *LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	3	3	3	3	3	2	2	1	2
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	0
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	5.60	3.00	5.10	8.00	5.60	8.86	10.20	2.00	2.90
	Max	5.60	10.60	15.40	20.00	23.60	20.60	22.00	34.00	46.00
	Mean	5.60	6.97	9.76	13.68	12.58	14.97	15.76	15.46	15.28
	Standard Deviation	#DIV/0!	3.02	3.73	5.88	7.72	5.62	5.18	11.87	17.80
	Coefficient of Variaton	#DIV/0!	0.43	0.38	0.43	0.61	0.38	0.33	0.77	1.16
	Numeric Target (ug/L)	62	62	62	62	62	62	62	62	62
	Number of Exceedences	0	0	0	0	0	0	0	0	0
Dry Weather	Number of Samples	39	83	83	75	94	83	83	83	83
	Number of Samples with ND	11	44	35	36	42	37	37	43	37
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	4	3	5	2	6	6	5	6	5
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	0.37	0.76	1.00	1.00	1.00	1.00	1	1.00	1.00
	Max	26.00	39.00	24.20	38.00	114.00	24.00	40	57.10	37.00
	Mean	5.05	5.98	5.76	8.78	8.65	6.03	5.58	6.38	5.54
	Standard Deviation	6.66	7.14	5.76	8.90	18.76	6.27	7.31	10.05	7.25
	Coefficient of Variaton	1.32	1.19	1.00	1.01	2.17	1.04	1.31	1.58	1.31
	Numeric Target (ug/L)	19	19	10	10	12	12	11	11	12
	Number of Exceedences	2	1	8	11	7	5	4	6	5

Lead Total (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	4	4
	Number of Samples with ND	3	2	3	1	0	0	0	1	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	0
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	7.69	1.00	25.70	2.00	2.00	2.00	1.00	2.00	3.00
	Max	7.69	2.02	25.70	2.00	2.85	5.50	5.88	9.77	14.80
	Mean	7.69	1.51	25.70	2.00	2.21	3.83	2.96	5.89	8.85
	Standard Deviation		0.72		0.00	0.43	1.76	2.58	5.49	5.73
	Coefficient of Variaton		0.48		0.00	0.19	0.46	0.87	0.93	0.65
	Numeric Target (ug/L)	62	62	62	62	62	62	62	62	62
	Number of Exceedences	0	0	0	0	0	0	0	0	0
Dry Weather	Number of Samples	39	39	39	35	50	39	39	35	39
	Number of Samples with ND	16	12	9	5	13	12	11	3	1
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	6	6	4	5	5	4	2	0	2
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	1.00	0.42	0.98	1.00	1.00	0.82	1.00	1.00	1.70
	Max	19.60	162.00	26.00	144.00	55.00	23.30	32.80	38.50	21.90
	Mean	6.24	15.87	5.07	16.68	5.77	4.00	8.44	7.27	6.40
	Standard Deviation	5.08	37.38	5.61	33.26	10.27	4.62	8.66	7.28	3.83
	Coefficient of Variaton	0.81	2.36	1.11	1.99	1.78	1.16	1.03	1.00	0.60
	Numeric Target (ug/L)				10	9.1	12	11	5	8.9
	Number of Exceedences				5	5	1	8	17	5

Note:

Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Selenium Dissolved (ug/L)

	Station	LAR - REACH 6 *LA River at Winnetka Ave.*	LAR - REACH 6 *LA River at White Oak Ave.*	LAR - REACH 4 *LA River at Sepulveda Blvd.*	LAR - REACH 4 *LA River at Tujunga Ave.*	LAR - REACH 3 *LA River at Colorado Blvd.*	LAR - REACH 3 *LA River at Figueroa St.*	LAR - REACH 2 *LA River at Washington Blvd.*	LAR - REACH 2 *LA River at Rosecrans Ave.*	LAR - REACH 1 *LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	0	2	2	2	2	2	2	1	1
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	1	1	1	1
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	1.60	0.70	0.40	0.60	0.40	0.50	0.30	0.20	0.20
	Max	22.20	15.30	8.30	3.00	2.70	3.10	3.20	1.30	1.20
	Mean	8.83	5.63	2.60	1.38	1.50	1.28	1.30	0.68	0.70
	Standard Deviation	9.28	5.27	3.10	0.99	0.93	1.04	1.12	0.43	0.40
	Coefficient of Variaton	1.05	0.94	1.19	0.71	0.62	0.81	0.86	0.64	0.57
	Numeric Target (ug/L)									
	Number of Exceedences									
Dry Weather	Number of Samples	39	83	83	75	94	82	83	83	83
	Number of Samples with ND	0	6	10	4	4	4	4	4	5
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	1	2	1	0	0	0	0	0
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	2.60	0.30	0.20	0.33	0.30	0.40	0.3	0.20	0.40
	Max	14.60	12.90	5.10	6.40	5.00	4.74	4.19	4.14	4.03
	Mean	7.35	7.52	1.18	1.75	1.69	1.51	1.51	1.43	1.38
	Standard Deviation	2.76	2.41	0.99	0.97	0.92	0.75	0.69	0.67	0.68
	Coefficient of Variaton	0.38	0.32	0.84	0.56	0.55	0.50	0.46	0.47	0.50
	Numeric Target (ug/L)	5	5							
	Number of Exceedences	31	68							

Selenium Dissolved (ug/L)

	Station	*Aliso Canyon Wash at Wilbur Ave.*	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	3	4
	Number of Samples with ND	0	0	0	0	0	0	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	1
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	0.50	1.20	0.70	0.10	0.30	0.20	0.40	0.20	0.10
	Max	18.20	10.70	7.10	0.30	0.60	0.30	1.00	0.30	0.70
	Mean	9.23	5.23	3.53	0.20	0.43	0.27	0.67	0.25	0.37
	Standard Deviation	8.51	4.18	2.97	0.10	0.15	0.06	0.31	0.07	0.31
	Coefficient of Variaton	0.92	0.80	0.84	0.50	0.35	0.22	0.46	0.28	0.83
	Numeric Target (ug/L)									
	Number of Exceedences									
Dry Weather	Number of Samples	39	39	39	34	50	39	39	35	39
	Number of Samples with ND	0	0	0	1	0	2	0	1	2
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	4	5	6	6	5	0	6
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	1.80	1.00	0.30	0.10	0.20	0.20	0.40	0.20	0.20
	Max	7.80	7.40	2.80	0.50	9.00	0.70	2.40	1.90	1.10
	Mean	4.09	2.59	1.27	0.28	0.70	0.42	0.79	1.01	0.38
	Standard Deviation	1.43	1.49	0.60	0.10	1.37	0.15	0.36	0.46	0.17
	Coefficient of Variaton	0.35	0.57	0.47	0.34	1.95	0.35	0.46	0.45	0.46
	Numeric Target (ug/L)									
	Number of Exceedences									

Note:

Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Selenium Total (ug/L)

		Station								
		LAR - REACH 6	LAR - REACH 6	LAR - REACH 4	LAR - REACH 4	LAR - REACH 3	LAR - REACH 3	LAR - REACH 2	LAR - REACH 2	LAR - REACH 1
		LA River at Winnetka Ave.	***LA River at White Oak Ave.***	***LA River at Sepulveda Blvd.***	***LA River at Tujunga Ave.***	***LA River at Colorado Blvd.***	***LA River at Figueroa St.***	***LA River at Washington Blvd.***	***LA River at Rosecrans Ave.***	***LA River at Willow St.***
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	0	2	2	2	2	2	2	1	1
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	1	0	0
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	2.00	0.90	0.50	0.70	1.00	1.00	0.50	0.40	0.20
	Max	23.70	20.80	9.80	3.20	9.00	3.40	3.20	1.50	3.20
	Mean	10.23	6.70	3.23	1.64	3.12	1.45	1.42	0.97	1.23
	Standard Deviation	9.86	7.27	3.53	0.93	2.96	0.96	1.04	0.41	1.06
	Coefficient of Variaton	0.96	1.08	1.09	0.57	0.95	0.66	0.73	0.43	0.86
	Numeric Target (ug/L)	5	5	5	5	5	5	5	5	5
	Number of Exceedences	2	4	1	0	1	0	0	0	0
Dry Weather	Number of Samples	39	83	83	75	94	82	83	83	83
	Number of Samples with ND	0	6	8	4	4	4	4	4	4
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	1	1	1	0	0	0	0	0
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	2.50	0.30	0.30	0.36	0.30	0.40	0.40	0.20	0.20
	Max	15.20	18.60	5.90	7.10	5.76	4.66	4.42	4.45	4.20
	Mean	7.99	8.09	1.30	1.91	1.80	1.62	1.62	1.57	1.53
	Standard Deviation	3.12	2.62	1.15	1.06	1.00	0.76	0.71	0.75	0.72
	Coefficient of Variaton	0.39	0.32	0.89	0.55	0.56	0.47	0.44	0.48	0.47
	Numeric Target (ug/L)	5	5							
	Number of Exceedences	33	71							

Selenium Total (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	***Caballero Creek***	***Bull Creek at Victory Blvd.***	***Tujunga Wash at Moorpark St.***	***Burbank Western Channel at Riverside Dr.***	***Verdugo Wash at Fairmont Ave.***	***Arroyo Seco at San Fernando Rd.***	***Rio Hondo at Garfield Ave.***	***Compton Creek at Del Amo Blvd.***
Wet Weather	Number of Samples	4	4	4	3	5	4	4	3	4
	Number of Samples with ND	0	0	0	0	0	0	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	1	1	1	1	1
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	0.80	1.30	1.60	0.10	0.30	0.20	0.40	0.20	0.10
	Max	21.30	12.40	7.90	0.30	1.20	0.40	1.00	0.30	0.80
	Mean	9.80	5.80	4.28	0.20	0.58	0.30	0.70	0.25	0.43
	Standard Deviation	9.48	4.93	2.90	0.10	0.43	0.10	0.30	0.07	0.35
	Coefficient of Variaton	0.97	0.85	0.68	0.50	0.74	0.33	0.43	0.28	0.81
	Numeric Target (ug/L)	5	5	5	5	5	5	5	5	5
	Number of Exceedences	2	2	2	0	0	0	0	0	0
Dry Weather	Number of Samples	39	39	39	34	50	39	39	35	39
	Number of Samples with ND	0	0	0	0	0	1	0	1	2
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	4	5	6	6	4	0	6
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	1.90	1.10	0.30	0.10	0.20	0.20	0.30	0.20	0.20
	Max	8.00	9.60	3.00	2.40	9.90	0.80	2.20	2.00	1.10
	Mean	4.47	3.25	1.37	0.39	0.73	0.42	0.85	1.12	0.42
	Standard Deviation	1.51	2.11	0.64	0.42	1.51	0.16	0.36	0.49	0.18
	Coefficient of Variaton	0.34	0.65	0.47	1.10	2.08	0.37	0.42	0.43	0.44
	Numeric Target (ug/L)									
	Number of Exceedences									

Note:

Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Zinc Dissolved (ug/L)

		Station								
		LAR - REACH 6	LAR - REACH 6	LAR - REACH 4	LAR - REACH 4	LAR - REACH 3	LAR - REACH 3	LAR - REACH 2	LAR - REACH 2	LAR - REACH 1
		LA River at Winnetka Ave.	*LA River at White Oak Ave.*	*LA River at Sepulveda Blvd.*	*LA River at Tujunga Ave.*	*LA River at Colorado Blvd.*	*LA River at Figueroa St.*	*LA River at Washington Blvd.*	*LA River at Rosecrans Ave.*	*LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	1	0	0	0	0	1	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	6.00	4.00	5.00	4.00	10.00	11.00	4.00	4.00	4.00
	Max	40.40	99.00	117.00	104.00	131.00	136.00	142.00	249.00	184.00
	Mean	18.13	26.05	40.54	38.87	50.35	43.60	38.64	55.10	46.23
	Standard Deviation	19.31	32.09	34.15	33.55	47.94	42.52	43.41	86.75	62.36
	Coefficient of Variaton	1.06	1.23	0.84	0.86	0.95	0.98	1.12	1.57	1.35
	Numeric Target (ug/L)	97	97	97	97	97	97	97	97	97
	Number of Exceedences	0	1	1	1	2	1	1	1	1
Dry Weather	Number of Samples	39	83	83	75	94	83	83	83	83
	Number of Samples with ND	0	7	2	2	2	2	2	2	2
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	1	0	2	1	0	2	2	0	1
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	4.00	0.40	27.00	14.00	4.40	13.50	17.00	12.00	10.30
	Max	43.00	163.00	116.00	135.00	80.90	79.00	58.80	74.50	58.00
	Mean	12.48	16.35	55.18	45.35	42.26	41.84	37.70	37.51	34.63
	Standard Deviation	7.40	20.93	15.66	17.19	12.99	10.45	8.20	11.31	11.37
	Coefficient of Variaton	0.59	1.28	0.28	0.38	0.31	0.25	0.22	0.30	0.33
	Numeric Target (ug/L)									
	Number of Exceedences									

Zinc Dissolved (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	4	4
	Number of Samples with ND	0	0	1	2	0	0	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	5.00	6.00	6.00	4.00	51.00	5.00	5.00	4.00	19.00
	Max	32.80	28.70	25.80	4.00	91.40	12.40	20.40	34.70	66.90
	Mean	12.95	13.18	14.93	4.00	61.86	9.03	10.93	18.40	46.73
	Standard Deviation	13.29	10.48	10.04		16.96	3.24	6.65	15.20	23.27
	Coefficient of Variaton	1.03	0.80	0.67		0.27	0.36	0.61	0.83	0.50
	Numeric Target (ug/L)	97	97	97	97	97	97	97	97	97
	Number of Exceedences	0	0	0	0	0	0	0	0	0
Dry Weather	Number of Samples	39	39	39	35	50	39	39	35	39
	Number of Samples with ND	0	5	3	0	0	0	3	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	3	3	1	0	0	2	1	1
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	5.00	4.00	2.00	4.00	20.00	4.00	4.00	8.00	10.00
	Max	42.00	16.40	19.00	63.00	143.00	26.00	16.10	259.00	110.00
	Mean	11.75	8.11	7.75	18.33	72.81	8.82	7.89	36.21	25.34
	Standard Deviation	6.73	3.68	3.87	11.90	15.60	5.05	3.30	44.03	18.55
	Coefficient of Variaton	0.57	0.45	0.50	0.65	0.21	0.57	0.42	1.22	0.73
	Numeric Target (ug/L)								128	
	Number of Exceedences								1	

Note:
Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Zinc Total (ug/L)

		Station								
		LAR - REACH 6	LAR - REACH 6	LAR - REACH 4	LAR - REACH 4	LAR - REACH 3	LAR - REACH 3	LAR - REACH 2	LAR - REACH 2	LAR - REACH 1
		LA River at Winnetka Ave.	*LA River at White Oak Ave.*	*LA River at Sepulveda Blvd.*	*LA River at Tujunga Ave.*	*LA River at Colorado Blvd.*	*LA River at Figueroa St.*	*LA River at Washington Blvd.*	*LA River at Rosecrans Ave.*	*LA River at Willow St.*
Wet Weather	Number of Samples	4	8	8	7	8	8	8	7	7
	Number of Samples with ND	0	0	0	0	0	0	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	2/28/2001	2/28/2001
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	20.00	11.00	57.00	44.80	15.00	16.00	21.00	19.00	12.00
	Max	96.60	120.00	177.00	209.00	272.00	153.00	146.00	255.00	184.00
	Mean	41.90	57.15	101.09	93.77	92.63	90.30	94.21	104.80	88.76
	Standard Deviation	36.58	48.06	41.08	59.65	87.51	50.60	51.24	80.92	65.68
	Coefficient of Variaton	0.87	0.84	0.41	0.64	0.94	0.56	0.54	0.77	0.74
	Numeric Target (ug/L)	159	159	159	159	159	159	159	159	159
	Number of Exceedences	0	0	1	1	1	0	0	2	2
Dry Weather	Number of Samples	39	83	83	75	94	83	83	83	83
	Number of Samples with ND	0	7	2	2	2	2	2	2	2
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	2/15/2005	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001	3/20/2001
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	8.00	5.00	14.40	32.00	19.00	21.00	26.00	25.00	20.00
	Max	248.00	190.00	158.00	220.00	91.80	158.00	95.00	97.00	143.00
	Mean	38.13	30.40	69.40	64.62	51.59	53.03	50.48	48.17	51.35
	Standard Deviation	42.16	25.62	22.60	31.77	13.84	18.39	13.82	12.30	17.78
	Coefficient of Variaton	1.11	0.84	0.33	0.49	0.27	0.35	0.27	0.26	0.35
	Numeric Target (ug/L)									
	Number of Exceedences									

Zinc Total (ug/L)

		Station								
		Aliso Canyon Wash at Wilbur Ave.	*Caballero Creek*	*Bull Creek at Victory Blvd.*	*Tujunga Wash at Moorpark St.*	*Burbank Western Channel at Riverside Dr.*	*Verdugo Wash at Fairmont Ave.*	*Arroyo Seco at San Fernando Rd.*	*Rio Hondo at Garfield Ave.*	*Compton Creek at Del Amo Blvd.*
Wet Weather	Number of Samples	4	4	4	3	5	4	4	4	4
	Number of Samples with ND	0	0	0	0	0	0	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
	Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
	Date to	12/18/2007	12/18/2007	12/18/2007	3/21/2006	1/23/2008	1/23/2008	1/23/2008	1/23/2008	1/23/2008
	Min	12.00	11.00	16.00	5.00	55.00	21.20	7.00	8.00	39.00
	Max	105.00	36.10	298.00	26.00	127.00	53.90	46.20	65.40	143.00
	Mean	37.50	20.53	89.50	14.67	86.80	32.53	25.58	44.58	87.00
	Standard Deviation	45.05	11.43	139.03	10.60	28.04	14.56	16.09	25.88	46.33
	Coefficient of Variaton	1.20	0.56	1.55	0.72	0.32	0.45	0.63	0.58	0.53
	Numeric Target (ug/L)	159	159	159	159	159	159	159	159	159
	Number of Exceedences	0	0	1	0	0	0	0	0	0
Dry Weather	Number of Samples	39	39	39	35	50	39	39	35	39
	Number of Samples with ND	0	0	0	0	0	0	0	0	0
	Number of Zeros	0	0	0	0	0	0	0	0	0
	Number of AE, NA and DNQ	0	0	0	0	0	0	1	0	0
	Date From	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005	2/15/2005
	Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
	Min	6.51	5.00	6.00	11.00	14.00	5.00	7.00	13.00	6.66
	Max	159.00	2280.00	77.00	739.00	738.00	318.00	351.00	348.00	149.00
	Mean	41.37	104.99	26.02	80.78	101.14	33.81	37.28	64.37	43.71
	Standard Deviation	38.73	387.01	17.93	132.91	94.84	51.86	58.58	59.47	29.55
	Coefficient of Variaton	0.94	3.69	0.69	1.65	0.94	1.53	1.57	0.92	0.68
	Numeric Target (ug/L)								131	
	Number of Exceedences								3	

Note:
Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Hardness (mg/L)

Station	LAR - REACH 6	LAR - REACH 6	LAR - REACH 4	LAR - REACH 4	LAR - REACH 3	LAR - REACH 3	LAR - REACH 2	LAR - REACH 2	LAR - REACH 1
	LA River at Winnetka Ave.	***LA River at White Oak Ave.***	***LA River at Sepulveda Blvd.***	***LA River at Tujunga Ave.***	***LA River at Colorado Blvd.***	***LA River at Figueroa St.***	***LA River at Washington Blvd.***	***LA River at Rosecrans Ave.***	***LA River at Willow St.***
Number of Samples	43	91	91	82	102	91	91	91	91
Number of Samples with ND	0	0	0	0	0	0	0	0	0
Number of Zeros	0	0	0	0	0	0	0	0	0
Number of AE, NA and DNQ	0	36	36	36	36	36	36	36	36
Date From	1/18/2005	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001	1/24/2001
Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
Min	185.00	126.00	98.90	68.80	141.00	83.30	84.90	0.00	70.50
Max	1220.00	1010.00	465.00	512.00	448.00	443.00	446.00	456.00	434.00
Mean	762.37	693.87	223.74	247.19	287.24	263.30	269.23	261.35	256.90
Median	777.00	720.00	209.00	244.50	288.00	262.00	265.00	260.00	257.00
Standard Deviation	190.64	170.29	79.72	69.44	64.51	61.80	58.90	60.26	62.35
Coefficient of Variaton	0.25	0.25	0.36	0.28	0.22	0.23	0.22	0.23	0.24
Number of Exceedences of Numeric Target (NA)									

Hardness (mg/L)

Station	***Aliso Canyon Wash at Wilbur Ave.***	***Caballero Creek***	***Bull Creek at Victory Blvd.***	***Tujunga Wash at Moorpark St.***	***Burbank Western Channel at Riverside Dr.***	***Verdugo Wash at Fairmont Ave.***	***Arroyo Seco at San Fernando Rd.***	***Rio Hondo at Garfield Ave.***	***Compton Creek at Del Amo Blvd.***
Number of Samples	43	43	43	38	55	43	43	39	43
Number of Samples with ND	0	0	0	0	0	0	0	0	0
Number of Zeros	0	0	0	0	0	0	0	0	0
Number of AE, NA and DNQ	0	0	0	0	0	0	0	0	0
Date From	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005
Date to	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008	8/13/2008
Min	51.30	154.00	105.00	65.20	136.00	174.00	151.00	57.00	32.40
Max	793.00	1060.00	1060.00	394.00	335.00	403.00	475.00	485.00	271.00
Mean	391.43	812.81	353.58	171.24	205.82	332.98	353.63	233.26	186.79
Median	364.00	833.00	307.00	163.50	207.00	342.00	353.00	221.00	209.00
Standard Deviation	134.03	161.95	168.40	57.00	30.84	49.21	60.55	97.04	62.47
Coefficient of Variaton	0.34	0.20	0.48	0.33	0.15	0.15	0.17	0.42	0.33
Number of Exceedences of Numeric Target (NA)									

Note:

Values designated as Non-Detect (ND), Analysis Error (AE), Not Analyzed (NA), and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

City of Los Angeles Status & Trends Monitoring Program Spatial and Temporal Trend Data (2001 - 2008)

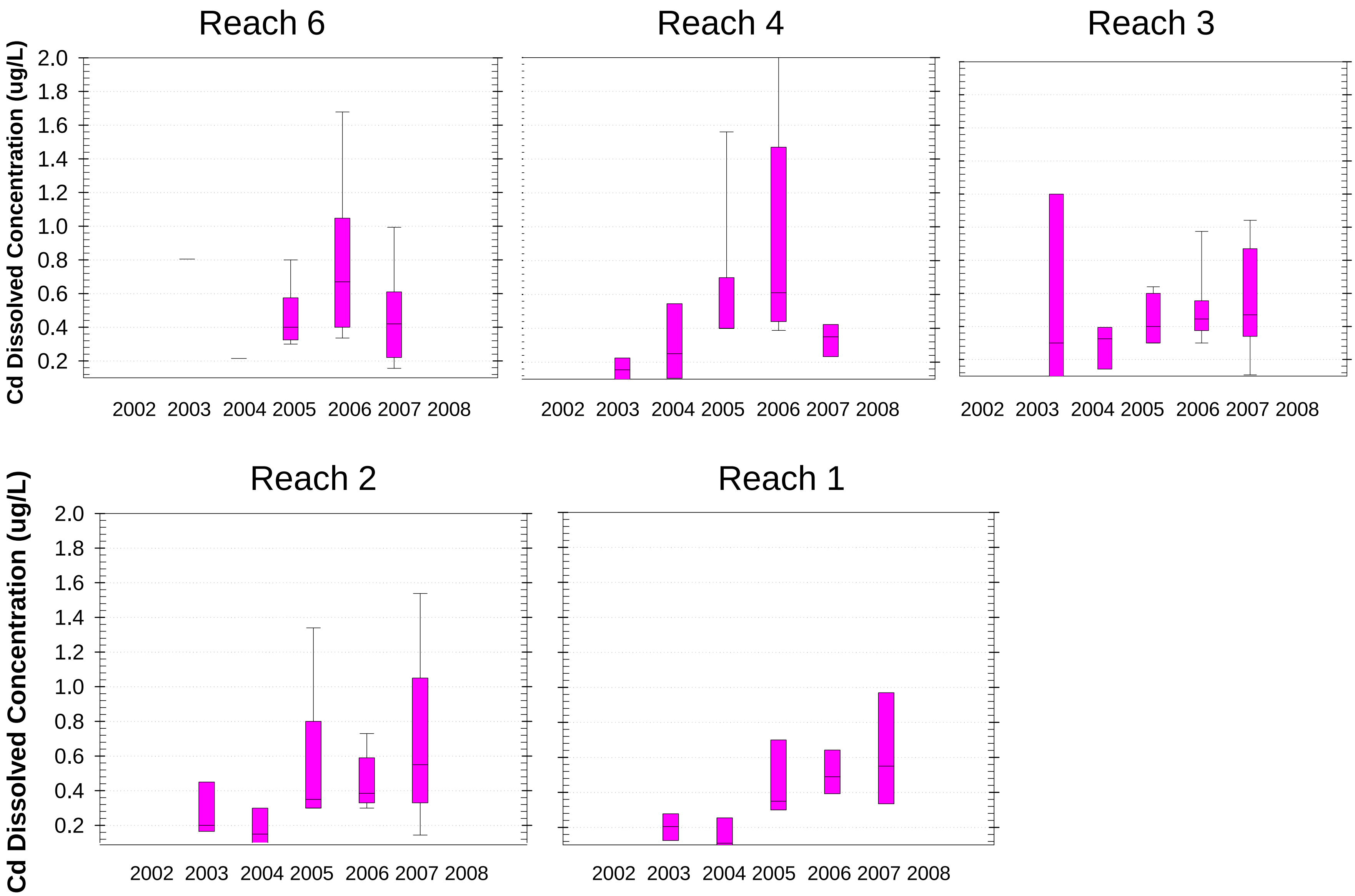

Figure 2-23a: Temporal and Spatial variation in Dry-weather Cd Dissolved Concentrations for the LA River Reaches
(Source: City of LA Status and Trends Data Set)

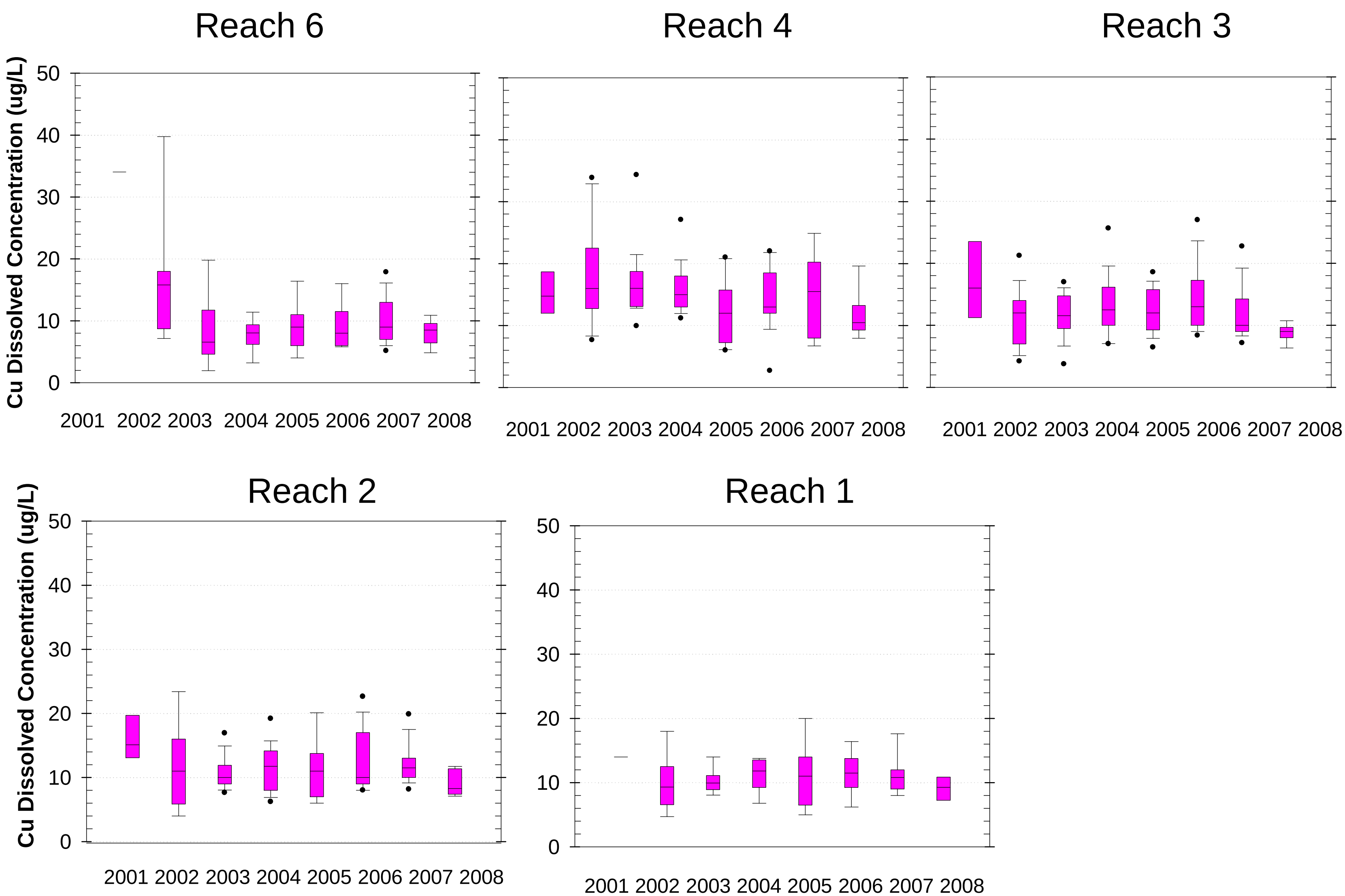

Figure 2-23c: Temporal and Spatial variation in Dry-weather Cu Dissolved Concentrations for the LA River Reaches (Source: City of LA Status and Trends Data Set)

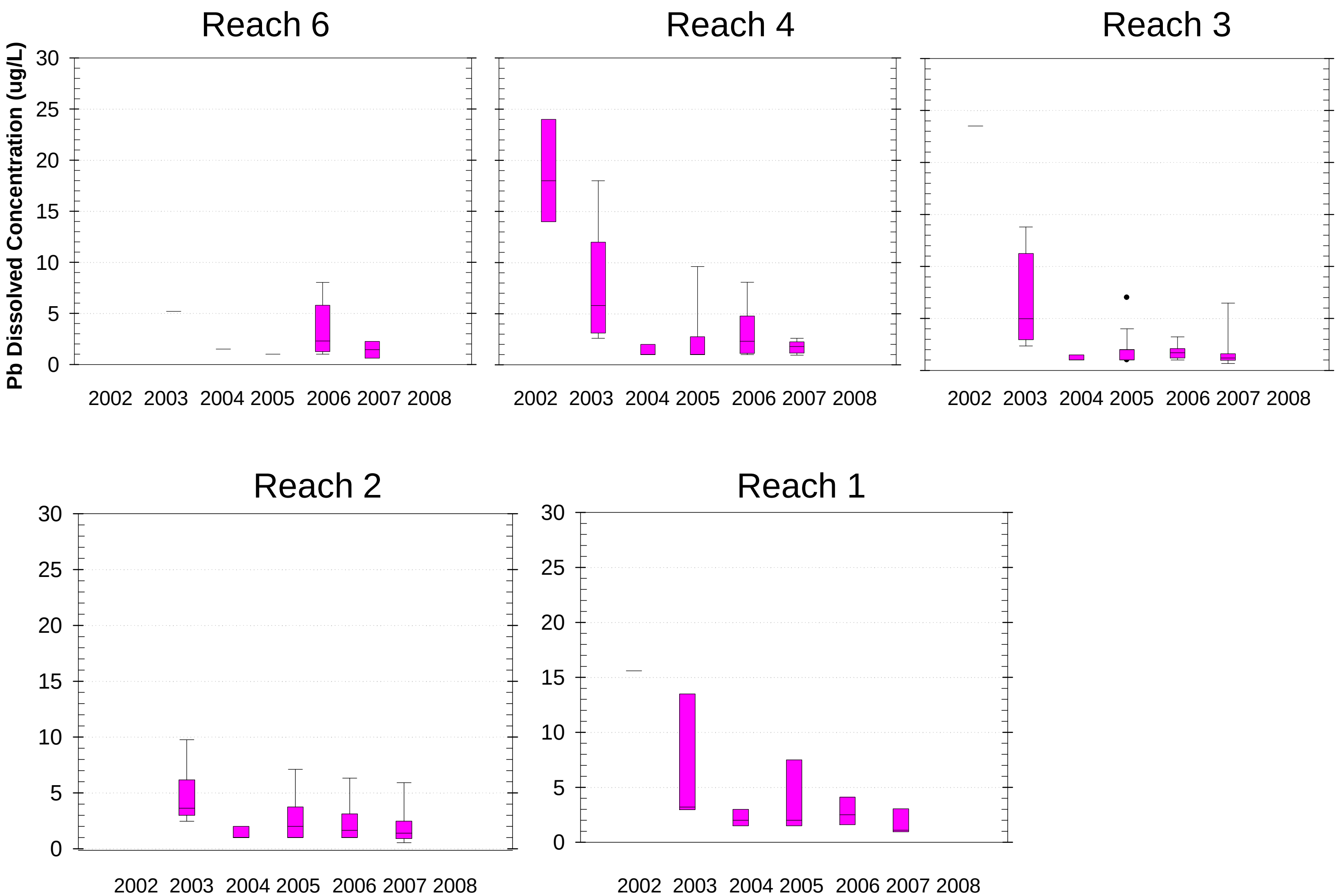

Figure 2-23e: Temporal and Spatial variation in Dry-weather Pb Dissolved Concentrations for the LA River Reaches
(Source: City of LA Status and Trends Data Set)

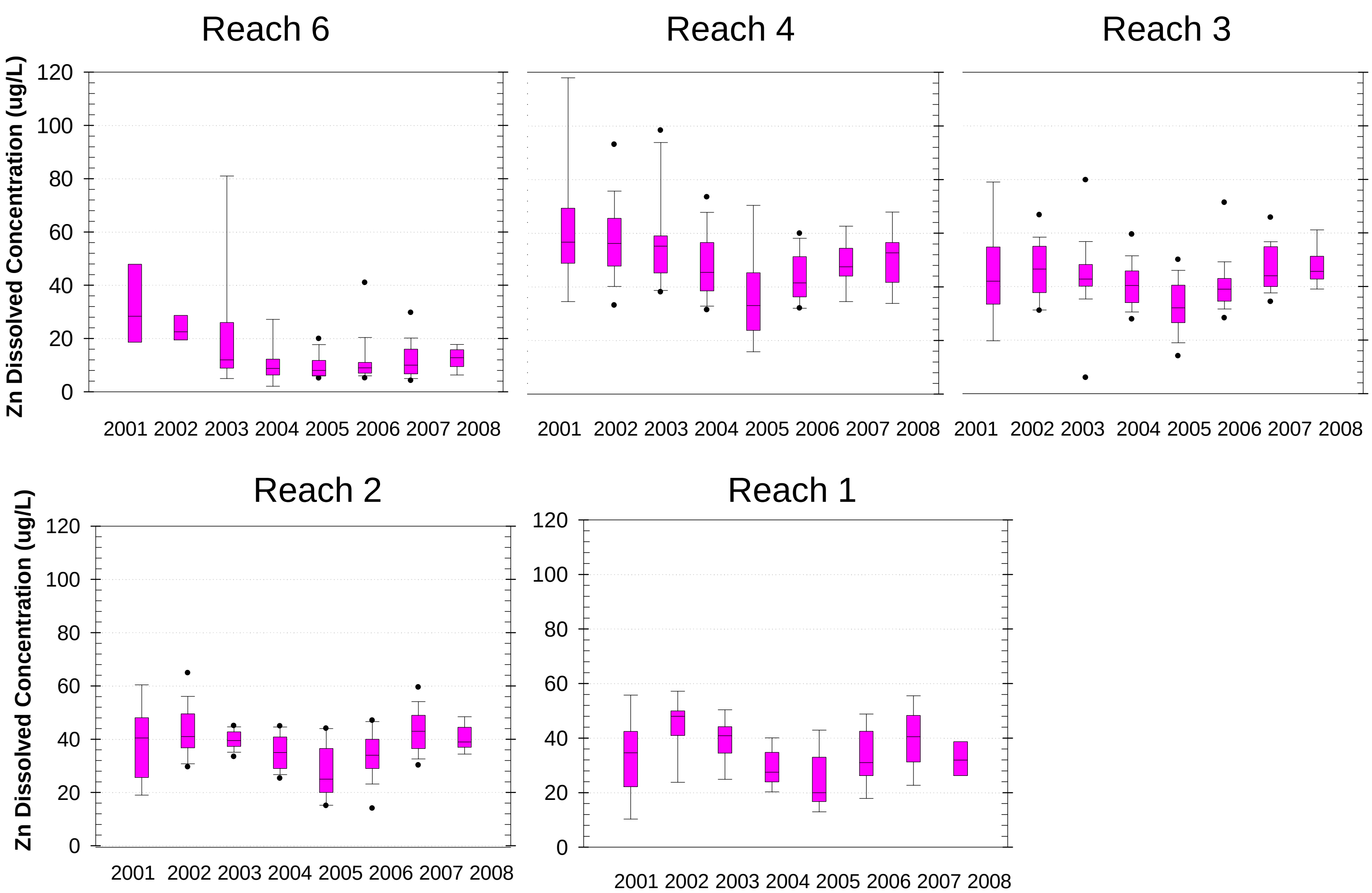

Figure 2-23g: Temporal and Spatial variation in Dry-weather Zn Dissolved Concentrations for the LA River Reaches
(Source: City of LA Status and Trends Data Set)

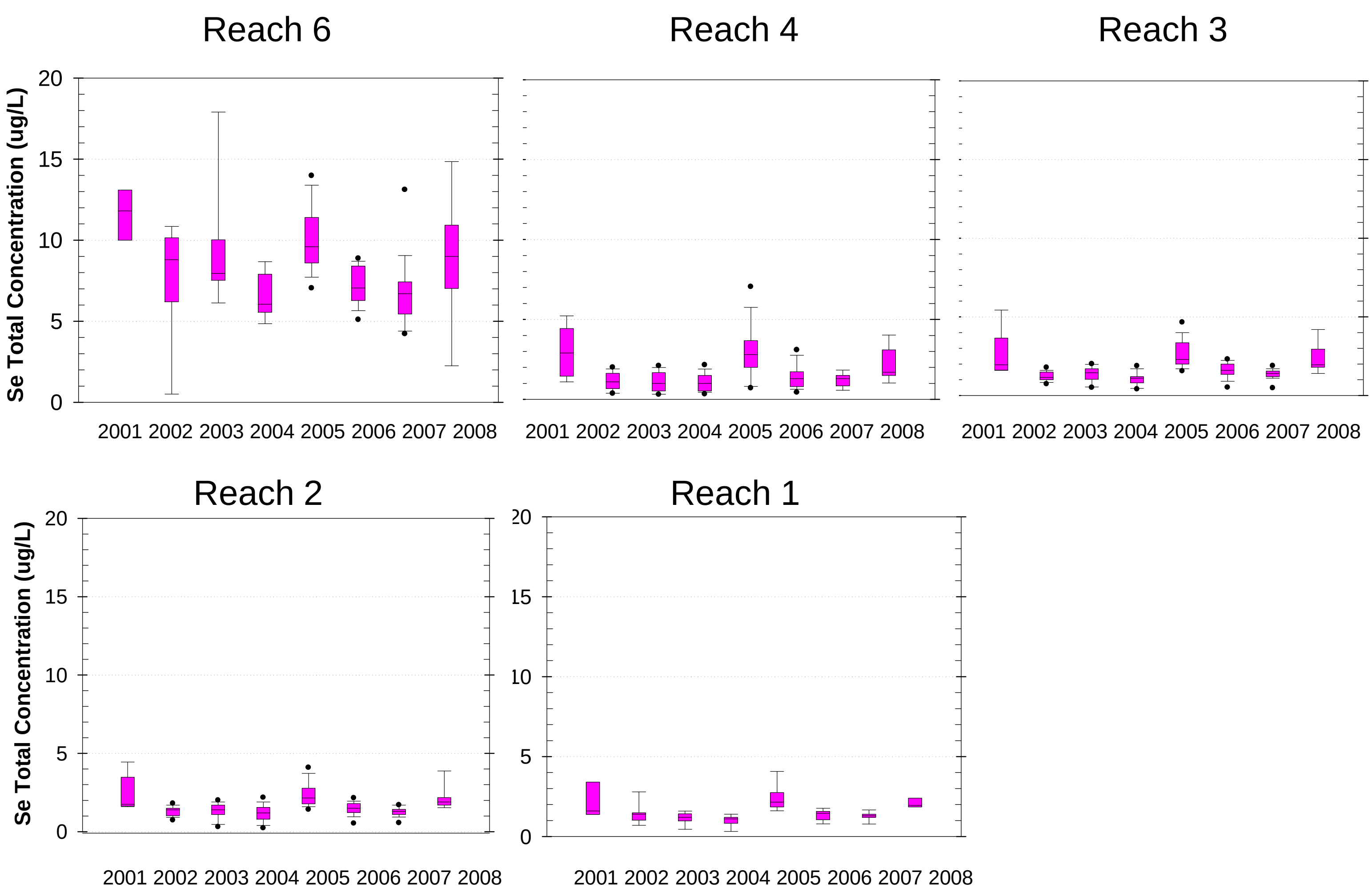

Figure 2-23i: Temporal and Spatial variation in Dry-weather Se Total Concentrations for the LA River Reaches (Source: City of LA Status and Trends Data Set)

City of Los Angeles
Water Reclamation Plant Data (1998 - 2008)

Cadmium Dissolved (μg/L)

		LA RIVER - REACH 6 *LA River at Reseda Blvd.*	LA RIVER - REACH 5 *LA River 1800' downstream of Tillman discharge*	LA RIVER - REACH 4 *LA River immediately upstream of Tujunga Wash*	LA RIVER - REACH 3 *LA River upstream of LAG*	LA RIVER - REACH 3 *LA River downstream of LAG*	LA RIVER - REACH 3 *LA River at Los Feliz*
Dry Weather	Number of Samples	27	28	27	32	32	26
	Number of Samples with ND	20	22	21	27	27	22
	Date From	11/2/1998	8/3/1998	11/2/1998	2/12/1996	2/12/1996	11/1/1998
	Date to	5/3/2005	5/3/2005	5/3/2005	5/4/2005	5/4/2005	5/4/2005
	Min	0.12	0.09	0.16	0.10	0.16	0.09
	Max	0.40	0.70	1.85	1.00	1.20	1.00
	Mean	0.27	0.26	0.70	0.34	0.57	0.35
	Standard Deviation	0.10	0.23	0.65	0.38	0.50	0.43
	Coefficient of Variaton	0.38	0.88	0.93	1.10	0.88	1.24
	Numeric Target (N/A)						
	Number of Exceedances						
Wet Weather	Number of Samples	0	1	0	1	1	1
	Number of Samples with ND	0	1	0	1	0	0
	Date From		2/11/1998		2/2/2004	2/2/2004	2/2/2004
	Date to		2/11/1998		2/2/2004	2/2/2004	2/2/2004
	Min					0.14	0.15
	Max					0.14	0.15
	Mean					0.14	0.15
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	3	3	3	3	3	3
	Number of Exceedences		0		0	0	0

Cadmium Total (μg/L)

		LA RIVER - REACH 6 *LA River at Reseda Blvd.*	LA RIVER - REACH 5 *LA River 1800' downstream of Tillman discharge*	LA RIVER - REACH 4 *LA River immediately upstream of Tujunga Wash*	LA RIVER - REACH 3 *LA River upstream of LAG*	LA RIVER - REACH 3 *LA River downstream of LAG*	LA RIVER - REACH 3 *LA River at Los Feliz*
Dry Weather	Number of Samples	11	11	11	25	24	25
	Number of Samples with ND	4	3	3	15	14	16
	Date From	8/2/2005	8/2/2005	8/2/2005	8/1/2005	8/1/2005	8/1/2005
	Date to	8/6/2008	8/6/2008	8/6/2008	8/6/2008	7/2/2008	8/6/2008
	Min	0.30	0.30	0.37	0.30	0.30	0.30
	Max	0.74	0.84	2.26	0.64	0.52	0.54
	Mean	0.47	0.51	0.86	0.46	0.43	0.40
	Standard Deviation	0.17	0.19	0.77	0.13	0.08	0.08
	Coefficient of Variaton	0.37	0.37	0.90	0.27	0.19	0.20
	Numeric Target (N/A)						
	Number of Exceedances						
Wet Weather	Number of Samples	0	0	0	0	0	0
	Number of Samples with ND	0	0	0	0	0	0
	Date From						
	Date to						
	Min						
	Max						
	Mean						
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	3.1	3.1	3.1	3.1	3.1	3.1
	Number of Exceedences	N/A	N/A	N/A	N/A	N/A	N/A

Note:
Values designated as non-detect (ND) were not included in statistical analysis

Copper Dissolved (µg/L)		LA RIVER - REACH 6	LA RIVER - REACH 5	LA RIVER - REACH 4	LA RIVER - REACH 3	LA RIVER - REACH 3	LA RIVER - REACH 3
		LA River at Reseda Blvd.	*LA River 1800' downstream of Tillman discharge*	*LA River immediately upstream of Tujunga Wash*	*LA River upstream of LAG*	*LA River downstream of LAG*	*LA River at Los Feliz*
Dry Weather	Number of Samples	27	28	27	32	32	26
	Number of Samples with ND	4	5	3	9	10	10
	Date From	11/2/1998	8/3/1998	11/2/1998	2/12/1996	2/12/1996	11/1/1998
	Date to	5/3/2005	5/3/2005	5/3/2005	5/4/2005	5/4/2005	5/4/2005
	Min	7.4	8.1	11.0	10.7	10.0	10.0
	Max	70.0	40.0	275.0	25.7	28.0	30.6
	Mean	18.4	16.4	32.1	16.6	14.1	17.3
	Standard Deviation	14.0	7.2	52.1	5.0	4.3	6.7
	Coefficient of Variaton	0.8	0.4	1.6	0.3	0.3	0.4
	Numeric Target	29	19	19	22	21	21
	Number of Exceedances	4	10	20	5	1	5
Wet Weather	Number of Samples	0	1	0	1	1	1
	Number of Samples with ND	0	0	0	0	0	0
	Date From		2/11/1998		2/2/2004	2/2/2004	2/2/2004
	Date to		2/11/1998		2/2/2004	2/2/2004	2/2/2004
	Min		21.0		18.4	14.3	14.9
	Max		21.0		18.4	14.3	14.9
	Mean		21.0		18.4	14.3	14.9
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	11	11	11	11	11	11
	Number of Exceedences	0	1	0	1	1	1

Copper Total (µg/L)		LA RIVER - REACH 6	LA RIVER - REACH 5	LA RIVER - REACH 4	LA RIVER - REACH 3	LA RIVER - REACH 3	LA RIVER - REACH 3
		LA River at Reseda Blvd.	*LA River 1800' downstream of Tillman discharge*	*LA River immediately upstream of Tujunga Wash*	*LA River upstream of LAG*	*LA River downstream of LAG*	*LA River at Los Feliz*
Dry Weather	Number of Samples	26	26	26	25	24	25
	Number of Samples with ND	0	0	0	0	0	0
	Date From	8/2/2005	8/2/2005	8/2/2005	8/1/2005	8/1/2005	8/1/2005
	Date to	9/3/2008	9/3/2008	9/3/2008	8/6/2008	7/2/2008	8/6/2008
	Min	5.0	8.0	10.0	7.6	6.8	4.3
	Max	40.0	306.0	72.0	36.0	33.0	33.0
	Mean	13.8	24.8	18.5	15.0	13.4	11.6
	Standard Deviation	8.3	57.6	12.5	7.2	6.0	6.3
	Coefficient of Variaton	0.6	2.3	0.7	0.5	0.4	0.5
	Numeric Target	30	26	26	23	26	26
	Number of Exceedances	2	2	2	4	1	1
Wet Weather	Number of Samples	0	0	0	0	0	0
	Number of Samples with ND	0	0	0	0	0	0
	Date From						
	Date to						
	Min						
	Max						
	Mean						
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	17	17	17	17	17	17
	Number of Exceedences	N/A	N/A	N/A	N/A	N/A	N/A

Note:
Values designated as non-detect (ND) were not included in statistical analysis

	Lead Dissolved (µg/L)	**LA RIVER - REACH 6**	**LA RIVER - REACH 5**	**LA RIVER - REACH 4**	**LA RIVER - REACH 3**	**LA RIVER - REACH 3**	**LA RIVER - REACH 3**
		LA River at Reseda Blvd.	***LA River 1800' downstream of Tillman discharge***	***LA River immediately upstream of Tujunga Wash***	***LA River upstream of LAG***	***LA River downstream of LAG***	***LA River at Los Feliz***
Dry Weather	Number of Samples	27	28	27	31	31	25
	Number of Samples with ND	20	18	19	24	22	18
	Date From	11/2/1998	8/3/1998	11/2/1998	2/12/1996	2/12/1996	11/1/1998
	Date to	5/3/2005	5/3/2005	5/3/2005	5/4/2005	5/4/2005	5/4/2005
	Min	1.0	0.3	0.9	0.8	0.7	0.6
	Max	12.0	19.0	36.0	6.1	31.8	7.8
	Mean	4.0	5.9	9.1	3.3	6.0	3.7
	Standard Deviation	3.8	5.4	11.4	2.1	9.8	2.4
	Coefficient of Variaton	1.0		1.3	0.6	1.6	0.6
	Numeric Target	11.0	6.6	7	7.6	7.5	7.5
	Number of Exceedances	3	8	7	1	2	2
Wet Weather	Number of Samples	0	1	0	1	1	1
	Number of Samples with ND	0	0	0	1	1	1
	Date From		2/11/1998		2/2/2004	2/2/2004	2/2/2004
	Date to		2/11/1998		2/2/2004	2/2/2004	2/2/2004
	Min		8				
	Max		8				
	Mean		8				
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	51	51	51	51	51	51
	Number of Exceedences	0	0	0	0	0	0

	Lead Total (µg/L)	**LA RIVER - REACH 6**	**LA RIVER - REACH 5**	**LA RIVER - REACH 4**	**LA RIVER - REACH 3**	**LA RIVER - REACH 3**	**LA RIVER - REACH 3**
		LA River at Reseda Blvd.	***LA River 1800' downstream of Tillman discharge***	***LA River immediately upstream of Tujunga Wash***	***LA River upstream of LAG***	***LA River downstream of LAG***	***LA River at Los Feliz***
Dry Weather	Number of Samples	26	26	26	25	24	25
	Number of Samples with ND	17	17	13	12	13	14
	Date From	8/2/2005	8/2/2005	8/2/2005	8/1/2005	8/1/2005	8/1/2005
	Date to	9/3/2008	9/3/2008	9/3/2008	8/6/2008	7/2/2008	8/6/2008
	Min	1.1	1.1	1.1	1.1	1.0	1.1
	Max	5.5	99.5	26.6	5.7	5.0	5.0
	Mean	2.3	13.1	5.8	2.5	2.1	2.1
	Standard Deviation	1.4	32.4	8.4	1.5	1.5	1.3
	Coefficient of Variaton	0.6	2.5	1.5	0.6	0.7	0.6
	Numeric Target	19	10	10	12	12	12
	Number of Exceedances	0	1	2	0	0	0
Wet Weather	Number of Samples	0	0	0	0	0	0
	Number of Samples with ND	0	0	0	0	0	0
	Date From						
	Date to						
	Min						
	Max						
	Mean						
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	62	62	62	62	62	62
	Number of Exceedences	N/A	N/A	N/A	N/A	N/A	N/A

Note:
Values designated as non-detect (ND) were not included in statistical analysis

Selenium Total (µg/L)		LA RIVER - REACH 6	LA RIVER - REACH 5	LA RIVER - REACH 4	LA RIVER - REACH 3	LA RIVER - REACH 3	LA RIVER - REACH 3
		LA River at Reseda Blvd.	*LA River 1800' downstream of Tillman discharge*	*LA River immediately upstream of Tujunga Wash*	*LA River upstream of LAG*	*LA River downstream of LAG*	*LA River at Los Feliz*
Dry Weather	Number of Samples	19	19	19	6	5	6
	Number of Samples with ND	0	0	0	0	2	2
	Date From	3/6/2007	3/6/2007	3/6/2007	5/1/2007	5/1/2007	5/1/2007
	Date to	9/3/2008	9/3/2008	9/3/2008	8/6/2008	5/7/2008	8/6/2008
	Min	5.2	1.5	1.4	1.1	1.1	1.5
	Max	11.0	6.5	6.0	3.3	2.5	2.7
	Mean	8.4	3.0	2.4	1.7	1.8	1.9
	Standard Deviation	1.6	1.4	1.1	0.8	0.7	0.5
	Coefficient of Variaton	0.2	0.5	0.5	0.5	0.4	0.3
	Numeric Target (N/A)						
	Number of Exceedances						
Wet Weather	Number of Samples	0	0	0	0	0	0
	Number of Samples with ND	0	0	0	0	0	0
	Date From						
	Date to						
	Min						
	Max						
	Mean						
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	5	5	5	5	5	5
	Number of Exceedences	N/A	N/A	N/A	N/A	N/A	N/A

Note:
Values designated as non-detect (ND) were not included in statistical analysis

Zinc Dissolved (µg/L)		LA RIVER - REACH 6	LA RIVER - REACH 5	LA RIVER - REACH 4	LA RIVER - REACH 3	LA RIVER - REACH 3	LA RIVER - REACH 3
		LA River at Reseda Blvd.	*LA River 1800' downstream of Tillman discharge*	*LA River immediately upstream of Tujunga Wash*	*LA River upstream of LAG*	*LA River downstream of LAG*	*LA River at Los Feliz*
Dry Weather	Number of Samples	27	28	27	32	32	26
	Number of Samples with ND	12	2	2	0	0	0
	Date From	11/2/1998	8/3/1998	11/2/1998	2/12/1996	2/12/1996	11/1/1998
	Date to	5/3/2005	5/3/2005	5/3/2005	5/4/2005	5/4/2005	5/4/2005
	Min	5.2	24.0	35.0	22.0	30.0	21.0
	Max	31.9	102.0	344.0	61.7	67.0	65.9
	Mean	15.1	36.4	63.9	40.1	44.0	38.2
	Standard Deviation	8.5	14.6	60.9	10.5	8.8	11.0
	Coefficient of Variaton	0.6	0.4	1.0	0.3	0.2	0.3
	Numeric Target (N/A)						
	Number of Exceedances						
Wet Weather	Number of Samples	0	1	0	1	1	1
	Number of Samples with ND	0	0	0	0	0	0
	Date From		2/11/1998		2/2/2004	2/2/2004	2/2/2004
	Date to		2/11/1998		2/2/2004	2/2/2004	2/2/2004
	Min		40.0		48.8	47.8	41.5
	Max		40.0		48.8	47.8	41.5
	Mean		40.0		48.8	47.8	41.5
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	97	97	97	97	97	97
	Number of Exceedences	0	0	0	0	0	0

Zinc Total (µg/L)		LA RIVER - REACH 6	LA RIVER - REACH 5	LA RIVER - REACH 4	LA RIVER - REACH 3	LA RIVER - REACH 3	LA RIVER - REACH 3
		LA River at Reseda Blvd.	*LA River 1800' downstream of Tillman discharge*	*LA River immediately upstream of Tujunga Wash*	*LA River upstream of LAG*	*LA River downstream of LAG*	*LA River at Los Feliz*
Dry Weather	Number of Samples	10	10	10	25	24	25
	Number of Samples with ND	0	0	0	0	0	0
	Date From	8/2/2005	8/2/2005	8/2/2005	8/1/2005	8/1/2005	8/1/2005
	Date to	8/6/2008	8/6/2008	8/6/2008	8/6/2008	7/2/2008	8/6/2008
	Min	6.0	20.0	30.0	25.0	27.0	24.0
	Max	118.0	57.0	242.0	78.0	82.0	58.0
	Mean	22.1	35.6	63.5	49.8	52.2	43.2
	Standard Deviation	34.0	10.9	63.5	10.3	11.7	8.0
	Coefficient of Variaton	1.5	0.3	1.0	0.2	0.2	0.2
	Numeric Target (N/A)						
	Number of Exceedances						
Wet Weather	Number of Samples	0	0	0	0	0	0
	Number of Samples with ND	0	0	0	0	0	0
	Date From						
	Date to						
	Min						
	Max						
	Mean						
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	159	159	159	159	159	159
	Number of Exceedences	N/A	N/A	N/A	N/A	N/A	N/A

Note:
Values designated as non-detect (ND) were not included in statistical analysis

Hardness (mg/L)	**LA RIVER - REACH 6**	**LA RIVER - REACH 5**	**LA RIVER - REACH 4**	**LA RIVER - REACH 3**	**LA RIVER - REACH 3**	**LA RIVER - REACH 3**
	LA River at Reseda Blvd.	***LA River 1800' downstream of Tillman discharge***	***LA River immediately upstream of Tujunga Wash***	***LA River upstream of LAG***	***LA River downstream of LAG***	***LA River at Los Feliz***
Number of Samples	40	40	40	40	39	40
Number of Samples with ND	0	0	0	0	0	0
Date From	11/2/1998	11/2/1998	11/2/1998	11/1/1998	11/1/1998	11/1/1998
Date to	8/6/2008	8/6/2008	8/6/2008	8/6/2008	5/7/2008	8/6/2008
Min	494	216	194	196	208	212
Max	976	708	522	448	414	470
Mean	714	370	286	296	275	296
Standard Deviation	111	101	82	62	45	57
Coefficient of Variaton	0.16	0.27	0.29	0.21	0.16	0.19
Number of Exceedences of Numeric Target (N/A)						

Los Angeles County
Data at Wardlow Gage (1994 - 2008)

LA RIVER - REACH 1

LA River at Wardlow

		Cadmium Dissolved (µL)	*Cadmium Total (µL)*	*Copper Dissolved (µL)*	*Copper Total (µL)*	*Lead Dissolved (µL)*	*Lead Total (µL)*	*Selenium Dissolved (µL)*	*Selenium Total (µL)*	*Zinc Dissolved (µL)*	*Zinc Total (µL)*
Dry Weather	Number of Samples	14	14	14	13	14	13	14	14	14	13
	Number of Samples with Result=0	14	11	0	0	8	2	10	10	1	1
	Date From	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000
	Date to	1/13/2004	1/13/2004	1/13/2004	1/13/2004	1/13/2004	1/13/2004	1/13/2004	1/13/2004	1/13/2004	1/13/2004
	Min		1.5	4.5	8.7	0.6	0.8	1.4	1.8	17.4	22.3
	Max		11.0	23.1	51.7	3.2	56.9	2.5	2.9	105.0	253.0
	Mean		5.7	10.4	21.2	1.9	9.7	1.9	2.2	60.7	101.1
	Standard Deviation		4.9	5.3	13.8	1.0	16.4	0.5	0.5	28.2	70.6
	Coefficient of Variaton		0.8	0.5	0.7	0.5	1.7	0.3	0.2	0.5	0.7
	Numeric Target	N/A	N/A	22	23	7.6	12	N/A	N/A	N/A	N/A
	Number of Exceedences			1	4	0	2				
Wet Weather	Number of Samples	13	13	13	13	13	13	13	13	13	13
	Number of Samples with Result=0	12	12	1	0	7	4	12	12	5	4
	Date From	10/30/2000	10/30/2000	10/30/2000	10/30/2000	10/30/2000	10/30/2000	10/30/2000	10/30/2000	10/30/2000	10/30/2000
	Date to	12/25/2003	12/25/2003	12/25/2003	12/25/2003	12/25/2003	12/25/2003	12/25/2003	12/25/2003	12/25/2003	12/25/2003
	Min	0.3	0.4	3.6	8.2	0.8	2.1	4.1	4.1	10.0	21.3
	Max	0.3	0.4	14.1	30.0	7.4	9.9	4.1	4.1	74.0	83.0
	Mean	0.3	0.4	7.5	15.1	3.3	5.2	4.1	4.1	42.9	54.9
	Standard Deviation			2.6	6.9	2.3	2.6			20.7	18.7
	Coefficient of Variaton			0.4	0.5	0.7	0.5			0.5	0.3
	Numeric Target	3	3.1	11	17	51	62	N/A	5	97	159
	Number of Exceedences	0	0	1	4	0	0		0	0	0

Notes:

Removed Copper Total=295 ug/L, Lead Total=1070 ug/L, Zinc Total=1030 ug/L from 10/31/2003

Values designated as zero (0) were not included in statistical analysis

Los Angeles County
Spatial and Temporal Trend Data (2000 - 2004)

Reach 1

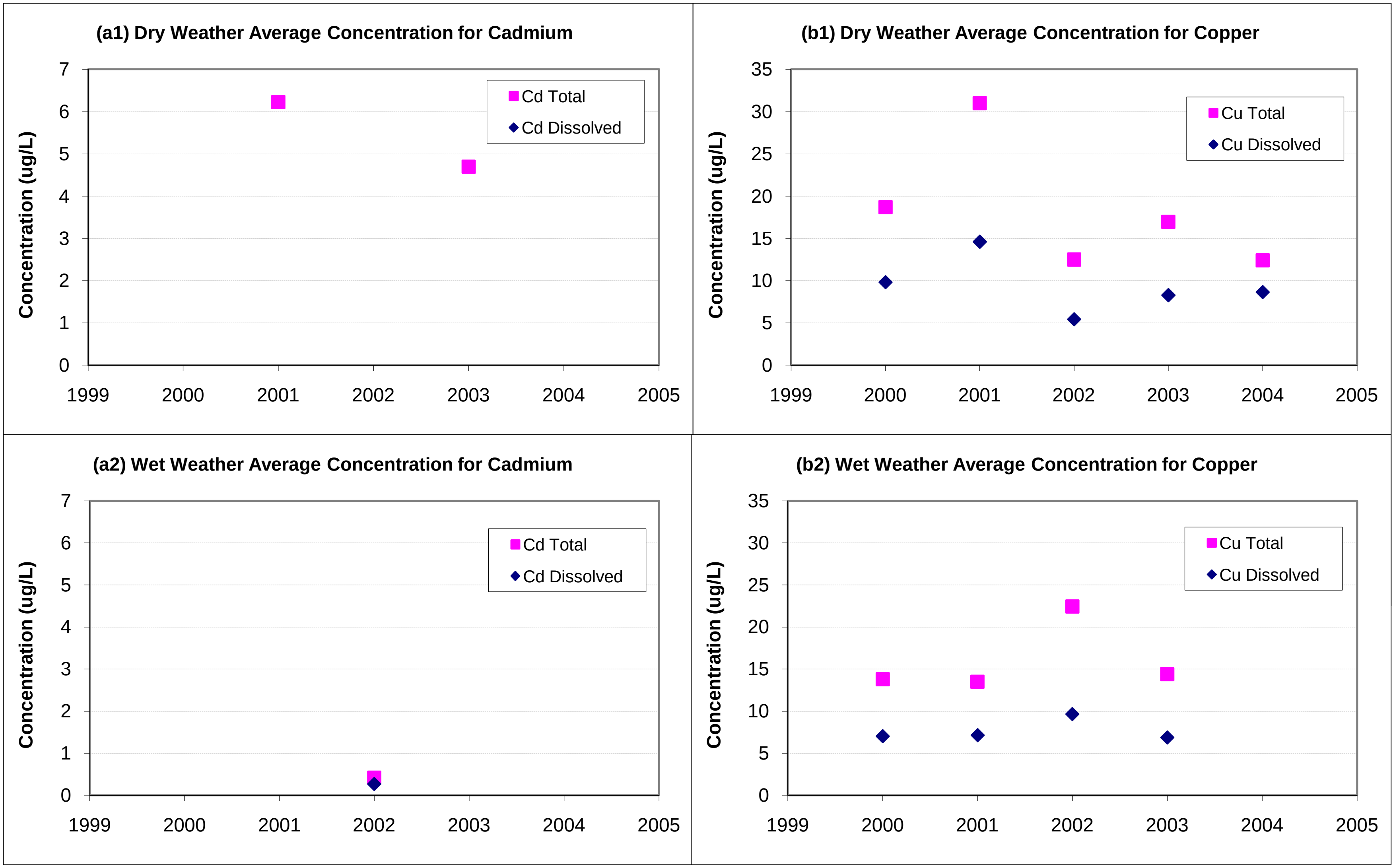

Figure 2-24a: Temporal variations in annual average metal concentrations in Reach 1 (Station -- LA River at Wardlow):
(a1) Cd dry weather and (a2) Cd wet weather; (b1) Cu dry weather and (b2) Cu wet weather
Source: LA County DPW NPDES Monitoring

Reach 1

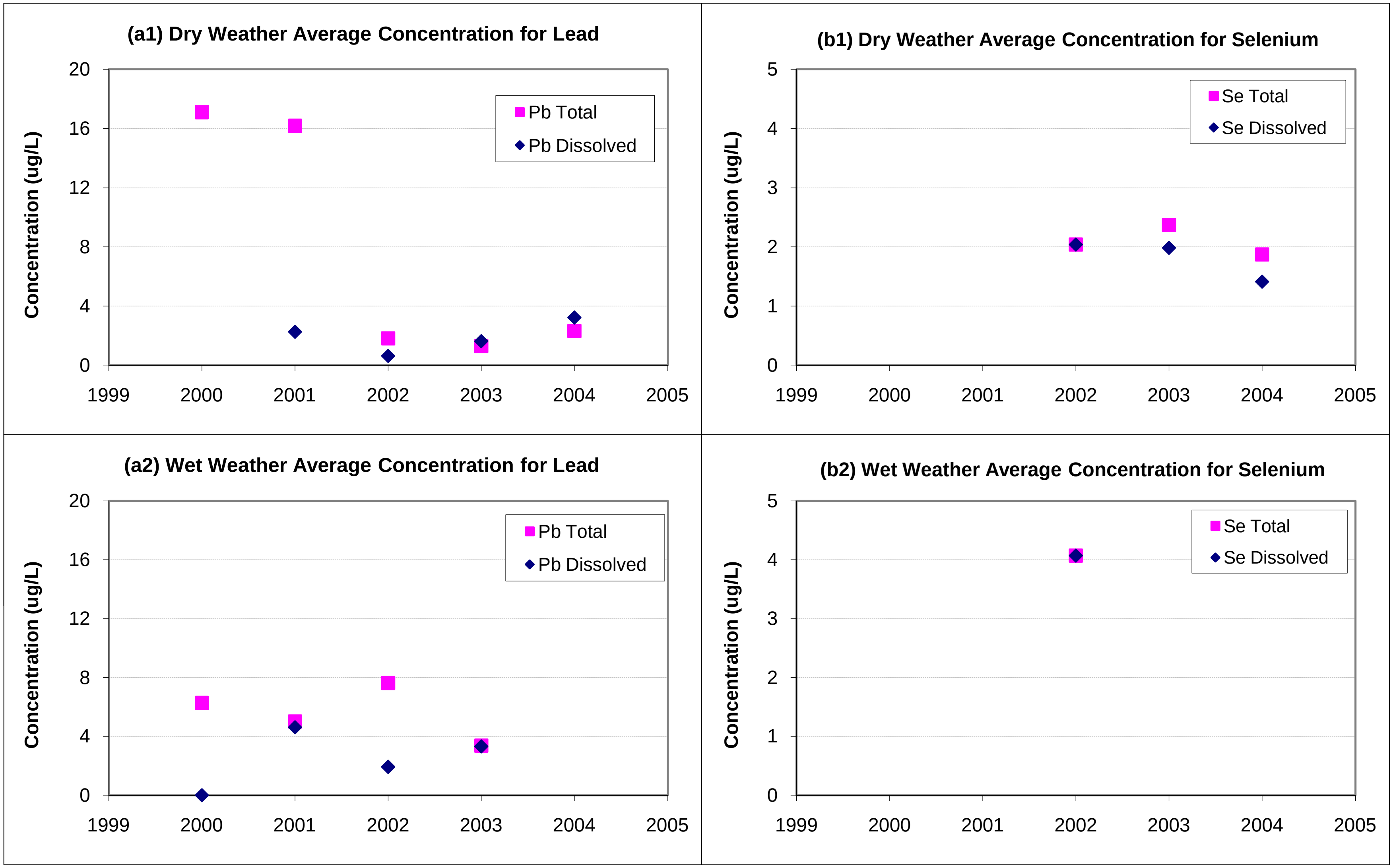

Figure 2-24b: Temporal variations in annual average metal concentrations in Reach 1 (Station -- LA River at Wardlow):
(a1) Pb dry weather and (a2) Pb wet weather; (b1) Se dry weather and (b2) Se wet weather
Source: LA County DPW NPDES Monitoring

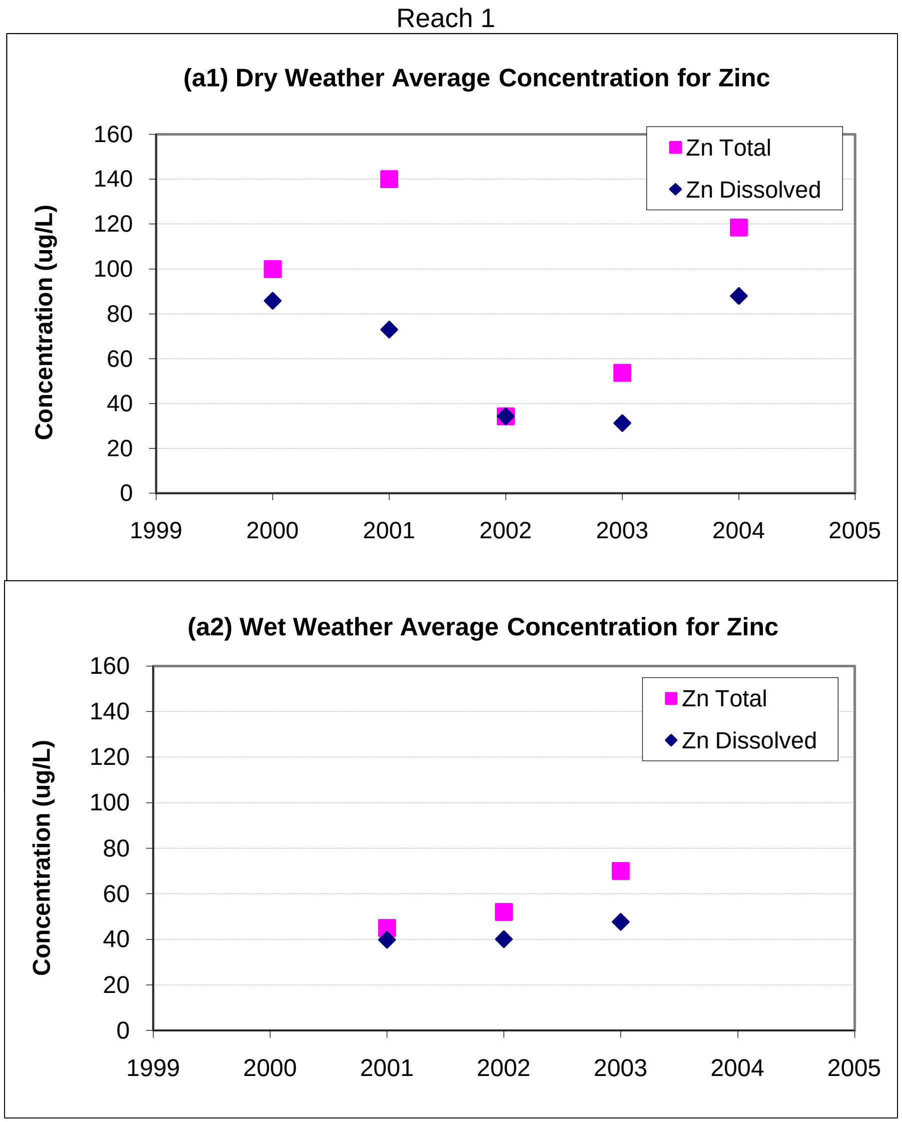

Figure 2-24c: Temporal variations in annual average metal concentrations in Reach 1 (Station -- LA River at Wardlow):
(a1) Zn dry weather and (a2) Zn wet weather
Source: LA County DPW NPDES Monitoring

Burbank Western Channel Data
(1995 - 2008)

Lockheed Wash/Burbank Western Channel

		Cadmium (ug/L)	Copper Dissolved (ug/L)	Copper Total (ug/L)	Lead (ug/L)	Selenium (ug/L)	Zinc (ug/L)
Wet Weather	Number of Samples	1	0	1	1	0	1
	Number of Samples with ND	1		1	1		0
	Number of Samples with DNQ	0		0	0		0
	Number of Zeros	0		0	0		0
	Date From	2/6/1998		2/6/1998	2/6/1998		2/6/1998
	Date to	2/6/1998		2/6/1998	2/6/1998		2/6/1998
	Min						57.0
	Max						57.0
	Mean						57.0
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	3.1	11	17	62	5	159
	Number of Exceedences	0		0	0	0	0
Dry Weather	Number of Samples	80	0	72	71	39	71
	Number of Samples with ND	33		6	15	7	6
	Number of Samples with DNQ	25		0	4	11	2
	Number of Zeros	0		0	0	0	0
	Date From	2/1/1995		2/1/1995	2/1/1995	5/5/1999	2/1/1995
	Date to	9/10/2008		9/10/2008	9/10/2008	9/10/2008	9/10/2008
	Min	0.2		1.2	0.3	1.0	11.0
	Max	2.5		150.0	16.5	4.3	420.0
	Mean	0.7		24.9	2.8	2.0	52.8
	Standard Deviation	0.6		25.0	2.7	1.1	62.6
	Coefficient of Variaton	0.9		1.0	1.0	0.5	1.2
	Numeric Target			26	14		
	Number of Exceedences			21	1		

Burbank Western Channel at Verdugo Ave

		Cadmium (ug/L)	Copper Dissolved (ug/L)	Copper Total (ug/L)	Lead (ug/L)	Selenium (ug/L)	Zinc (ug/L)
Wet Weather	Number of Samples	1	0	1	1	0	1
	Number of Samples with ND	1		1	1		0
	Number of Samples with DNQ	0		0	0		0
	Number of Zeros	0		0	0		0
	Date From	2/6/1998		2/6/1998	2/6/1998		2/6/1998
	Date to	2/6/1998		2/6/1998	2/6/1998		2/6/1998
	Min						68.0
	Max						68.0
	Mean						68.0
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	3.1	11	17	62	5	159
	Number of Exceedences	0		0	0	0	0
Dry Weather	Number of Samples	68	0	60	59	27	59
	Number of Samples with ND	29		4	18	6	0
	Number of Samples with DNQ	21		0	4	3	0
	Number of Zeros	0		0	0	0	0
	Date From	2/1/1995		2/1/1995	2/1/1995	5/5/1999	2/1/1995
	Date to	9/10/2008		9/10/2008	9/10/2008	9/10/2008	9/10/2008
	Min	0.2		6.0	0.8	1.2	25.0
	Max	11.0		201.0	10.0	15.3	169.0
	Mean	1.2		26.4	1.8	5.1	77.0
	Standard Deviation	2.5		26.9	1.6	3.6	23.7
	Coefficient of Variaton	2.1		1.0	0.9	0.7	0.3
	Numeric Target			19	9.1		
	Number of Exceedences			36	1		

Note:

Values designated as Non-Detect (ND) and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Burbank Western Channel at Griffith Park/Victory Blvd.

		Cadmium (ug/L)	Copper Dissolved (ug/L)	Copper Total (ug/L)	Lead (ug/L)	Selenium (ug/L)	Zinc (ug/L)
Wet Weather	Number of Samples	1	0	1	1	0	1
	Number of Samples with ND	1		1	1	0	0
	Number of Samples with DNQ	0		0	0	0	0
	Number of Zeros	0		0	0	0	0
	Date From	2/6/1998		2/6/1998	2/6/1998	1/0/1900	2/6/1998
	Date to	2/6/1998		2/6/1998	2/6/1998	1/0/1900	2/6/1998
	Min						53.0
	Max						53.0
	Mean						53.0
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	3.1	11	17	62	5	159
	Number of Exceedences	0		0	0	0	0
Dry Weather	Number of Samples	5	0	5	5	0	5
	Number of Samples with ND	5		3	5		1
	Number of Samples with DNQ	0		0	0		0
	Number of Zeros	0		0	0		0
	Date From	2/1/1995		2/1/1995	2/1/1995		2/1/1995
	Date to	8/2/1998		8/2/1998	8/2/1998		8/2/1998
	Min			8.5			38.0
	Max			21.0			56.0
	Mean			14.8			44.3
	Standard Deviation			8.8			8.1
	Coefficient of Variaton			0.6			0.2
	Numeric Target			19	9.1		
	Number of Exceedences			1	0		

Burbank Western Channel at Riverside Drive

		Cadmium (ug/L)	Copper Dissolved (ug/L)	Copper Total (ug/L)	Lead (ug/L)	Selenium (ug/L)	Zinc (ug/L)
Wet Weather	Number of Samples	0	0	0	0	0	0
	Number of Samples with ND						
	Number of Samples with DNQ						
	Number of Zeros						
	Date From						
	Date to						
	Min						
	Max						
	Mean						
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target	3.1	11	17	62	5	159
	Number of Exceedences						
Dry Weather	Number of Samples	63	15	70	55	27	55
	Number of Samples with ND	24	0	1	12	7	0
	Number of Samples with DNQ	23	0	0	1	3	0
	Number of Zeros	0	0	0	0	0	0
	Date From	11/17/1998	5/24/2007	11/17/1998	11/17/1998	5/5/1999	11/17/1998
	Date to	9/10/2008	10/8/2008	9/10/2008	9/10/2008	9/10/2008	11/12/2008
	Min	0.3	13.2	7.3	0.9	1.3	4.4
	Max	8.9	34.5	70.4	5.9	15.3	163.0
	Mean	1.2	24.2	25.6	2.0	5.0	82.7
	Standard Deviation	2.3	5.9	12.6	1.2	3.5	24.6
	Coefficient of Variaton	1.9	0.2	0.5	0.6	0.7	0.3
	Numeric Target		18	19	9.1		
	Number of Exceedences		13	49	0		

Note:
Values designated as Non-Detect (ND) and Detected, Not Quantifiable (DNQ) were not included in statistical analysis

Southern California Coastal Water Research Project Data (2000 - 2007)

Cadmium (ug/L)

		Station					
		Los Angeles River - Reach 6	*Los Angeles River - Reach 5*	*Los Angeles River - Reach 4*	*Los Angeles River - Reach 3*	*Los Angeles River - Reach 2*	*Los Angeles River - Reach 1*
Dry Weather	Number of Samples	31	4	34	19	41	6
	Number of Samples with ND	28	4	32	18	39	3
	Number of Zeros	0	0	0	0	0	0
	Number of Samples with NA	0	0	0	0	0	0
	Date From	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000
	Date to	7/29/2001	7/29/2001	7/29/2001	7/29/2001	7/29/2001	10/31/2003
	Min	1.10		1.60	0.70	23.10	0.12
	Max	2.60		2.00	0.70	26.00	0.43
	Mean	1.73		1.80	0.70	24.55	0.26
	Standard Deviation	0.78		0.28		2.05	0.16
	Coefficient of Variaton	0.45		0.16		0.08	0.62
	Numeric Target						
	Number of Exceedences						
Wet Weather	Number of Samples	0	0	0	0	33	47
	Number of Samples with ND					19	20
	Number of Zeros					0	0
	Number of Samples with NA					0	0
	Date From					1/26/2001	1/26/2001
	Date to					11/12/2001	2/3/2004
	Min					0.50	0.19
	Max					8.30	105.00
	Mean					2.36	8.75
	Standard Deviation					2.12	27.75
	Coefficient of Variaton					0.90	3.17
	Numeric Target					3.1	3.1
	Number of Exceedences					4	3

Cadmium (ug/L)

		Station					
		McCoy Canyon	*Dry Canyon*	*Bell Creek*	*Verdugo Wash - Reach 1*	*Arroyo Seco*	*Compton Creek*
Dry Weather	Number of Samples	1	1	4	6	16	2
	Number of Samples with ND	1	1	4	3	12	1
	Number of Zeros	0	0	0	0	0	0
	Number of Samples with NA	0	0	0	0	0	1
	Date From	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000
	Date to	9/10/2000	9/10/2000	9/10/2000	10/31/2003	3/1/2006	9/10/2000
	Min				0.44	0.10	
	Max				4.20	0.55	
	Mean				2.05	0.21	
	Standard Deviation				1.94	0.23	
	Coefficient of Variaton				0.95	1.06	
	Numeric Target						
	Number of Exceedences						
Wet Weather	Number of Samples	0	0	0	41	38	0
	Number of Samples with ND				18	23	
	Number of Samples with NA				0	0	
	Date From				1/26/2001	2/10/2001	
	Date to				11/1/2003	2/28/2006	
	Min				0.20	0.01	
	Max				8.70	1.90	
	Mean				2.53	0.42	
	Standard Deviation				2.05	0.49	
	Coefficient of Variaton				0.81	1.16	
	Numeric Target				3.1	3.1	
	Number of Exceedences				7	0	

Note:
Values designated as Non-Detect (ND) and Not Analyzed (NA) were not included in statistical analysis

Copper (ug/L)

		Station					
		Los Angeles River - Reach 6	***Los Angeles River - Reach 5***	***Los Angeles River - Reach 4***	***Los Angeles River - Reach 3***	***Los Angeles River - Reach 2***	***Los Angeles River - Reach 1***
Dry Weather	Number of Samples	31	4	34	19	41	6
	Number of Samples with ND	4	4	13	15	20	3
	Number of Zeros	0	0	0	0	0	0
	Number of Samples with NA	0	0	0	0	0	0
	Date From	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000
	Date to	7/29/2001	7/29/2001	7/29/2001	7/29/2001	7/29/2001	10/31/2003
	Min	10.00		10.90	11.60	10.10	9.99
	Max	243.00		165.00	31.90	1320.00	25.60
	Mean	32.70		36.14	20.75	102.74	17.13
	Standard Deviation	44.66		36.55	8.78	289.17	7.89
	Coefficient of Variaton	1.37		1.01	0.42	2.81	0.46
	Numeric Target	30	30	26	26	22	23
	Number of Exceedences	8	0	9	1	10	1
Wet Weather	Number of Samples	0	0	0	0	33	47
	Number of Samples with ND					3	1
	Number of Zeros					0	0
	Number of Samples with NA					0	0
	Date From					1/26/2001	1/26/2001
	Date to					11/12/2001	2/3/2004
	Min					8.80	5.40
	Max					460.00	178.00
	Mean					62.63	38.79
	Standard Deviation					96.23	37.08
	Coefficient of Variaton					1.54	0.96
	Numeric Target					17	17
	Number of Exceedences					16	28

Copper (ug/L)

		Station					
		McCoy Canyon	***Dry Canyon***	***Bell Creek***	***Verdugo Wash - Reach 1***	***Arroyo Seco***	***Compton Creek***
Dry Weather	Number of Samples	1	1	4	6	16	2
	Number of Samples with ND	0	1	1	1	8	1
	Number of Zeros	0	0	0	0	0	0
	Number of Samples with NA	0	0	0	0	0	1
	Date From	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000
	Date to	9/10/2000	9/10/2000	9/10/2000	10/31/2003	3/1/2006	9/10/2000
	Min	11.00		12.00	18.00	0.21	
	Max	11.00		24.00	160.00	130.00	
	Mean	11.00		18.00	65.44	19.87	
	Standard Deviation			6.00	63.00	45.23	
	Coefficient of Variaton			0.33	0.96	2.28	
	Numeric Target			30		22	19
	Number of Exceedences			0		2	0
Wet Weather	Number of Samples	0	0	0	41	38	0
	Number of Samples with ND				4	2	
	Number of Zeros				0	0	
	Number of Samples with NA				0	0	
	Date From				1/26/2001	2/10/2001	
	Date to				11/1/2003	2/28/2006	
	Min				11.00	0.40	
	Mean				80.56	11.34	
	Standard Deviation				77.83	10.18	
	Coefficient of Variaton				0.97	0.90	
	Numeric Target				17	17	
	Number of Exceedences				26	7	

Note:
Values designated as Non-Detect (ND) and Not Analyzed (NA) were not included in statistical analysis

Lead (ug/L)

		Station					
		River - Reach 6	***River - Reach 5***	***River - Reach 4***	***River - Reach 3***	***River - Reach 2***	***River - Reach 1***
Dry Weather	Number of Samples	31	4	34	19	41	6
	Number of Samples with ND	29	3	34	18	39	2
	Number of Zeros	0	0	0	0	0	0
	Number of Samples with NA	0	0	0	0	0	0
	Date From	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000
	Date to	7/29/2001	7/29/2001	7/29/2001	7/29/2001	7/29/2001	10/31/2003
	Min	10.00	22.00		18.00	155.00	0.11
	Max	12.00	22.00		18.00	843.00	117.00
	Mean	11.00	22.00		18.00	499.00	32.25
	Standard Deviation	1.41				486.49	56.70
	Coefficient of Variaton	0.13				0.97	1.76
	Numeric Target	19	19	10	12	11	12
	Number of Exceedences	0	1	0	1	2	1
Wet Weather	Number of Samples	0	0	0	0	33	47
	Number of Samples with ND					3	1
	Number of Zeros					0	0
	Number of Samples with NA					0	0
	Date From					1/26/2001	1/26/2001
	Date to					11/12/2001	2/3/2004
	Min					1.40	1.90
	Max					270.00	123.00
	Mean					39.16	32.70
	Standard Deviation					58.84	32.60
	Coefficient of Variaton					1.50	1.00
	Numeric Target					62	62
	Number of Exceedences					7	9

Lead (ug/L)

		Station					
		McCoy Canyon	***Dry Canyon***	***Bell Creek***	***Verdugo Wash - Reach 1***	***Arroyo Seco***	***Compton Creek***
Dry Weather	Number of Samples	1	1	4	6	12	2
	Number of Samples with ND	1	1	2	3	10	1
	Number of Zeros	0	0	0	0	0	0
	Number of Samples with NA	0	0	0	0	0	1
	Date From	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000
	Date to	9/10/2000	9/10/2000	9/10/2000	10/31/2003	3/1/2006	9/10/2000
	Min			19.00	9.96	0.02	
	Max			42.00	91.00	0.09	
	Mean			30.50	60.29	0.06	
	Standard Deviation			16.26	43.94	0.05	
	Coefficient of Variaton			0.53	0.73	0.90	
	Numeric Target			19		11	8.9
	Number of Exceedences			1		0	0
Wet Weather	Number of Samples	0	0	0	41	38	0
	Number of Samples with ND				4	2	
	Number of Zeros				0	0	
	Number of Samples with NA				0	0	
	Date From				1/26/2001	2/10/2001	
	Date to				11/1/2003	2/28/2006	
	Min				1.40	0.02	
	Max				760.00	36.60	
	Mean				80.49	7.51	
	Standard Deviation				133.93	9.04	
	Coefficient of Variaton				1.66	1.20	
	Numeric Target				62	62	
	Number of Exceedences				15	0	

Note:

Values designated as Non-Detect (ND) and Not Analyzed (NA) were not included in statistical analysis

Selenium (ug/L)

		Los Angeles River - Reach 6	Los Angeles River - Reach 5	Los Angeles River - Reach 4	Los Angeles River - Reach 3	Los Angeles River - Reach 2	Los Angeles River - Reach 1
Dry Weather	Number of Samples	0	0	0	0	0	1
	Number of Samples with ND						0
	Number of Zeros						0
	Number of Samples with NA						0
	Date From						10/31/2003
	Date to						10/31/2003
	Min						2.64
	Max						2.64
	Mean						2.64
	Standard Deviation						
	Coefficient of Variaton						
	Numeric Target						
	Number of Exceedences						
Wet Weather	Number of Samples	0	0	0	0	0	6
	Number of Samples with ND						0
	Number of Zeros						0
	Number of Samples with NA						0
	Date From						11/1/2003
	Date to						2/2/2004
	Min						1.33
	Max						121.00
	Mean						40.80
	Standard Deviation						59.83
	Coefficient of Variaton						1.47
	Numeric Target						5
	Number of Exceedences						2

Selenium (ug/L)

		McCoy Canyon	Dry Canyon	Bell Creek	Verdugo Wash - Reach 1	Arroyo Seco	Compton Creek
Dry Weather	Number of Samples	0	0	0	2	6	0
	Number of Samples with ND				0	1	
	Number of Zeros				0	0	
	Number of Samples with NA				0	0	
	Date From				10/31/2003	9/6/2005	
	Date to				10/31/2003	3/1/2006	
	Min				2.20	0.27	
	Max				2.63	2.10	
	Mean				2.42	0.77	
	Standard Deviation				0.30	0.76	
	Coefficient of Variaton				0.13	0.99	
	Numeric Target						
	Number of Exceedences						
Wet Weather	Number of Samples	0	0	0	0	16	0
	Number of Samples with ND					1	
	Number of Zeros					0	
	Number of Samples with NA					0	
	Date From					2/27/2006	
	Date to					2/28/2006	
	Min					0.01	
	Max					2.23	
	Mean					1.02	
	Standard Deviation					1.03	
	Coefficient of Variaton					1.00	
	Numeric Target					5	
	Number of Exceedences					1	

Note:
Values designated as Non-Detect (ND) and Not Analyzed (NA) were not included in statistical analysis

Zinc (ug/L)

		Station					
		Los Angeles River - Reach 6	***Los Angeles River - Reach 5***	***Los Angeles River - Reach 4***	***Los Angeles River - Reach 3***	***Los Angeles River - Reach 2***	***Los Angeles River - Reach 1***
Dry Weather	Number of Samples	31	4	34	19	41	6
	Number of Samples with ND	7	0	9	4	10	1
	Number of Zeros	0	0	0	0	0	0
	Number of Samples with NA	0	0	0	0	0	0
	Date From	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000
	Date to	7/29/2001	7/29/2001	7/29/2001	7/29/2001	7/29/2001	10/31/2003
	Min	11.10	22.90	14.10	12.20	14.00	0.49
	Max	135.00	48.70	194.00	141.00	10000.00	123.00
	Mean	42.17	32.90	52.44	42.31	536.26	55.12
	Standard Deviation	35.31	11.78	41.39	32.61	1968.84	47.19
	Coefficient of Variaton	0.84	0.36	0.79	0.77	3.67	0.86
	Numeric Target						
	Number of Exceedences						
Wet Weather	Number of Samples	0	0	0	0	33	47
	Number of Samples with ND					3	1
	Number of Zeros					0	0
	Number of Samples with NA					0	0
	Date From					1/26/2001	1/26/2001
	Date to					11/12/2001	2/3/2004
	Min					35.00	25.00
	Max					1600.00	1240.00
	Mean					245.23	214.30
	Standard Deviation					330.95	225.83
	Coefficient of Variaton					1.35	1.05
	Numeric Target					159	159
	Number of Exceedences					9	21

Zinc (ug/L)

		Station					
		McCoy Canyon	***Dry Canyon***	***Bell Creek***	***Verdugo Wash - Reach 1***	***Arroyo Seco***	***Compton Creek***
Dry Weather	Number of Samples	1	1	4	6	15	2
	Number of Samples with ND	0	1	3	1	5	1
	Number of Zeros	0	0	0	0	0	0
	Number of Samples with NA	0	0	0	0	0	1
	Date From	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000	9/10/2000
	Date to	9/10/2000	9/10/2000	9/10/2000	10/31/2003	3/1/2006	9/10/2000
	Min	12.00		16.00	35.00	0.34	
	Max	12.00		16.00	683.00	207.00	
	Mean	12.00		16.00	297.80	29.79	
	Standard Deviation				321.31	63.85	
	Coefficient of Variaton				1.08	2.14	
	Numeric Target						
	Number of Exceedences						
Wet Weather	Number of Samples	0	0	0	41	38	0
	Number of Samples with ND				4	0	
	Number of Zeros				0	0	
	Number of Samples with NA				0	0	
	Date From				1/26/2001	2/10/2001	
	Date to				11/1/2003	2/28/2006	
	Min				45.00	0.77	
	Max				1430.00	234.00	
	Mean				438.08	56.54	
	Standard Deviation				441.84	60.88	
	Coefficient of Variaton				441.84	60.88	
	Numeric Target				159	159	
	Number of Exceedences				19	3	

Note:
Values designated as Non-Detect (ND) and Not Analyzed (NA) were not included in statistical analysis

Appendix C
Structural BMP Methodology

Section 1
Introduction

The Los Angeles County-wide Structural BMP Prioritization Analysis Tool (SBPAT)[1] coupled with the use of other modeling analysis tools provided the means for identifying potential BMP locations and types for implementation. SBPAT screens areas based on *need* (e.g., pollutant load generation and downstream impairments), and then identifies *opportunities* (e.g., appropriateness of the area, proximity to storm drains) for BMP implementation. SBPAT uses a GIS-based decision tool that relies on four steps for identifying BMP implementation opportunities (Figure C-1). The steps and section that provides relevant information is as follows:

1. ***Catchment Prioritization*** - Prioritize catchments based on water quality management need (e.g., pollutant-loading, receiving water issues) (Section 2).

2. ***Identification of Structural BMP Opportunities*** - Identify potential BMP opportunities within high priority catchments based on factors such as parcel size, land use, and ownership (Section 3).

3. ***Preliminary Screening of BMP Opportunities*** - Identify appropriate BMPs based on factors such as cost, maintenance, and effectiveness for the pollutants of concern (Section 4).

4. ***Site-Specific BMP Evaluation*** - Develop site-specific implementation strategies based on desktop analyses and field investigations (Section 5).

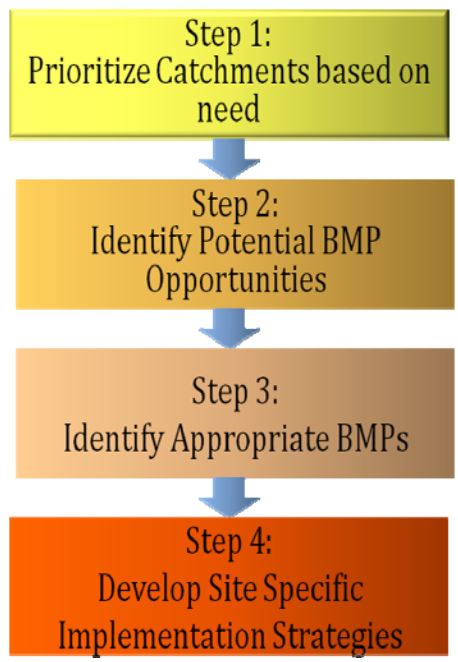

Figure C-1
Steps for Selection of Structural BMPs

The following sections summarize the methodology associated with each step as applied to the development of the Los Angeles River Metals TMDL Implementation Plan. A more detailed explanation of the methodology can be found in the SBPAT Guidance Manual (Geosyntec 2008a).

[1] Developed by Geosyntec Consultants for the County of Los Angeles Department of Public Works, Heal the Bay, and the City of Los Angeles Bureau of Sanitation

Section 2
Catchment Prioritization

2.1 Overview

The first step of the process identifies the catchments that have the potential to generate the highest pollutant load during wet weather events. The SBPAT modeling analysis of pollutant loads relies on Event Mean Concentration (EMC) data applicable to different land uses. Although this Implementation Plan is being submitted to meet the requirements of the Los Angeles River Metals TMDL, other pollutants of concern were considered during the catchment prioritzation process. This multi-pollutant approach is consistent with the guiding principle that the Implementation Plan incorporate an integrated water resources approach.

SBPAT calculates a Catchment Prioritization Index (CPI) for each of the delineated catchments in the watershed based on the potential for a particular catchment to contribute pollutant loads for any modeled pollutant of concern. The CPI assigned to each catchment ranges from 1 to 5, with 5 representing the highest priority. For a more detailed explanation of the CPI calculation, see Step 1 of the SBPAT Guidance Manual (Geosyntec 2008a). Following is a brief summary of the key elements of this step of the analysis.

2.2 Pollutant-Specific Catchment Prioritization Index

SBPAT calculates pollutant-specific CPI scores for each catchment as the product of area-weighted pollutant EMCs, area-weighted 85th-percentile precipitation depths, and area-weighted volumetric runoff coefficients (based on land use from Southern California Association of Governments [SCAG] and land use runoff coefficients reported by Ackerman & Schiff, 2003; Table C-1 below).

Table C-1
Runoff Coefficient Based on Land Use

Land Use	Runoff Coefficient[(1)]
Commercial/Educational	0.61
Industrial/Transportation/Other Urban	0.64
Open	0.06
Residential	0.39

[(1)] Source: Ackerman, D. and K. Schiff. Modeling Storm Water Mass Emissions to the Southern California Bight. J. of Environmental Engineering. April 2003. pp. 308-317.

Notes: “Other urban” category, which includes “mixed industrial/commercial” and “under construction” SCAG land use categories, represents <1% of total County area

The pollutant CPI scores for each catchment were then normalized by the maximum observed score for each pollutant and weighted by pollutant group based on the relative importance assigned to each pollutant group. Table C-2 summarizes the consensus-based pollutant group weights (as determined by the participants in the development of SBPAT).

Table C-2
Pollutant Group Weights for Normalized Pollutant CPI Calculation

Pollutant	Weight
Trash	0
Nutrients (Nitrate)	10
Bacteria (Fecal Coliform)	10
Total Metals (Total Copper, Total Lead, Total Zinc) (5 points each)	15
Total Suspended Solids (representing sediment)	5

Finally, the adjusted metals pollutant CPI scores for each catchment were multiplied by three, which weights the score in recognition that a TMDL has been adopted for this constituent. This adjustment resulted in a preliminary CPI score. Final CPI scores were obtained by normalizing the preliminary CPI scores to a maximum possible score of 5.

2.3 Catchment Prioritization

A CPI analysis was completed for each of the analyzed pollutants (for Los Angeles River Watershed, this analysis included fecal coliform, copper, lead, zinc, and Total Suspended Solids [TSS]). The prioritization results for each pollutant (1–lowest priority to 5-highest priority) can be illustrated by pollutant and as a weighted average for all analyzed pollutants. This integrated map provides a final catchment-specific prioritization that is multi-pollutant based.

A "nodal" catchment prioritization index, or NCPI, was used to group hydrologically linked high-priority catchments with "downstream" catchments that may be utilized for potential regional BMP implementation. Using the downstream catchment attribute, catchments tributary to each network node were identified and an area-weighted average CPI score for that node was computed. After rounding to the nearest integer, each catchment was assigned the NCPI value of its associated outlet node.

Catchments with high NCPI scores are characterized as having an upstream tributary area that contains a relatively large proportion of high priority catchments. A comparison of the spatial distribution of NCPI scores with CPI scores often shows general agreement regarding the classification of priority catchments. High priority NCPI catchments are typically down-gradient of, or are themselves, high priority catchments as determined by the CPI score

For the Los Angeles River Metals TMDL Implementation Plan the following approach used to develop the final catchment-specific prioritization that is multi-pollutant based. The first step was to normalize the estimated loading from each subcatchment. Normalization converts mass loading estimates to dimensionless ranks (0-1) relative to the maximum estimated load. Factors considered prior to summing the normalized values for each subcatchment include:

- Allocating equal influence to each family of pollutants, including bacteria (fecal coliform), nutrients (total nitrogen), metals (total copper, total lead, and total zinc), and sediment (TSS) in the development of a multi-pollutant CPI. This is accomplished by converting the normalized loads to a scale of 1-10 for fecal coliform and total nitrogen and 1-5 for total copper, total lead, total zinc, and TSS. Sediment has an equal influence although TSS is only scaled from 1-5 because it is assumed that one-half of the sediment-related water quality conditions of concern can be attributed to metals.

- Weighting of the rescaled normalized loads, by a factor of two or three, to account for known pollutants of concern in subcatchments that drain to waterbodies that either are on the 303(d) list of impairments or have an adopted TMDL, respectively.

- Incorporating other impairments on the 303(d) list that are not within one of the families of pollutants discussed above (such as organic compounds). These are accounted for by adding an additional five points for each impairment. Following these transformations, load estimates for each pollutant and other impairment considerations are summed. For each subcatchment, these sums are normalized to a scale of 1-5 (rounding upward to the nearest integer to facilitate plotting) to generate a final CPI. The result of this effort is a subcatchment map that identifies which areas are expected to contribute the greatest pollutant loads.

Section 3
Identification of Structural BMP Opportunities

3.1 Introduction

The second step of the BMP selection process focuses on identifying opportunities for BMP implementation in the watershed. This section describes the analyses that were conducted to identify candidate locations for regional and distributed structural BMPs in the high-priority catchments (those with a CPI or NCPI of 4 or 5) identified in the previous step (Section 2).

The method used to identify candidate BMP opportunities in the Los Angeles River Watershed differs in part from the approach applied in the SBPAT model. For the Los Angeles River Watershed, candidate BMP locations were determined by screening parcels in relation to several watershed-wide GIS layers. SBPAT also screens parcels, but results are presented as opportunity catchments rather than specific locations. Because the catchment delineations in the Los Angeles River Watershed are larger than those in other area watersheds, e.g., Ballona Creek Watershed (averaging 500 versus 40 acres), multiple candidate locations for distributed and/or regional BMPs are likely to occur within a single catchment. To account for this, BMP opportunities are expressed at the parcel level, rather than combining parcel information to the catchment scale. In addition, parcel level results are useful in subsequent BMP selection steps involving desktop and field investigations of regional and distributed BMP opportunities.

3.2 Identifying Candidate BMP Locations

Determining the feasibility of constructing and operating structural BMPs at a potential site depends on many factors and must account for the amount of runoff captured. Generally, sites with available open space, public ownership, and close proximity to storm drain systems make better candidates for retrofitting structural BMPs in already developed areas.

The selection of candidate locations for structural BMPs focused on the watershed's high priority catchments so that implementation occurs in areas with the greatest potential for pollutant loading. Site characteristics and potential constraints in high priority CPI and NCPI catchments (as identified in the previous step) were evaluated as part of the process to identify candidate BMP locations (Figure C-2). This process uses watershed-wide GIS analysis to extract parcels from the County of Los Angeles database based on several criteria suitable for BMP siting and removes parcels from this list based on constraints. The criteria for retaining and then removing parcels differ depending on the scale and type of BMP.

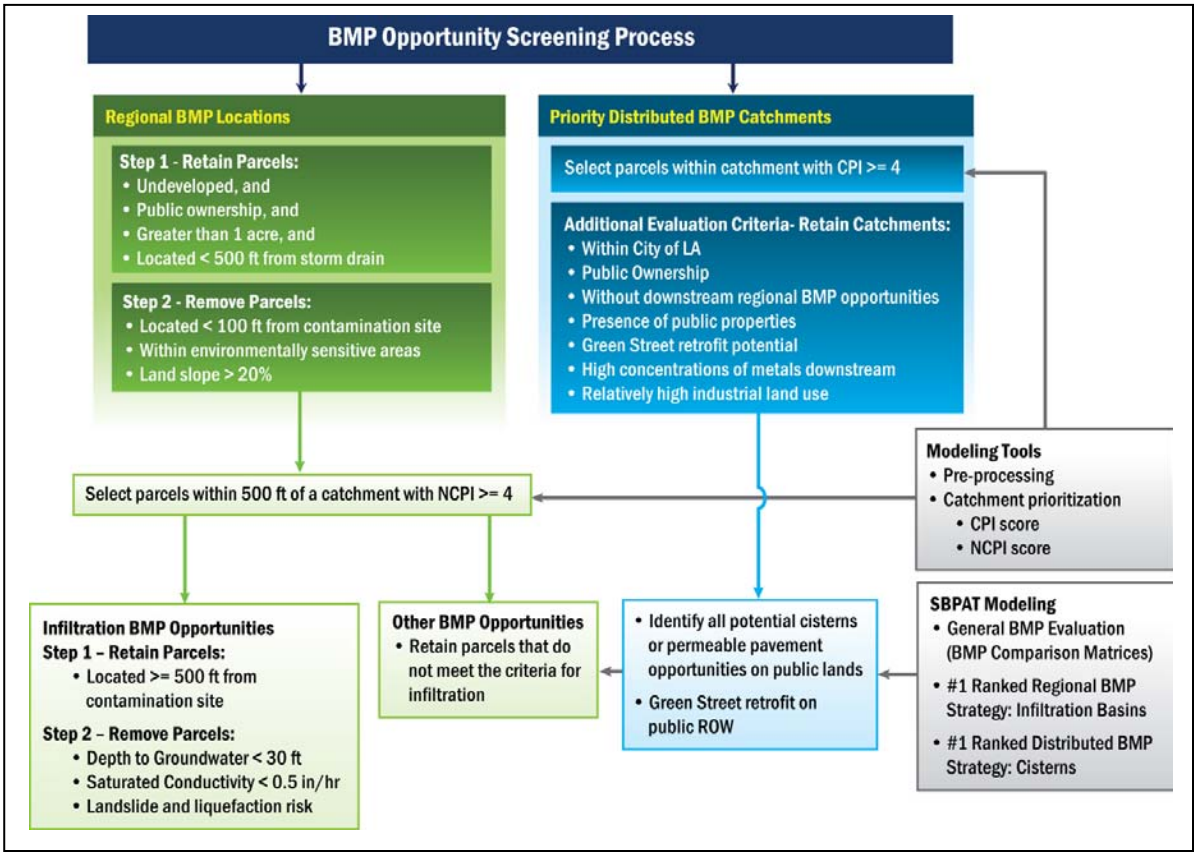

Figure C-2
Procedure used to Evaluate Structural BMPs at Candidate Locations in the Los Angeles River Watershed

3.3 Parcel Screening for Candidate BMP Locations

Candidate BMP sites identified in the previous step are further screened. Parcels containing fatal flaws that would either impede BMP construction, or would not significantly improve water quality, were screened out or removed from the list of candidate BMP locations. This screening process, while designed to encapsulate as much site information as possible, does not represent a site-specific assessment, but rather provides an initial set of candidate locations for further investigation.

A GIS-level screening analysis (using ArcGIS v9.3) identifies candidate BMP locations by removing Los Angeles County GIS database parcels that do not meet specific criteria from the candidate list. The parcel screening process employs available GIS data to assess as much site information as possible at a watershed-wide scale. Different watershed-wide geospatial layers and shapefiles were used to characterize constraints for all parcels within the Los Angeles River Watershed. Parcels that did not meet predefined criteria were excluded from the list of candidate BMP locations. Evaluation criteria for structural BMP locations included the following:

3.3.1 Site Area, Ownership, and Land Use

An important step in the parcel screening process involved identifying site areas, landowners, and land use constraints. Distributed BMPs are typically applied to developed areas because BMP options often involve retrofitting a site to capture on-site runoff (Note: distributed BMPs also would apply to new development, but the City's SUSMP requirements already address that opportunity). Candidate locations for implementing distributed BMPs may include residential, commercial or industrial land uses; however, ease of implementation is much higher on publicly owned lands. Therefore ideal candidate locations are street right-of-ways, small parks and school properties.

In contrast, regional BMPs require large areas of open space; therefore, candidate locations are limited to parcels categorized as undeveloped or open space (e.g., parks) that are publicly owned. Narrowing the implementation of regional BMPs to publicly owned lands reduces the need to coordinate with private landowners when implementing a project.

3.3.2 Proximity to Storm Drain

For regional BMPs, the proximity of a site to existing storm drains is an important consideration in the selection of a candidate location, because stormwater collection system diversions are common for BMPs at this scale. Candidate regional BMP locations for this TMDL Implementation Plan will be within 500 feet of a storm drain or channel to limit the amount of conveyance required to redirect and capture stormwater runoff. Distributed BMPs collect runoff directly from the landscape; therefore, their proximity to storm drains does not affect the technical feasibility of a project.

3.3.3 Contaminated Sites Screening

Implementation of structural BMPs on contaminated sites can be challenging; therefore, the list of candidate BMP locations does not include any parcels within 100 feet of any known active contaminated site. This screening leveraged several geospatial databases of contaminated sites:

- *Geotracker*: GIS database containing point locations for potentially contaminated sites, provided by the Los Angeles Regional Water Quality Control Board (LARWQCB). The database includes potential groundwater contamination from Leaking Underground Storage Tanks (LUSTs); Department of Defense sites (DoD); Spills, Leaks, Investigations, and Cleanups (SLIC); and landfill sites.

- *EnviroStor Cleanup*: GIS database containing point locations for potentially contaminated sites from the California Department of Toxic Substances Control (DTSC). The database contains sites with potentially contaminated soil, including sites with known contamination and sites requiring further investigation.

- *EnviroStor Permitted*: GIS database containing point locations for potentially contaminated sites from DTSC. The database includes facilities that are authorized to treat, store, dispose, or transfer hazardous waste.

3.3.4 Environmentally Sensitive Area Screening

The list of candidate BMP locations does not include any parcels within environmentally sensitive areas. Screened environmentally sensitive areas include:

- Significant Ecological Areas designated by Los Angeles County.
- Critical habitat for the Santa Ana sucker (*Catostomus santaanae*).
- Critical habitat for Braunton's milk-vetch (*Astragalus brauntonii*).
- California Natural Diversity Database: GIS information for the California Natural Diversity Database, provided by the California Department of Fish and Game (CDFG), contains the location of rare and endangered species (including individual plants, animals, and communities).
- Important Bird Areas (IBAs) per Audubon California, completion date November 2008. IBAs are sites that provide essential habitat for one or more species of bird, and include sites for breeding, wintering, and/or migrating birds. IBAs may include public or private lands, or both, and they may be protected or unprotected.
- Designated wetland areas or waters of the state.

3.3.5 Topography

Parcel topography was analyzed to remove sites located on hilltops, or containing slopes of 20% or greater. Regional BMPs on hilltops would have a limited catchment area and usefulness, and steep slopes present constructability issues.

3.3.6 High Priority Catchment Screening

Of the identified opportunity locations, only parcels located within high priority catchments, with CPI or NCPI scores of 4 or 5 as identified by SBPAT, were considered for BMP implementation. This procedure identifies BMP sites that would have the greatest impact on water quality by placing them in catchments with the highest modeled upstream pollutant loading. Allowing parcels to fall within a 500-foot buffer prevents acceptable parcels that may be in close proximity to a high NCPI catchment, from exclusion. Although outside of the high NCPI catchment, when located just downstream of the catchment, these parcels may be excellent candidate BMP locations for capturing runoff.

3.4 Mapping Green Street Candidate BMP Locations

Additional mapping was conducted to identify potential locations for the installation of Green Streets as a type of distributed BMPs. Many green street retrofits opportunities exist within the Los Angeles River Watershed, even if they are not identified in parcel database screening. Roadways that make good candidates for green street retrofits contain pervious areas within the right–of-way (ROW), such as medians and utility strips. Additionally, roadways without pervious areas but with large ROW widths relative to the traffic load can be candidates for retrofit. This type of opportunity was not assessed for this TMDL Implementation Plan.

Roadways within the Los Angeles River Watershed can be characterized by evaluating land cover within street ROWs. This characterization involved the analysis and reclassification of aerial images used in the Los Angeles One Million Tree Canopy Cover Assessment (Million Trees initiative) (McPherson et al. 2007). Using multi-spectral satellite imagery data, the Million Trees initiative categorized land coverage into five types: impervious, tree canopy, irrigated grass, dry grass/bare soil, and a combination of tree, grass, and soil, based on specific image characteristics for each category. Roadways containing greater aerial coverage of irrigated grass or dry grass/bare soil provide significant pervious areas for constructing green street retrofits. The evaluation of green street retrofits involved scoring each roadway based on the amount of pervious coverage.

Step one of this BMP candidate evaluation included assigning scores to each land coverage type. Impervious coverage areas were assigned a score of zero; tree canopy areas received a score of one; irrigated grass/soil areas were given a score of four; and a combination of tree, grass, and soil types were assigned a score of two (Table C-3). The result is a raster map of land coverage scores based on impervious areas and vegetation coverage.

Table C-3
Land Coverage Classification and Associated Pervious Score

Map Coverage Classification	Pervious Surface Score
Impervious surface (rooftops, road surface, driveways)	0
Tree cover (trees and shrubs)	1
Irrigated Grass (green grass and ground cover)	4
Dry grass/bare soil	4
Combination of tree cover, irrigated grass, and dry grass/bare soil	2

Potential roads for green street retrofits are identified by averaging the pervious surface scores for each roadway area. Using this scores, road sections with approximately 40 percent of the roadway segment in a pervious land cover group were screened as likely opportunities. Lastly, candidate green street retrofits were limited to ROWs within high priority catchments that contain a CPI score of four or greater.

It should be noted that accurate pervious/impervious coverage data is limited because tree cover impedes satellite observation of the surface in certain areas. This is especially true for residential areas because they often have greater tree coverage. Accordingly, the coverage analysis describe here is used only as a tool to identify potential locations for green street retrofits. Additional desktop and street-level analysis will be necessary to verify findings and further refine site locations.

Section 4
Preliminary Screening of BMP Opportunities

4.1 Description of BMP Options

The previous section described the process for identifying candidate opportunity sites for structural BMPs within the City of Los Angeles' portion of the Los Angeles River Watershed. The types of distributed or regional BMPs that are most appropriate for a candidate site depend upon several factors, including cost, expected effectiveness, ease of implementation, and environmental constraints. This section describes the methodology for screening candidate locations.

4.2 BMP Evaluation

The SBPAT preliminary screening methodology for evaluating BMP options involves a comparison of four general screening categories to determine which types of structural BMPs may be most appropriate for each catchment (Geosyntec 2008a). The four general categories of evaluation are: (1) cost, (2) effectiveness, (3) ease of implementation, and (4) other environmental factors (Table C-4). This screening yields a series of catchment-specific data tables that apply user-defined weights to various BMP evaluation criteria. These data are used to calculate relative scores for each type of distributed and regional BMP.

The SBPAT methodology places equal emphasis on cost, effectiveness, and ease of implementation (with a total weighting of 30% each). The other environmental factors category receives a lower total weighting factor (10%). Each of these four screening factors contain a number of sub-factors that have their own weighting (Tables C-5 and C-6).

SBPAT performs general, structural BMP evaluations at a catchment level; however, candidate BMP locations in the LA River watershed for this project were identified at a parcel level. Thus, BMP-type scores for candidate BMP locations are equal for all opportunity parcels within the same catchment. The description below provides the methodology of the general, structural BMP evaluation for the Los Angeles River Watershed. A more detailed description of the SBPAT methodology is provided in the SBPAT Users Manual (Geosyntec, 2008a).

Table C-4 BMP Evaluation Criteria Weighting for the Los Angeles River Watershed	
BMP Implementation Criteria	**% Weight**
Cost	**30%**
Capital	15
Operations and Maintenance	15
Effectiveness	**30%**
Effluent Concentration (Trash, Nutrients, Bacteria, Metals, Sediment)	15.0
Other Pollutants (e.g., toxicity, bioaccumulation)	2.5
Volume Mitigation	2.5
Reliability	10
Implementation	**30%**
Engineering/Siting Feasibility	10
Ownership/ROW/Jurisdiction	10
Environmental Clearance	5
Permitting, Water Rights	2.5
Safety (Public)	2.5
Environment/Other Factors	**10%**
Other Potential Benefits (e.g. conservation)	6
Other Potential Impacts (e.g. vectors)	4
Total Weight	**100%**

The default weights specified in the SBPAT Methodology for each category (Table C-4) originate from a long-term collaboration among stakeholders in the County of Los Angeles, spearheaded by the City of Los Angeles Bureau of Sanitation, the County of Los Angeles Department of Public Works, and Heal the Bay. These collaborative efforts generated matrices to weight and score specific BMPs for each category as they are applied to regional BMPs (Table C-5) and distributed BMPs (Table C-6). The participating stakeholders leveraged a wide set of information when developing scores for the regional and distributed BMPs described herein. Considering the extent of this process, the default weights and scores for each BMP screening factor have not changed for this TMDLIP. The basis for each scoring factor is as follows:

Relative Cost Scores - BMP scores (1 to 5 points) are applied to two factors within the cost category: (1) capital costs (15%)[2]; and (2) operations and maintenance (15%). The total weight for the cost category is 30%.

[2] Land acquisition costs not considered in capital cost scoring

Table C-5
Regional BMP Comparison Matrix[3]

Ranking Factors	Potential Fatal Flaw?	Weight	Score (1=worst - 5=best, Fatal Flaw (FF))						
			Infiltration Basins	Detention Basins	Detention w/SSF Wetlands	Constructed SF Wetlands	Treatment Facility	Hydrodynamic Devices	Channel Naturalization
Cost		**30%**							
– Capital	N	15%	4	4	2	4	1	3	4
– Operations and Maintenance	N	15%	1	3	2	2	2	4	3
Effectiveness		**30%**							
– Effluent Conc. (by pollutant group)									
- Trash	N	**15% of Total[4]**	5	4	5	5	5	4	2
- Nutrients	N		5	2	5	5	5	2	5
- Bacteria	N		5	2	4	3	5	2	1
- Metals	N		5	3	5	5	5	3	4
- Sediment	N		5	3	5	5	5	4	4
– Other Pollutants (toxicity,	N	2.5%	5	3	4	4	4	3	3
– Volume Mitigation	N	2.5%	5	3	3	3	2	1	2
– Reliability	N	10.00%	2	3	3	3	5	3	3
Implementation		**30%**							
– Implementation Issues									
- Engineering/Siting Feasibility	Y	10.0%							
- Ownership/ROW/Jurisdictions	Y	10.0%							
- Environmental Clearance	N	5.0%	4	4	4	4	2	4	2
- Permitting, Water Rights	Y	2.5%	5	5	5	2	2	2	2
– Safety (Public)	Y	2.5%	3	3	3	3	4	4	3
Environment/Other Factors		**10.0%**							
– Other Potential Benefits (e.g., conservation)	N	6.0%	5	4	4	4	1	1	5
– Other Potential Impacts (e.g., vectors)	Y	4.0%	3	2	3	2	3	3	3
Weighted Score		**100%**							

[3] BMP table criteria and weights were developed based on steering committee consensus and best professional judgment of the Project Team.
[4] Effluent concentration scores will be weighted by catchment NCPI scores.

Table C-6
Distributed BMP Comparison Matrix[5]

Ranking Factors	Potential Fatal Flaw?	Weight	Score (1=worst - 5=best, Fatal Flaw (FF))							
			Cisterns	Bio-retention	Vegetated Swales	Green Roofs	Pervious/ Permeable Pavements	GSRDs	Media Filters	Catch Basin Inserts
Cost		**30%**								
– Capital	N	15%	3	2	4	1	2	2	3	5
– Operations and Maintenance	N	15%	5	3	4	4	5	3	4	4
Effectiveness		**30%**								
– Effluent Conc. (by pollutant group)										
- Trash	N	**15% of Total**[6]	5	5	4	4	5	4	5	4
- Nutrients	N		5	5	4	4	5	1	3	1
- Bacteria	N		5	5	1	4	5	1	3	1
- Metals	N		5	5	4	4	5	2	4	1
- Sediment	N		5	5	3	4	5	3	5	2
– Other Pollutants (toxicity, bioaccum.)	N	2.5%	4	4	4	4	4	1	4	1
– Volume Mitigation	N	2.5%	3	4	4	4	4	1	1	1
– Reliability	N	10.00%	3	4	4	3	2	3	3	3
Implementation		**30%**								
– Implementation Issues										
- Engineering/Siting Feasibility	Y	10.0%								
- Ownership/ROW/Jurisdictions	Y	10.0%								
- Environmental Clearance	N	5.0%	5	5	5	5	5	5	5	5
- Permitting, Water Rights	Y	2.5%	5	5	5	5	5	5	5	5
– Safety (Public)	Y	2.5%	4	3	3	4	3	4	4	4
Environment/Other Factors		**10.0%**								
– Other Potential Benefits (e.g., conservation)	N	6.0%	5	4	4	4	3	1	1	1
– Other Potential Impacts (e.g., vectors)	Y	4.0%	2	3	3	3	3	3	3	3
Weighted Score		**100%**								

5 BMP table criteria and weights were developed based on steering committee consensus and best professional judgment of the Project Team.
6 Effluent concentration scores will be weighted by catchment CPI scores.

Relative Effectiveness Scores – Effluent concentration scores are based on data presented in the United States Environmental Protection Agency (EPA) and American Society of Civil Engineers (ASCE) International BMP database; Water Environment Research Foundation (WERF) guidelines (2005); and California BMP Handbooks (CASQA 2003). The scoring is a relative approximation based on reported, achievable effluent concentrations for each BMP type.[7] BMP scores (1 to 5 points) are applied to each of several factors within the effectiveness category. These factors and their respective weights include: (1) effluent concentrations by pollutant group (15%); (2) other pollutants (2.5%); (3) volume mitigation (2.5%); and (4) reliability (10%). The total weight for the effectiveness category is 30%.

A summary of the scoring procedure and weighting used for the factors in this category is as follows:

- Weighting, allocated among the individual pollutant groups, is determined based on the contribution of each pollutant to each catchment's CPI score. Regional BMP evaluations use the contribution of each pollutant to the nodal CPI. For distributed and regional BMPs, the general BMP evaluation reduces each pollutant's relative contribution to a component by taking 15% of each pollutant. This results in a total pollutant removal effectiveness weighting of 15%. The effluent concentration by pollutant group (i.e., Trash, Nutrients, Bacteria, Metals, and Sediment) is site-specific and changes depending on the land use in the catchment. The weighting for all other factors is fixed for all catchments in the watershed.

- Other pollutant scores address BMP effectiveness for bioaccumulation, toxicity, legacy pesticides, and ecological impacts (2.5%).

- Volume mitigation scores address BMP effectiveness for reducing runoff volumes (2.5%)[8].

- Reliability scores address BMP effectiveness and reliability for performance, and sensitivity to operations and maintenance (10%).

Relative Ease of Implementation Scores - Relative ease of implementation ("implementability") scores for each BMP type has a total weight allocation of 30%. Assessing ease of implementation requires a general BMP evaluation of environmental clearance and permitting factors. This assessment is completed prior to site-specific BMP evaluation for planning-level engineering feasibility, parcel ownership, and public safety. Two of the criteria used to evaluate ease of implementation involve a fatal flaws analysis. A fatal flaw occurs when site conditions make implementation of a certain BMP unfeasible. Other criteria used to evaluate ease of implementation do not have the potential to become fatal flaws. The following is the BMP implementability score factors evaluated:

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[7] These evaluations were based on effluent concentrations, not pollutant removal percentages, because the former is considered a more reliable and robust proxy for water quality performance..

[8] Some commenter's have expressed that this weight should be increased. The user has this option for specific development.

- Engineering/siting feasibility scores: this evaluation is conducted during the site-specific BMP evaluation (10%) and includes a fatal flaw analysis. For example, if the site is upstream of most stormwater runoff, then challenges associated with rerouting runoff could eliminate the site from consideration by identifying the problem as a fatal flaw.

- Ownership/right-of-way/jurisdictions scores: this evaluation is conducted during the site-specific BMP evaluation (10%). The evaluation includes a fatal flaw analysis.

- Environmental clearance scores (5%).

- Permitting/water rights scores: fatal flaws may be identified during the site-specific constraints screening (2.5%).

- Public safety scores: fatal flaws may be identified during the site-specific constraints screening (2.5%).

Environmental/Other Factors Scores - BMP scores (1 to 5 points) are applied to two factors within the environmental/other factors category: (1) potential benefits (6%); and (2) potential impacts (4%). The total weight for this category is 10%. Factors in this category and their associated weighting include:

- Potential benefits scores account for a weight of 6% in the general BMP evaluation. Scoring for this factor included the following considerations:

  - Flood control/detention storage (2%)

  - Downstream impacts/hydromodification (1%)

  - Integrated water resources/water conservation (2%)

  - Habitat development (1%)

- Potential impacts scores: These scores have a total weight allocation of 4%. A score or identification of a fatal flaw is assigned based on a site-specific evaluation. This factor considers:

  - Vector issues (1%)

  - Bacteria source/regrowth issues (e.g., potential to accumulate organic debris or sediment, or attract avian populations) (1%)

  - Competing site uses, which are evaluated during a site visit (2%)

4.3 Infiltration Screening for Regional BMPs

To refine the results of the general BMP assessment described above, additional analyses evaluated the feasibility of establishing infiltration basins at candidate regional BMP locations. Although infiltration basins score high in the general BMP assessment for many factors, site requirements may limit or prevent their implementation. Infiltration basins, when not sited appropriately, could cause potential flooding, storm drain backflow, groundwater contamination, or increased risk of landslide/liquefaction.

To assess the feasibility of installing an infiltration basin at candidate regional BMP sites, five additional screening factors were evaluated:

- ***Adequate distance from contaminated sites*** - This criterion is similar to preliminary parcel screening carried out on potential sites; however, in this step, the screening criterion was increased from a minimum of 100 feet to 500 feet of separation from contaminated sites. This criterion was selected to reduce the potential of infiltrated water contributing to the movement or dispersion of a contaminated plume, or transporting soil contaminants into the groundwater aquifer.

- ***Adequate depth to groundwater*** – A minimum depth to the groundwater table threshold must be established to prevent storm drain backflow and potential flooding, and protect groundwater. The requirement from the LARWQCB is 10 feet of separation from the proposed infiltration basin invert to the seasonal high groundwater level. However, for this screening activity, a minimum of 30 feet was applied for the purpose of incorporating a margin of safety, given the resolution of the available groundwater depth data.

- ***Minimum saturated hydraulic conductivity (K_{sat})*** - Soil conditions must be permeable enough to support infiltration. The minimum Ksat of underlying soil must be at least 0.5 inch/hour (Caltrans Storm Water Quality Handbook: Project Planning and Design Guide, 2007).

- ***Outside of landslide zone*** - The site must be located outside landslide risk zones.

- ***Outside of liquefaction zone*** - The site must be located outside liquefaction risk zones.

Section 5
Site-Specific BMP Evaluation

Planning and siting of potential regional and distributed structural BMPs is particularly challenging because of the highly developed conditions in the watershed. Because the majority of structural regional BMPs will need to be retrofitted into developed areas of the watershed, the BMP analyses require significant site-specific BMP evaluations, including additional data collection and field inspections in order to screen, prioritize, and select sites.

5.1 Regional BMP Site Selection

This section summarizes the methods and results of the process used to (1) identify potential structural regional BMP sites in the watershed, and (2) conduct field inspections to further evaluate the sites. Three technical steps were followed to evaluate BMP candidate locations for regional BMP implementation:

- GIS-level screening to screen BMPs based on data available in GIS layers
- Desktop-level screening to identify BMP opportunities and constraints based on aerial photos and any other available information (e.g., storm drain information)
- Field-level screening to ground-truth opportunities and constraints identified during the two previous screening levels, and identify any other issues

Each of these steps is described in more detail below. In addition, one of the guiding principles for the Implementation Plan is to incorporate the stakeholder knowledge and understanding of the watershed. Accordingly, sites identified by stakeholders were also considered and included as appropriate during this phase of the analysis.

5.1.1 GIS –Level Screening

This step relied on GIS to screen sites using a series of "constraints" layers such as landslide zones, poor soil infiltration zones, and environmentally sensitive areas. The outcome of this step included site-specific maps with the following information:

- Catchment-specific constraints maps (with landslide areas, slopes, etc.)
- Catchment-specific opportunity maps (with aerial photos, storm drains, parcel ownership, etc.)
- Subwatershed-level drainage/opportunity maps (with drainage patterns)
- Regional opportunity catchment maps

5.1.2 Desktop-Level Screening

Because regional sites have tributary areas that are typically several hundred acres or more, the location needs to have sufficient space to construct a BMP and manage the runoff generated from the tributary area. Where opportunities for construction of a regional BMP could not be identified within a catchment, those locations were screened out. The focus of selecting the potential regional BMPs sites was to spread out the sites within the watershed. This is to ensure that the areas from major tributary and mainstem reaches that are listed on the 303(d) list are considered for treatment. The following information was summarized for each site:

- General area description (cross streets, landmarks)
- Drainage area
- Land use of regional BMP site and neighboring parcels
- Upstream development
- Description of potential parcels for BMP Implementation
- Storm drain information
- Drainage area
- Open space
- Existing BMPs and project proposals
- Stakeholder projects in the watershed
- Parks and open space areas
- Utility corridors
- Blacktop areas (school playgrounds)
- Roadways

The outcome of this step was the preparation of maps and figures to aid the field investigator when visiting the site to further assess the opportunity to implement a regional BMP at the location.

Field-Level Screening

The final step in the screening process is a field investigation to evaluate each site as an opportunity for implementing a regional BMP. The purpose of the visit was to: (1) verify previously identified constraints, and (2) identify any additional fatal flaws (e.g., flood control limitations, jurisdictional issues, storm drain proximity, public safety concerns, etc.) or opportunities (e.g., identification of open space to implement distributed BMPs in the area). For each site visit, the information generated from the GIS and desktop-level screenings was verified, supplemented, and/or corrected as needed in the field. Appendix F includes field investigation packages.

5.2 Distributed BMP Site Selection

The process involved in identifying the distributed BMP opportunities is similar to the process for the regional sites, except for the types of BMPs and the area served. This section summarizes the methods and results of the process used to (1) identify potential structural distributed BMP sites in the watershed, and (2) conduct field inspections to further evaluate the sites. In this analysis, a distributed BMP site is defined as a catchment, typically about 40 acres in size.

5.2.1 Methodology

The overall methodology used to identify distributed BMP opportunities is the same as what was used for regional BMPs (GIS-level screening, desktop-level screening, and field-level screening), with slight differences in the details of the steps. The details of these three steps specific to distributed BMPs are discussed below.

GIS-Level Screening

Unlike regional BMPs, distributed BMP opportunities exist throughout the watershed, and the GIS layers used to screen regional BMP sites do not limit the implementation of distributed BMPs. GIS-level screening for distributed BMPs was used to focus the potential implementation where the pollutant loads are likely to be the highest. The high CPI scored catchments was the only data layer used in the GIS-level screening for distributed BMPs. Following completion of this screening activity, only 117 high scoring catchments (CPI score of 4 or 5) remained.

Desktop-Level Screening

The desktop-level screening was performed to select 100 catchments from the 117 high scoring catchments within the City of Los Angeles. This was done by skewing the selection toward Reach 2 and other industrial areas, where there were fewer regional BMP opportunities.

Once the 100 opportunity catchments were identified, smaller representative portions of each 500 acre catchment were selected in order to make the detailed field investigation feasible. For each of the 500 acre catchments a representative sub-catchment, approximately 40 acres in size, was selected. The representative sub-catchments were chosen based on a distribution of land uses that was similar to that of the larger 500 acre catchment.

Field-Level Screening

The field-level screening was performed on the 100 distributed BMP catchments identified in the desktop-level screening. Field investigation of distributed BMP opportunity sites provided an estimate of the type, number, and potential area within each catchment that could be retrofitted to install a distributed BMP. This information was evaluated to identify percent treatment for each proposed BMP type and each major land use for the 100 distributed BMP catchments. These results were used to support quantitative analyses associated with implementation of distributed BMPs.

Green Streets as a Distributed BMP Approach

Green streets are a major component of proposed distributed BMPs. Streets are a part of the City's storm drain system, as storm water runoff flows down the streets along gutter curbs into catch basins that are connected to storm drain lines that flow directly into the Los Angeles River and its tributaries. The City's street infrastructure currently plays a major role in carrying pollutants from neighborhoods to receiving waterbodies. All of the streets and alleys have the potential to be converted from impervious surfaces to permeable surfaces or Green Streets. The public right-of-way provides a large area where infiltration swales or other types of pervious surfaces can be constructed to collect, retain, or detain storm water runoff.

After performing the GIS-level, desktop-level, and field-level screening, it was found that the greatest opportunity for distributed BMPs were Green Street parkways. Distributed BMP opportunities are limited to areas within public right-of-way, and streets and alleys represent the greatest area of public right-of-way. The field investigations determined the feasibility of converting existing parkways to Green Street parkways, or bioretention facilities. The field investigations estimated the length and width of existing parkways as well as the tributary area. It was assumed that even if an existing parkway was converted to a treatment facility, any mature trees would remain in place. The extent of mature trees within the parkway was noted, and taken into account when calculating the usable treatment area and percent treatment.

Appendix D
Stakeholder Coordination

Stakeholder Meeting Notes

Appendix D
Stakeholder Meetings

The project team met with a variety of stakeholders representing watershed, environmental, and community interests to identify opportunities for collaboration on implementation of BMPs to manage urban runoff. For each meeting, the discussion focused on the following theme: What can your organization tell us about existing or proposed projects or programs that may be an opportunity for collaboration with the City of Los Angeles to achieve TMDL compliance goals? The following sections provide highlights from each stakeholder group meeting.

Los Angeles and San Gabriel Rivers Watershed Council

The project team met with Alex Kenefick (Compton Creek Watershed Coordinator) and Edward Belden (Water Programs Manager) on May 18, 2009. A subsequent meeting was held with Nancy Steele (Executive Director) on June 3, 2009. Following is summary of the meeting discussions:

- Watershed Council staff discussed the Elmer Street green street retrofit project and LA Department of Water and Power projects in the Sun Valley area.
- Mr. Kenefick offered to provide a Google map of approximately 50 water quality related projects under consideration in the Compton Creek Watershed. This map was provided to the project team in a subsequent email.
- Staff recommended review of the IRWMP and Los Angles River Revitalization Projects, which contain a large number of potential projects/BMP sites in the watershed (see Section 4.2 above).
- Staff mentioned a number of other projects they were aware of in the watershed including a Los Angeles Community Redevelopment Agency park project with greenspace in the Vermont Avenue corridor between Gage and Washington Streets, the next phase of the Augustus Hawkins Park, and ongoing community improvement projects being directed by St. Michael's Church on Manchester Boulevard in south Los Angeles.
- It was recommended that the use of more demonstration projects would help build community understanding and support for BMP implementation. Piloting projects first can help identify conflicts and the means to resolve them.
- Other collaboration/consultation opportunities include meeting or working with the following groups: Arroyo Seco Foundation, Urban Semillas, North East Trees, Trust for Public Lands, Amigos de los Rios, Pacoima Beautiful, Boyle Heights/Hazard Park project in Hazard Drain, East Yards Communities for Environmental Justice, Los Angeles Poverty Department, and Audubon Society.
- The Watershed Council has an Ecosystems Evaluation Program, which is evaluating the sociological, environmental and economic indicators that measure how people interact with the environment. The project is still ongoing, but may be

able in time to provide a means for better quantification of institutional BMP program benefits.

- It was recommended that the City focus BMP implementation efforts in areas where recycled material facilities, train yards and other industrial facilities are located.

Los Angeles Conservation Corps (LACC)

The project team met with Bruce Saito (Executive Director) and Dan Knapp (Deputy Director) on May 19, 2009. Following is summary of the meeting discussion:

- Staff described several programs: (1) River Keepers program which conducts cleanups in pocket parks along and near the Los Angeles River, e.g., they are currently working in Elsyian Valley along seven miles of river; (2) Clean and Green Program which works with kids to reduce trash and collect recyclables; Sea Lab which includes water quality testing and coastal education programs.
- LACC partners with other organizations, e.g., Friends of the Los Angeles River to conduct water quality testing, cleanups, and public education in coordination, Metropolitan Water District to remove non-native plants from Bull Creek, and Mountains and Rivers Conservancy to support education and cleanup programs
- LACC is involved in park construction projects that incorporate stormwater management BMPs, e.g., construction of bioswales. The goal of these projects is on job-training.

Audubon Society, San Fernando Valley

The project team met with Muriel Kotin and Mark Osokow on May 19, 2009. Following is summary of the meeting discussion:

- Audubon does not have projects that directly provide opportunities to better manage urban runoff. However, they are interested in protection of environmentally sensitive areas and do collaborate with others in the watershed.
- It was suggested that the City look at potential metals sources not often considered, e.g., copper-based chemicals used by plumbing companies to treat tree roots and water treatment facilities to for algae control.
- Audubon does participate in public education and outreach activities including use of recycled water, trash management, and cleanup events. Recommended continued emphasis on public education and outreach which needs to include explanations for what to do with products that cause harm to the environment, e.g., old tires, and household hazardous waste.
- The "Audubon at Home" program teaches water conservation to homeowners. The program provides information on the planting the right type of vegetation to prevent urban runoff.
- The Sepulveda Basin Wildlife Steering Committee could be a potential collaborative partner. Participants in the past have included Audubon Society,

California Native Plant Society, Canada Goose Project, The River Project, Sierra Club and Resource Conservation District of Santa Monica Mountains.

TreePeople

The project team met with Rebecca Drayse, Edith Ben-Horin, Peter Massey and Mary Skerritt on June 2, 2009. Following is summary of the meeting discussion:

- Staff indicated their support for an inclusive approach to TMDL implementation, i.e., implement BMPs that address multiple pollutants simultaneously.
- The organization is very active in watershed education programs and would like to see such education become part of the regular school curriculum. In addition, it was recommended that Los Angeles Unified School District teachers be given salary credits when they go through training on watershed education topics.
- Schools are the largest landowner in the City. Programs that work with the schools could yield significant results. For example, education activities could be expanded by including teachers and students in local projects, especially if the project is in the local neighborhood associated with a school.
- Ownership of a project is an important consideration for implementation. Demonstration projects may not have any entity that "owns" the projects. This can cause problems in the long term. Instead of demonstration projects, it is recommended that after City agencies build projects they also operate and maintain them.
- The Sun Valley Watershed area was noted as an area in need of focus for implementation of BMPs. The Elmer Avenue project is a good example of the type of BMP projects needed.
- Partnership with Los Angeles Department of Water and Power is needed because of that organizations mission to capture more stormwater.
- Staff recommended that the TMDL Implementation Plan concentrate the activities of multiple, but separately implemented, programs. For example, it has been shown that low tree canopy coverage correlates with high pollutant loads. Thus, efforts to increase tree canopy coverage can have a water quality benefits.
- It was recommended that the City adopt (1) a downspout disconnection ordinance that requires that downspouts drain to permeable surfaces; and (2) an ordinance that addresses how parking lots are built so that they help reduce urban runoff from the site.
- The City should coordinate its efforts with other projects and programs which have related water quality goals, e.g., Prop O projects and IRP plan.
- Following the meeting, the project team was given a tour of the TreePeople Facility. Ms. Ben-Horin noted that the facility has been used in the past to pilot test BMPs and could be available for such collaborative work in the future.

Friends of the Los Angeles River (FoLAR)

The project team met with Ramona Marks on June 9, 2009. Following is summary of the meeting discussion:

- FoLAR is actively involved in education-related activities involving the Los Angeles River. This effort includes River School Days with local elementary age children, monthly e-newsletter, clean-up activities, water quality testing, and walking tours.
- Katherine Cera and Associates recently completed a study which look at neighborhoods in the Elysian Valley and Atwater Village areas where river access could be improved while at the same time incorporating BMPs to improve infiltration of urban runoff. A copy of this study was provided to the City.
- Fish tissue studies have previously been conducted in the Glendale Narrows are of the river by FoLAR (Note: these data were incorporated into TM 1). FoLAR plans to expand these studies into other areas of the watershed if funding is approved by FoLAR's Board.
- FoLAR would like to be more actively involved in river activities, but are greatly restricted by limited funding and staff.

North East Trees

The project team met with Holly Harper on June 9, 2009. Following is summary of the meeting discussion:

- Information was provided on the Oros Green Street Project, one of the first Proposition O projects funded and collaboratively implemented by the City, North East Trees and other community organizations.
- Follow-up water quality monitoring is planned for the Oros Green Street Project, which will be able to provide information on water quality benefits of such projects.
- North East Trees is working with other local cities on urban runoff management projects. Information on the Cudahy River Park project was provided as an example.
- North East Trees strongly supports continued implementation of green street projects, especially where multiple benefits, including infiltration, education, and habitat rehabilitation, can be achieved.
- A site matrix is being developed for use as a decision tool for identification, selection and implementation of green street projects. Once completed, this matrix can be made available.
- North East Trees projects focus on implementation of structural BMPs rather than implementation of institutional BMP programs such as education.
- A youth training program is being implemented that provides training and opportunity to work on BMP projects over a 12-16 week period.

- Where projects can solve other local community needs, e.g., standing water/drainage issues, and broken curbs and sidewalks, local stakeholders are supportive of projects.
- When implementing structural BMPs, the City's schedule should try and coincide with the City's schedule for street repair/maintenance in the same area. This allows parallel efforts to be linked so that urban runoff management opportunities are maximized.

Heal the Bay

The project team met with Suzy Santinela, James Alamillo, Refugio "Reg" Mata and Kirsten James on June 9, 2009. Following is summary of the meeting discussion:

- Staff provided information on some of the partnerships/projects they have developed with schools and community groups in the Los Angeles River Watershed, including the Youth Opportunities High School, Wisdom Academy for Young Scientists, St. Michael's Church, Vermont Median, and Washington Elementary School. Subsequent to the meeting, information on some of these projects was provided.
- Projects with the organizations listed above combine the need for community greening and beautification with implementation of BMPs to reduce urban runoff.
- Heal the Bay has found that it is important to include the local community in the project development process.
- Heal the Bay is currently working with the City on Green Streets and Low Impact Development Initiatives and would like to see these efforts continue with strong support.
- It was recommended that increased collaboration occur among City agencies, including Watershed Protection Division, CRA, LADWP, and Parks and Recreation.
- Staff recommended that the City consider implementing the TMDL at the sub-watershed level first through implementation of pilot BMP projects. Based on experiences from this effort, expand BMP implementation to other subwatersheds.
- Additional organizations recommended for outreach to during implementation include Urban Semillas, Amigos de Los Rios, Pacoima Beautiful, Mountains Recreation and Conservation Authority, and Pacific American Volunteer Association.

Los Angeles Equestrian Center (LAEC)

The project team met with George Chatigny (General Manager) on June 10, 2009. The emphasis of the discussion with the LAEC was on BMP implementation activities that have been implemented to date to control bacteria loads in urban runoff. While not necessarily applicable to metals, the information provided (see notes in Appendix B) will eventually be useful for implementation of the Los Angeles River bacteria TMDL, which is expected to be adopted by late 2009 or 2010.

Los Angeles Department of Water and Power (LADWP)

The project team met with Mark Hanna and Susan Avila on June 10, 2009. Following is summary of the meeting discussion:

- LADWP is actively involved in the implementation of projects that will have urban runoff management benefits. The focus of these efforts is in the Sun Valley Watershed area where projects are being planned and implemented to increase infiltration of stormwater. This area is of particular interest because of good infiltration rates (as compared to the western part of the San Fernando Valley) and the presence of LADWP wells located throughout this area.
- Information was provided on two specific projects that are currently in the planning phase: (1) Whitnall Powerline Easement Stormwater Capture Project; and (2) Valley Generating Station Stormwater Recharge Project. Subsequent to the meeting LADWP provided fact sheets for each project.
- LADWP has been gathering data for a number of years that demonstrate that infiltration improves the quality of water within six feet of the ground surface.
- LADWP is interested in collaborating on green street projects in the future.
- Institutional BMP programs focus on water conservation rather than source control; however, water conservation programs can reduce the volume of dry weather flows.

Mujeres de la Tierra

The project team met with Irma Munoz, Adan Ortega and Jade Lockhart on June 16, 2009. Following is summary of the meeting discussion:

- Staff discussed the Aliso Creek Confluence Project. The purpose of the project is to create a greenway in the area of the Los Angeles River/Aliso Creek confluence. Much of the land in the area is owned by LADWP.
- It was recommended that the City work with local community organizations on BMP implementation so that the local community can take "ownership" of the project.
- Institutional BMP activities include public education and outreach, e.g., work is ongoing to implement their Reseda Project to expose youth to water issues and potential careers in sustainability-focused jobs.

Stakeholder Workshops

Stakeholder Workshop 1
March 25, 2009

Los Angeles River Metals Total Maximum Daily Load (TMDL) Implementation Plan

Stakeholder Workshop 1

March 25, 2009

Opening Remarks

Stakeholder Introductions

Agenda

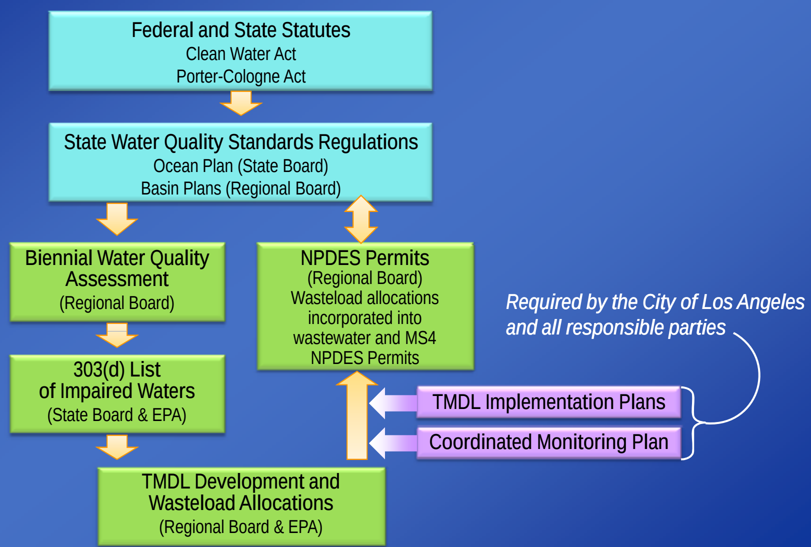
- Background
- Stakeholder Participation
- Metals TMDL Implementation Plan Development Process
  - Characterization
  - Potential Green Strategies
  - Development of Alternatives
  - Quantitative Nexus
- Next Steps

Background

Total Maximum Daily Load (TMDL)

A TMDL specifies the maximum amount of a specific pollutant that can enter and assimilate into a specific receiving waterbody without causing impairment to the ecosystem.

Regulatory Context



LA River Pollutants of Concern

- Metals TMDL:
  - Cadmium, Copper, Lead, Zinc, and Selenium
- Other TMDLs:
  - Trash
  - Nutrients (no stormwater targets)
- 303(d) List:
  - Bacteria
  - Cyanide
  - Diazinon (pesticide)
  - Oil
  - 1,1-DCE, PCE, TCE

Los Angeles River Metals TMDL

- The Los Angeles River Metals TMDL sets a limit to the amount of metals that are allowed to enter the Los Angeles River
- The Implementation Plan will describe how the City will reduce the amount of metals currently entering the Los Angeles River

Purpose

- ***Total Maximum Daily Load (TMDL) Implementation Plan*****: to improve water quality and meet regulations**
- ***Stakeholder Workshops*****: to provide input on the development of the Implementation Plan**

Stakeholder Participation

Stakeholder Participation

- Workshop 1: Introduction/Watershed Characterization
- Workshop 2: Potential Green BMP Strategies (June 2009)
- Workshop 3: BMP Alternatives Plan (Sept 2009)

Stakeholder Participation

- Integration with other plans
  - LA River Revitalization Plan
  - City of Los Angeles Integrated Resource Plan
  - City of Los Angeles Water Quality Compliance Master Plan for Urban Runoff
  - LA County Integrated Regional Water Management Plan
  - Tujunga/Pacoima Watershed Plan
  - Others
- Opportunities for collaboration

Metals TMDL Implementation Plan Development Process

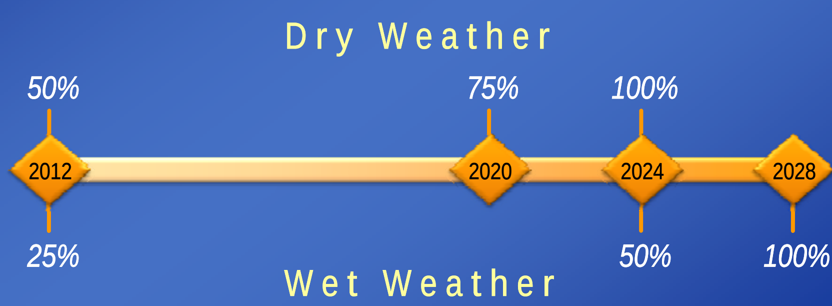
Implementation Plan Development Process

Implementation Plan Due Dates

- Draft Metals TMDL Implementation Plan due to Regional Board: January 11, 2010
- Final Metals TMDL Implementation Plan due to Regional Board: July 11, 2010

Compliance Timeline

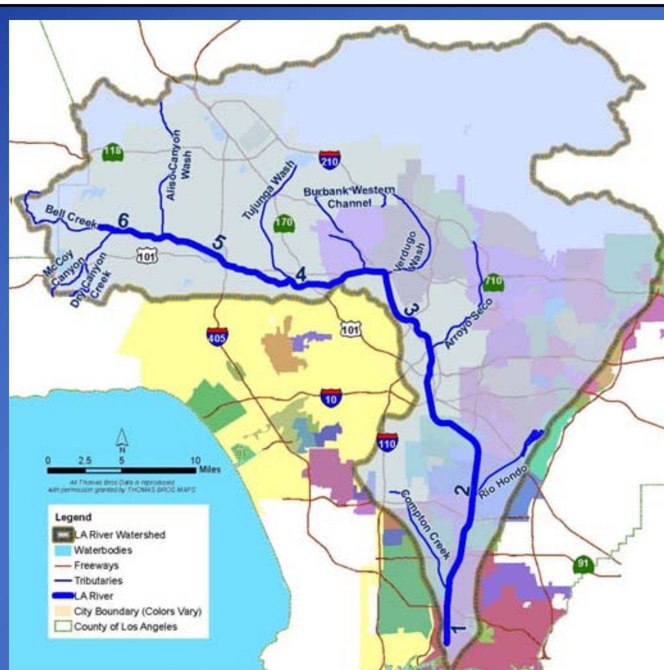
Deadlines: Percent of Drainage Area that must meet Waste Load Allocation (WLA) by date shown



Step 1: Characterization

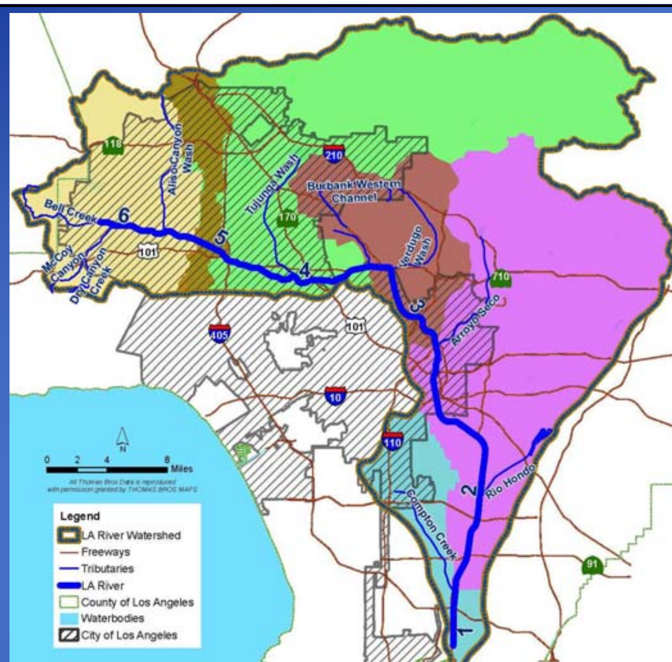
Los Angeles River Watershed

- LA River is 55 miles long
- LAR Watershed is 834 square miles (534,700 acres)
- City of Los Angeles is 33% of the watershed area (45% of urban area)



Reaches of the Los Angeles River

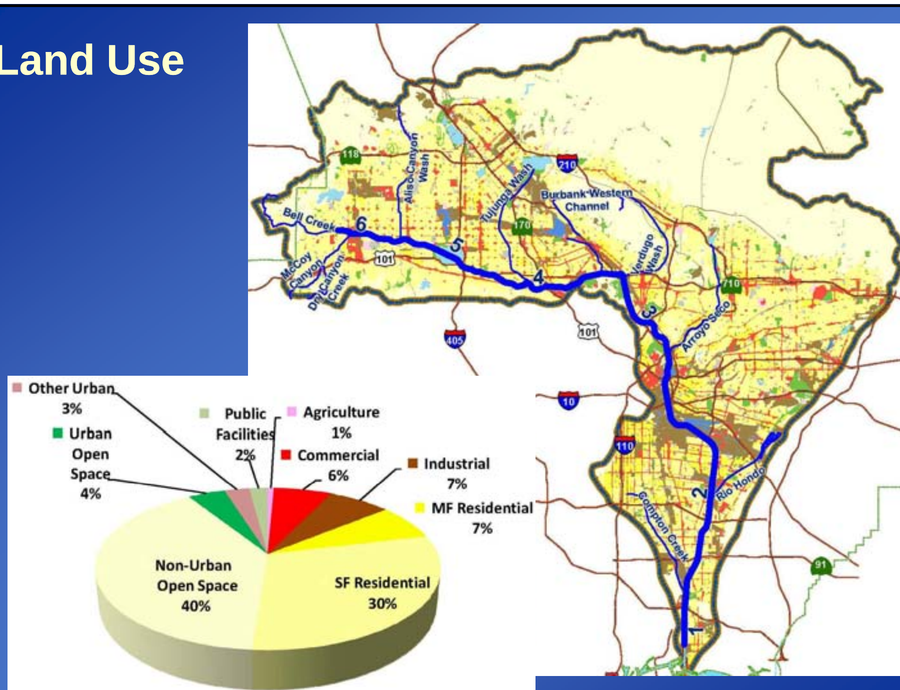
- The TMDL subdivides the LA River into six reaches



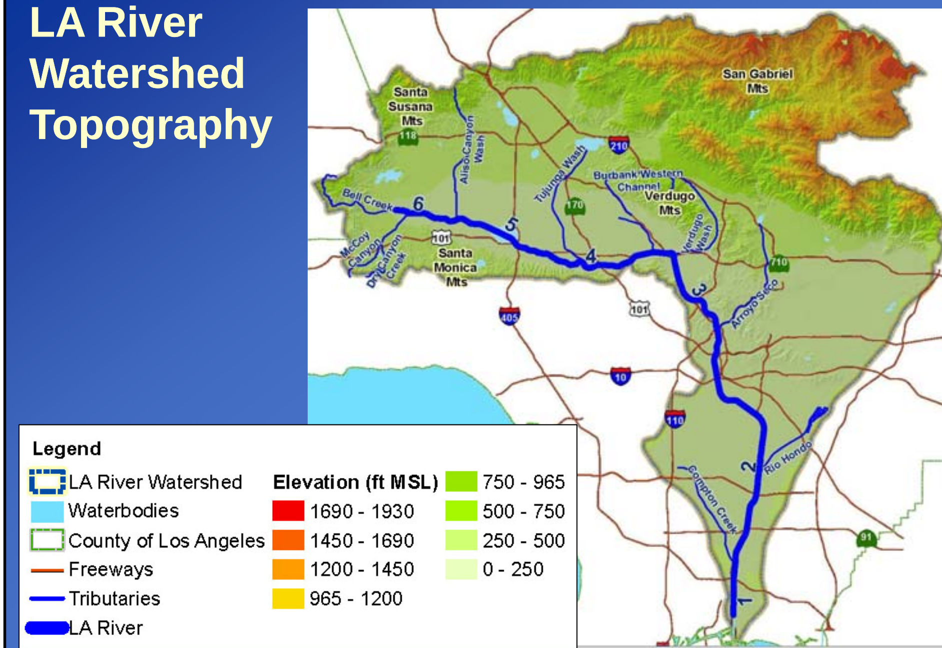
Reaches of the Los Angeles River

- The TMDL subdivides the LA River into six reaches

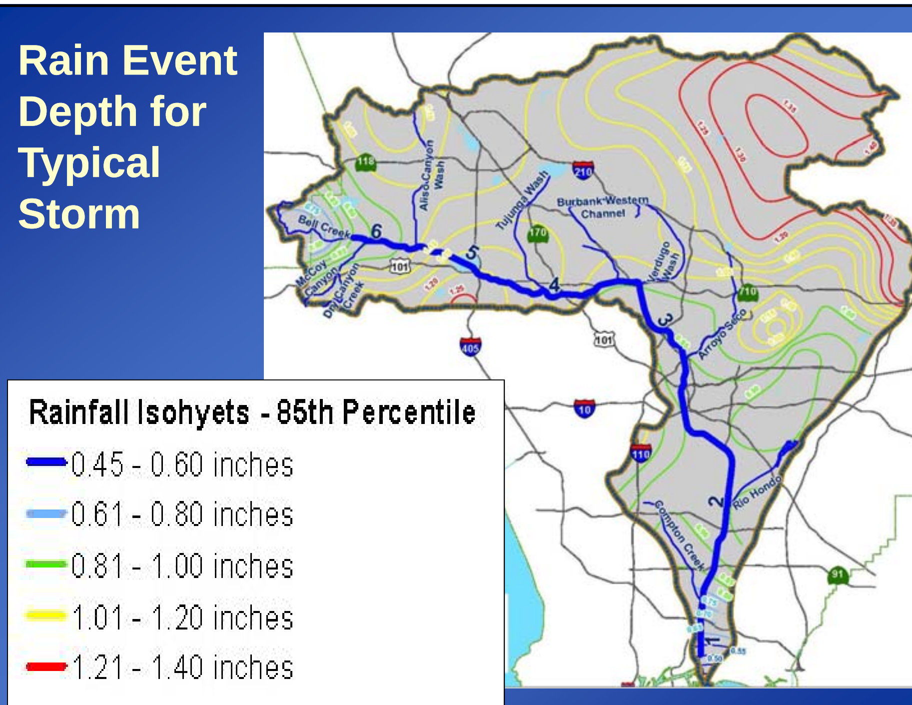
Land Use



LA River Watershed Topography



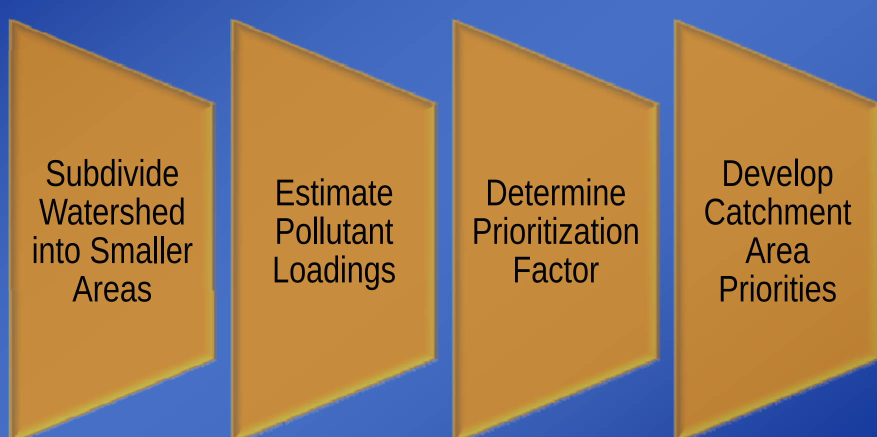
Rain Event Depth for Typical Storm



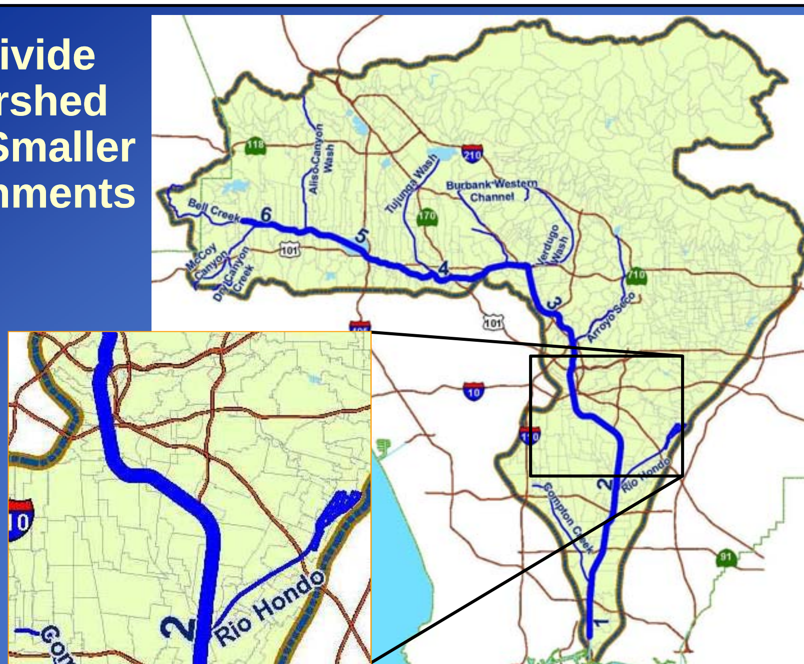
Watershed Water Quality

- Compile available water quality monitoring data
  – City of LA Status and Trends
  – LA County Monitoring Data
  – Water Reclamation Facilities
  – SCCWRP studies
  – Southern California Marine Institute
- Analyze existing monitoring data for all pollutants of concern
  – Identify trends
  – Compare to TMDL
- Prioritizing pollutant loading areas of concern

Basis for Prioritizing Areas

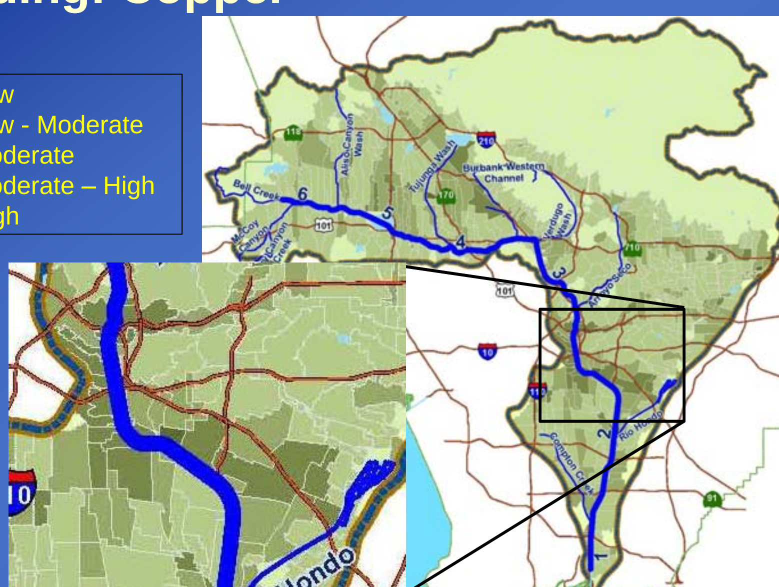


Subdivide Watershed into Smaller Catchments



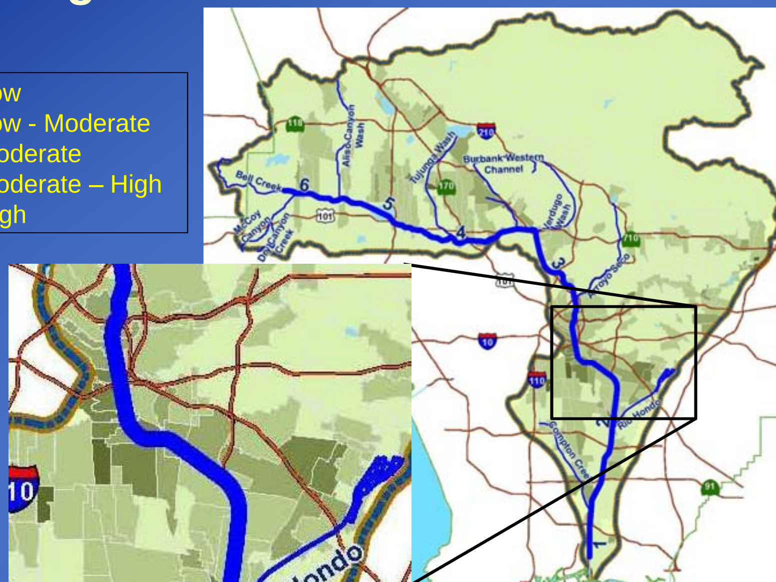
Estimating Storm Event Pollutant Loading: Copper

Low
Low - Moderate
Moderate
Moderate – High
High



Estimating Storm Event Pollutant Loading: Zinc

- Low
- Low - Moderate
- Moderate
- Moderate – High
- High

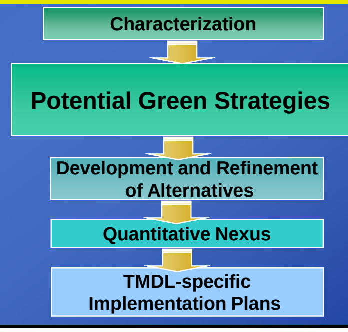


Multiple Pollutant Catchment Prioritization Index (CPI)

- Low
- Low - Moderate
- Moderate
- Moderate – High
- High

Step 2: Potential Green Strategies

(Detailed Discussion in Workshop 2)



Potential Green Strategies

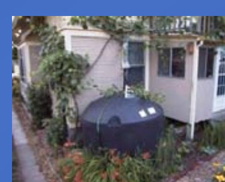
- Non-structural / Institutional BMPs
- Structural BMPs
  - Distributed
  - Regional/Sub-regional

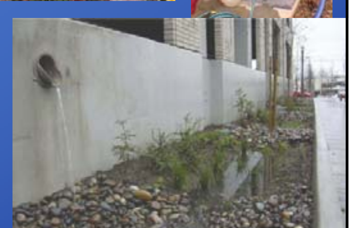
Potential Green Strategies

- Examples of Non-Structural / Institutional BMPs:
  - Development and Redevelopment Design Standards
  - Downspout Redirect Program
  - Product Substitution (e.g. copper brake pads)
  - Enhanced street sweeping and catch basin cleaning
  - Education: recycling used oil, proper car washing, restaurant trash handling, etc.

Potential Green Strategies

- Examples of Distributed Structural BMPs:
  - Cisterns
  - Bioretention
  - Permeable Paving
  - Gross Solids Removal Devices
  - Drain Inlet Inserts and Filters
  - Street and Parking Lot Biofiltration Retrofits



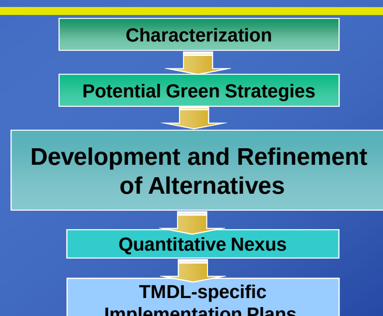


Potential Green Strategies

- Examples of Regional/ Subregional BMPs:
  - Detention
  - Infiltration
  - Natural Treatment Systems (e.g. wetlands)
  - Treatment Facilities

Step 3: Development of Alternatives

(Detailed Discussion in Workshop 3)



Step 3: Development of Alternatives

- BMP Selection and Prioritization based on:
  - Performance (load and volume reduction)
  - Implementability
  - Other benefits/constraints
  - Cost

Step 4: Quantitative Nexus

(Detailed Discussion in Workshop 3)

Step 4: Quantitative Analysis

- Quantify pollutant reductions expected under the BMP Alternatives Plan
- Consider ongoing studies by City, County, and Others
- Evaluate potential for compliance with TMDL (Target Concentrations)

Next Steps

- Next Stakeholder Workshop will be in June 2009
  - Topic: Potential Green Strategies

Contacts

Watershed Protection Division

- Morad Sedrak, Project Manager
  Morad.Sedrak@lacity.org, 213-485-3951
- Seth Carr, Project Engineer
  Seth.Carr@lacity.org, 213-485-3961

Los Angeles River Metals TMDL Implementation Plan
Stakeholder Workshop 1 - March 25, 2009

Comment Response Matrix		
No.	**Comment**	**Response**
1	The plan should include a study of parking lots in the region since these are the largest open spaces.	For priority catchments, important distributed BMPs being evaluated include looking at how imperviousness can be reduced. This will include consideration of porous pavement, retrofits to replace concrete with green surfaces and curb cuts to move water from pavement into retrofitted areas.
2	Consider how the amount of rainfall falling on different areas of the watershed actually translates into runoff. More rain may fall on high elevation undeveloped areas, but the high perviousness of these areas reduces runoff.	This area specific characteristic will be considered when evaluating potential runoff.
3	Open space is important to consider, but it is important to be aware that some open spaces are also designated brownfields and areas of blight.	As part of the site specific assessment, the project team will be looking at a map showing point locations of registered brownfields. When developing catchment-specific opportunities, open space will be checked against this list.
4	It is important to consider soil permeability when siting BMPs.	This information has been characterized for the watershed and will be considered locally when evaluating BMP opportunities
5	Can you determine the degree of contamination present in land at the Chatsworth Nature Preserve (closed in 1969) as part of this study?	This implementation plan only focuses on surface water runoff quality to the Los Angeles River.
6	Who set up the delineations for the smaller catchments that you've put on the maps?	Los Angeles City and County
7	Are you including groundwater in your analysis?	Groundwater quality and depth has been characterized for the watershed and will be considered locally when evaluating BMP opportunities.
8	It is important to consider the validity of the data entered into the model. For example, you have identified commercial land uses as an important contributor of pollutants, but I've seen data that indicates that residential land uses actually contribute more.	The project team is looking at established data, including event mean concentrations (EMCs) developed locally by the County Department of Public Works. However, if additional data related to metals loading in residential areas is available, we will review the data for applicability.
9	Will the Department of Water and Power right of way on the 710 Fwy be a part of this project? For example, will you consider that space for development of a wetlands area?	When looking for BMP opportunities in the watershed all potential open space areas will be considered, especially when located in a priority area. We will evaluate the potential use of this location during the next phase of the project.
10	You referred to the watersheds; are you referring to the City of Los Angeles only? Or the Los Angeles River watershed as a whole?	The characterization included the entire watershed; however, at this point in time the siting of BMPs will focus on lands within the jurisdiction of the City.
11	If the BMP is in the City of Los Angeles, but drains an area outside of the City, how will you handle it?	In these situations, the City will investigate cost-sharing opportunities with the jurisdictions outside of the City.

Los Angeles River Metals TMDL Implementation Plan

Stakeholder Workshop 1 - March 25, 2009

Comment Response Matrix		
No.	**Comment**	**Response**
12	How does the modeling and BMP analysis tie into modeling efforts being carried out by the County? Is it correct that you will not be switching over to the County's modeling system until later? Will it include things that the current model does not?	The County's ongoing model development efforts will not be finished in a timely manner to allow us to use it. Therefore, the City must move forward with its own approach to meet the TMDL Implementation Plan deadline. However, the approach being used is a model developed cooperatively by the City, County and Heal the Bay. It should be noted that the project team is using a model as a decision support tool. There are many steps that go beyond a model's output that rely on general engineering principles and knowledge of the LA River watershed, and therefore we do not anticipate being limited by the use of one model versus another.
13	I see some bias towards BMPs for the high load areas. Will you consider use of end of the pipe solutions?	Yes. The phrase BMP refers to a wide variety of treatment options, including where necessary end of pipe solutions.
14	Have you looked into how additional public transportation would affect the amount of pollutant loading from freeway sources?	We will be quantifying benefits of non-structural and institutional BMPs as part of the development of the implementation plan. We will evaluate potential benefits from increased use of public transportation.
15	It may be worthwhile to get data from high speed rail to see how that may affect TMDLs in the river since the route is projected to run right next to the River.	The project team will request the available data to consider potential impacts and collaboration opportunities associated with the implementation of this project.
16	CPI Index – Region 6 – Canyon Creek is colored as moderate. Are you aware that some pollutants (in particular selenium) are naturally occurring?	The project team is aware of this issue and will consider it as appropriate in the development of the implementation plan.
17	What are you going to do about CEQA? I have concerns about how this fits into your timeline.	We will be working with the Bureau of Engineering Environmental group to satisfy the requirements of CEQA either at this stage or prior to the implementation of projects identified in the plan.
18	AB1420, Urban Water Practices – how is the City partnering with other agencies to comply with requirements?	AB 1420 pertains to water supply grants or loan funds; implementation of BMPs to reduce runoff volume will provide opportunity for stormwater reuse and groundwater recharge - both of which benefit conservation and may reduce use of potable water. The City's water supplier, the Department of Water and Power is working with other agencies through the Upper Los Angeles River Watersheds Steering Committee to implement projects identified in the Greater Los Angeles Integrated Regional Water Management Plan.

Los Angeles River Metals TMDL Implementation Plan
Stakeholder Workshop 1 - March 25, 2009

Comment Response Matrix		
No.	**Comment**	**Response**
19	As you look at BMP prioritization, it would be important to look at those projects that are already in development/in progress - IRWMP.	We agree and are already implementing this recommendation as part of the next phase of the project.
20	Look at the catchment boundaries now before you get too far into the process so that any discrepancies may be fixed. Waiting to ground-truth late in the process is a concern.	Catchment boundaries within the City of Los Angeles have been field-verified by city staff, however catchments outside the City may not have received this attention. Catchment boundaries will be evaluated at all priority sites identified.
21	The Wilmington Drain project in partnership with the LA County Sanitation District is a wonderful example of wetlands reconstruction.	Comment noted.
22	Utilize the One Million Trees Canopy Cover Assessment which includes analysis from the Center for Urban Forest Research.	These data are being evaluated as part of this project.
23	Is the City open to working with neighboring cities to develop plans to meet the TMDL requirements?	Absolutely, the City has embraced the concept of developing ONE implementation plan for the upper LAR jurisdictions 3, 4, 5, and 6, however other municipalities in the region including the County of LA elected not to partcipate and/or not share the cost of developing the ONE plan.
24	BMP opportunities may differ from one City to another, e.g., the City of Downey does infiltration because they can; Carson cannot. Consider bioremediation and work done by universities in this area.	While the characterization looked at the entire watershed, the siting of BMPs will focus on the City's jurisdiction. BMPs will be selected based on site-specific characteristics, including factors that consider whether BMPs such as infiltration are feasible given local conditions.
25	The public comment deadline for Boeing Santa Susanna Field Laboratory NPDES permit amendment for discharge to Bell Creek is April 15th.	Comment noted.
26	Pierce College is implementing stormwater drainage into the LA River (based on their MP). Is this allowed? It seems as though colleges and schools are exempt. This is an area I would like this project to follow-up on.	Colleges and schools are not exempt from MS4 stormwater requirements. Jenny Newman, Regional Board, clarified that they are subject to MS4 Part II requirements shortly after the question was asked.
27	Are public transportation (CalTrans) projects exempt from TMDL regulations?	CalTrans is not exempt from MS4 requirements and the metals TMDL identifies them as a responsible party.
28	DTSC Clean Ups – Chatsworth Park South has a lot of clay pigeons which are a potential source of metals contamination.	Thank you for the information. These types of sources will be considered when developing the implementation plan.
29	Will this study evaluate industrial stormwater discharges where permits have been extended?	Industrial facilities have their own discharge permit and have responsibilities as described in the TMDL. While the Regional Board is responsible for ensuring compliance at these facilities, the City will consider these sources as it evaluates water quality and develops its plan.

Los Angeles River Metals TMDL Implementation Plan
Stakeholder Workshop 1 - March 25, 2009

Comment Response Matrix

No.	Comment	Response
30	Can the City provide more financial and political support to the Brake Pad Partnership (BPP) , e.g., by providing more support for SB 346 which will phase out copper in brake pads.	The City will continue to support the efforts of the BPP. The City is providing a letter of support for SB 346 to the sponsor (Kehoe). The City has also donated financial support to the BPP in this current fiscal year despite the troubled economic environment.
31	The presentation has focused on wet weather runoff. How do you plan to address/prioritize BMPs for dry weather flows?	Dry weather runoff will be addressed in two ways: 1) through non-structural solutions (e.g. source reduction or reduction in dry weather volume, etc), and 2) where BMPs are implemented to treat wet weather runoff, these BMPs will generally be able to treat dry weather runoff tributary to the BMP.
32	In some places in the City, land use models may not truly reflect all pollutants. Some things are not accounted for, e.g., metals loading may be high from auto salvage yards which are only a part of a parcel, i.e. the parcel may not be classified as industrial/commercial but still have a metals load. An example is along Cesar Chavez near the Los Angeles River.	Thank you for the comment. We want to evaluate these types of sources to the extent possible and we are looking to stakeholders to provide specific information of this nature.
33	We need to be aware that we may not know what was historically at each site, such as in Reach 6 – Topanga Plaza near the new Metro Orange Line. We need to research those areas by checking old maps for former land use (USGS maps are dated back to 1952).	The project team will be utilizing a map showing point locations of registered brownfields - which are open spaces that might be considered for a BMP. When developing catchment-specific opportunities, these areas will be further evaluated to check potential for presence of contaminated soils.
34	Santa Susanna area is still extremely contaminated despite having a clean-up effort lasting about 30 years. CEQA here has been avoided for the entire time. They get exemptions from Department of Toxic Substances Control – can you address this?	This implementation plan will only address surface water runoff impacts to the Los Angeles River.

Stakeholder Workshop 2
July 1, 2009

Los Angeles River Metals Total Maximum Daily Load (TMDL) Implementation Plan

Stakeholder Workshop 2

July 1, 2009

WATERSHED PROTECTION
CITY OF LOS ANGELES

Opening Remarks

Stakeholder Introductions

Agenda

- Workshop No. 1 Review
- Identification of BMP Opportunities
  - Types of BMPs
  - Preliminary Identification of Potential Sites
  - Stakeholder Collaboration
- Next Steps & Closing Remarks

Workshop No.1 Review

Compliance Timeline

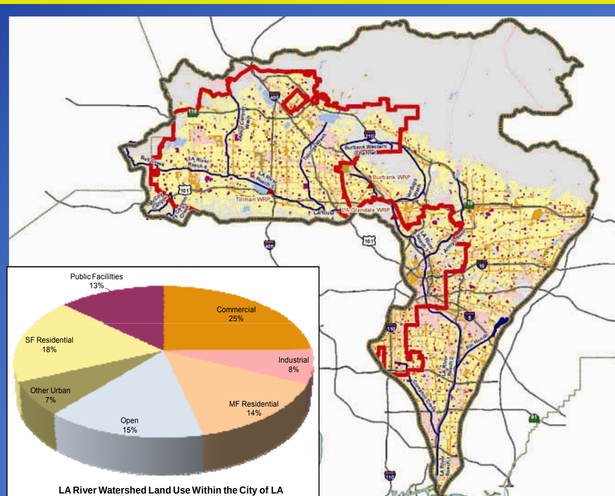
- Draft implementation plan due January 11, 2010
- Deadlines: percent of drainage area that must meet Waste Load Allocation (WLA) by date shown

Implementation Plan Development Process

Los Angeles River Watershed Characterization

- LA River is 55 miles long
- LAR Watershed is 834 square miles (534,700 acres)
- City of Los Angeles is 33% of the watershed area (45% of urban area)

Pollutant Load Model - Land Use Based

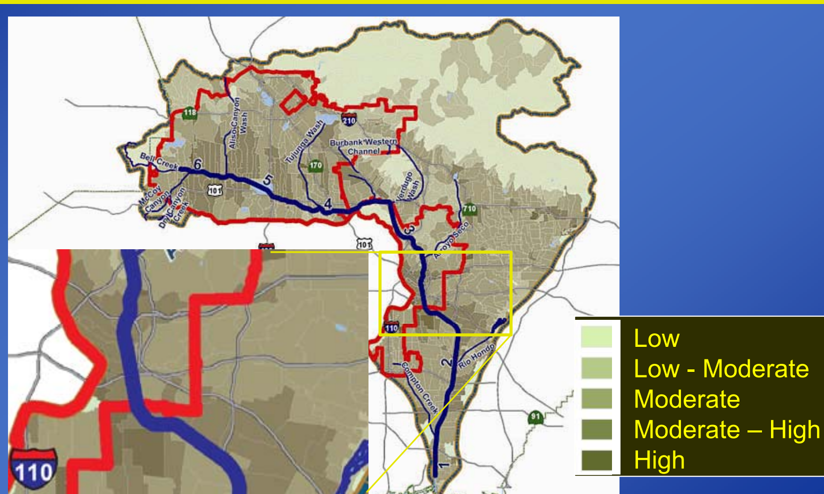


LA River Watershed Land Use Within the City of LA

Basis for Prioritizing Areas

- Subdivide Watershed into Smaller Areas
- Estimate Pollutant Loadings
- Determine Prioritization Factor
- Develop Catchment Area Priorities

Multiple Pollutant Catchment Prioritization Index (CPI)



Identification of Green BMP Opportunities – Types of BMPs

TMDL Implementation Plan Will Include Institutional & Green Structural BMPs

- Institutional BMPs
  - Controlling pollutants through activities such as public outreach, source control, new or modified regulations and policies
- Green Structural BMPs
  - A constructed or natural green system that improves water quality through treatment
  - City emphasizing green solutions in BMP selection

Institutional BMPs

- Street Sweeping and Catch Basin Cleaning
- Safer Alternative Products
- Education and Outreach (Commercial and Residential)
- Ordinances, Codes, and Enforcement
- Downspout Redirection

Institutional BMPs: Redirect to Pervious Surfaces

City Source Control Program Update

- Brake Pad Partnership Program
  - State Senate approved on June 3 (SB 346)
  - City has provided support financially and through participation in meetings and lobbying activities
- Lead Wheel Weight Bill (SB 757)
  - Currently in State Senate Judiciary Committee
  - City providing support through letters and lobbying activities

Standard Urban Stormwater Mitigation Program (SUSMP)

- Enhanced SUSMP
  - SUSMP Guidelines:
    - Require developers to maximize pervious surfaces to allow percolation of stormwater into the ground.
    - Establish stormwater infiltration requirement guidelines to be approved by the Board of Public Works.
  - SUSMP BMP Prioritization
    1. Infiltration Systems
    2. Bio-Filtration/Retention Systems
    3. Stormwater Capture and Re-Use
    4. Mechanical Units
    5. Combination of Any of the Above

Regional & Distributed Green BMPs

- Distributed/Onsite Green BMPs
  - Stormwater devices and landscaping practices dispersed throughout a catchment serving small drainage areas
  - Examples: vegetated swales, bioretention, porous pavement, green roofs, cisterns
- Regional Green BMPs
  - Centralized stormwater facilities placed near a catchment outlet to treat urban runoff from a large drainage area
  - Example: infiltration basins, detention basins, constructed wetlands

Structural Distributed Green BMPs: Bioretention Areas and Urban Streetscape

Urban Streetscape

Bioretention Areas

Structural Distributed Green BMPs: Infiltration Basins, Planters, and Other Systems

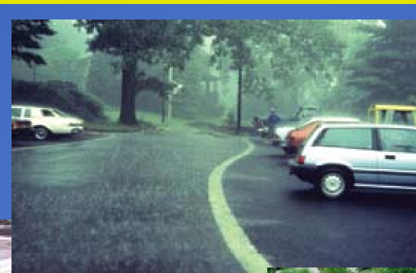
Infiltration Basin

Infiltration Planter

Infiltration Trench

Structural Distributed Green BMPs: Porous Pavements

Sidewalks & Walkways



Parking Lots

Driveways & Patios

Structural Distributed Green BMPs: Vegetated Swales

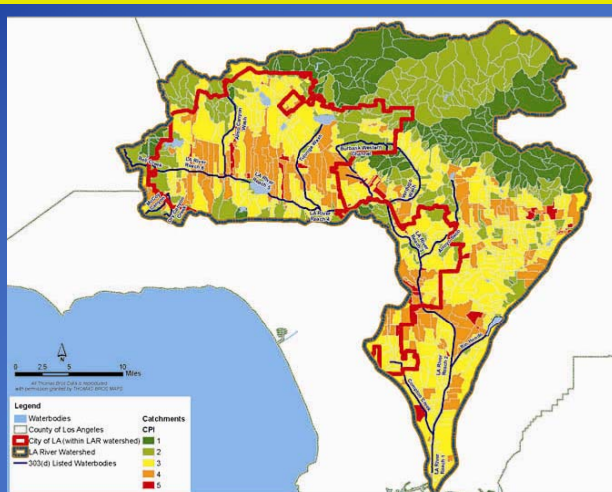
Structural Regional Green BMPs: Infiltration Basin and Subsurface Wetlands

Infiltration Basin

Subsurface Wetland

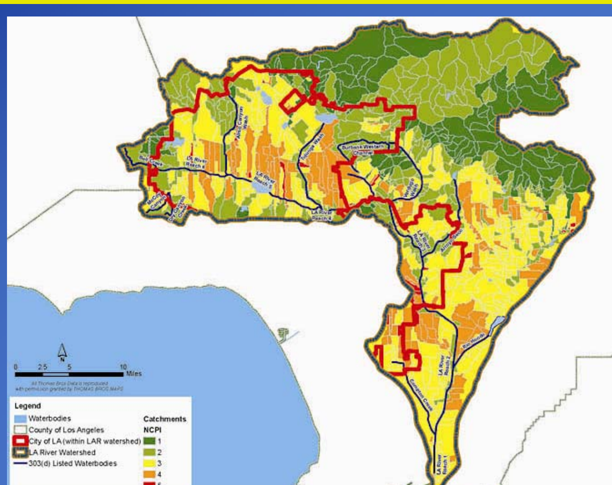
Identification of Green BMP Opportunities – Identification of Potential Sites

Structural Green BMP Prioritization (Distributed)



- CPI (catchment prioritization index)
- Ranking process for distributed BMPs
- Individual, high-priority catchment areas

Structural BMP Prioritization (Regional)



- Nodal catchment prioritization index
- Ranking process for regional BMPs
- Group of catchments converging at a common outlet

Initial Structural Green BMP Screening Process

Parcel Screening Process

Distributed Green BMP Locations

Step 1 - Retain Parcels:
- Developed
- Public ownership
- Greater than 1 acre

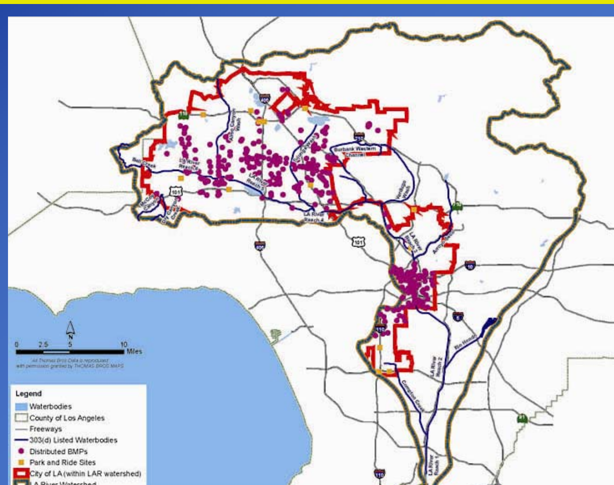
Step 2 - Remove Parcels:
- Residential land use
- Located < 100 ft from contamination site
- Within environmentally sensitive areas

Regional Green BMP Locations

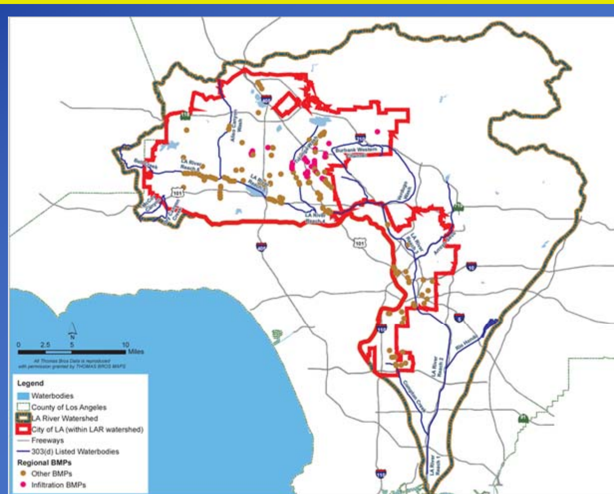
Step 1 - Retain Parcels:
- Undeveloped
- Public ownership
- Greater than 1 acre
- Located < 500 ft from storm drain

Step 2 - Remove Parcels:
- Located < 100 ft from contamination site
- Within environmentally sensitive areas
- Land slope > 20%

Preliminary Distributed Green BMP Priorities: High Pollutant Loading & Opportunity Sites



Preliminary Regional Green BMP Priorities: High Pollutant Loading & Opportunity Sites



Example of Regional BMP Candidate Location: Extensive Opportunities

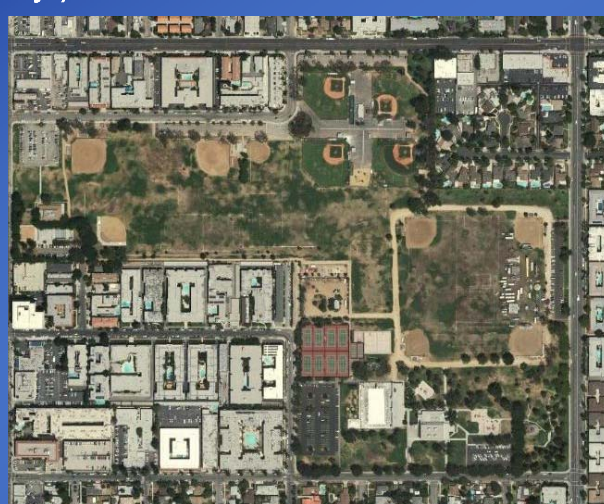
Pierce College

Example of Regional BMP Candidate Location: Extensive Opportunities

Pierce College

Example of Regional BMP Candidate Location: Limited Opportunities

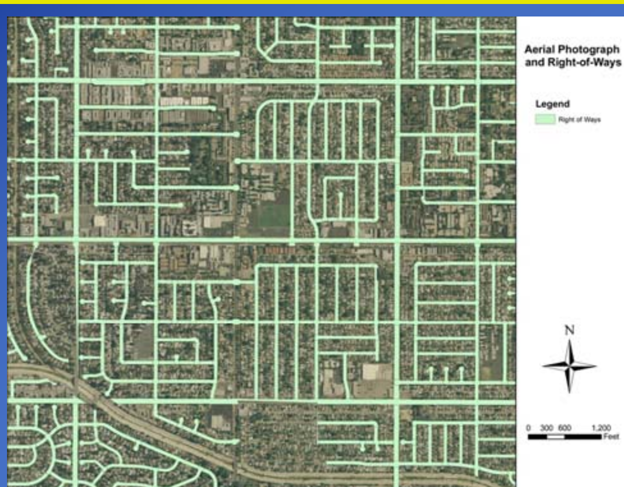
Van Nuys/Sherman Oaks Park



Example of Regional BMP Candidate Location: Limited Opportunities

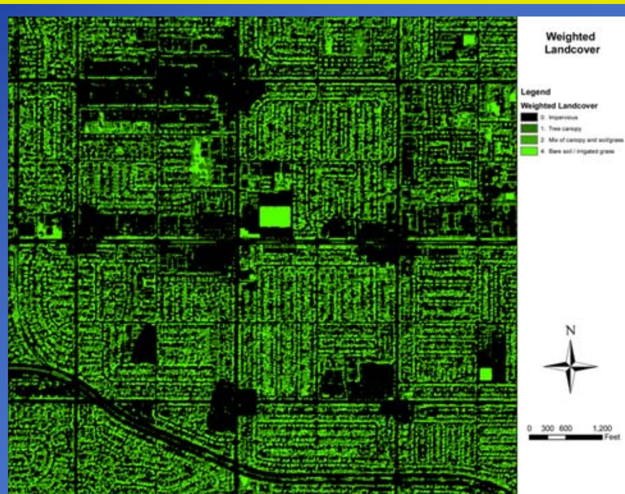
Van Nuys/Sherman Oaks Park

Mapping of Green Street Retrofit Opportunities



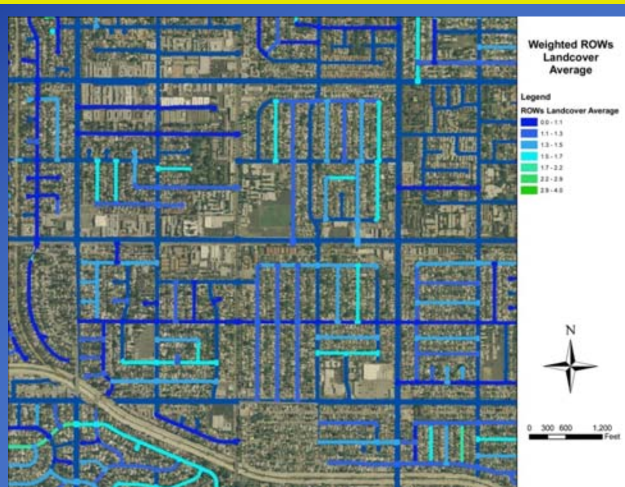
– Delineate ROWs: superimposed on City aerial map

Mapping of Green Street Retrofit Opportunities



- Categorized and scored land cover within ROWs
- Result is a “weighted” land cover map

Mapping of Green Street Retrofit Opportunities



- Combined ROWs and land cover into an average score for each area
- Higher scores indicate greater pervious space

Mapping of Green Street Retrofit Opportunities

- Land cover assessment
- Roadway scoring based on pervious coverage
- Recommend-ations narrowed to high-priority catchments and public ROWs

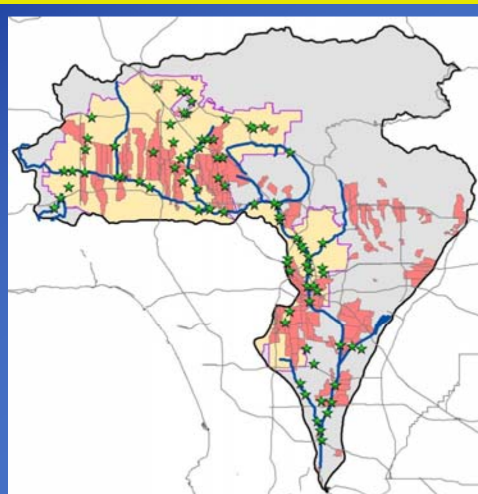
Green Street Retrofit Example: Oros Street

Identification of BMP Opportunities – Stakeholder Collaboration

Stakeholder Collaboration

- Identify ongoing or planned BMP projects being implemented by stakeholders
- Compare stakeholder structural BMP project locations with prioritized distributed and regional BMP identified via modeling process
- Purpose: identify areas of overlap to highlight best collaboration opportunities

Overlap Between Catchment Prioritization and Projects Identified in Existing Plans



- LA County IRWMP
- LA River Revitalization Master Plan
- Tujunga/Pacoima Watershed Plan
- Compton Creek Watershed Management Plan
- Others

Stakeholder Collaboration

- Key stakeholder discussions:
  - Los Angeles and San Gabriel Rivers Watershed Council
  - Los Angeles Conservation Corps
  - Audubon Society, San Fernando Valley
  - TreePeople
  - Mujeres de la Tierra
  - Heal the Bay
  - North East Trees
  - Friends of the Los Angeles River
  - Los Angeles Equestrian Center
  - Los Angeles Department of Water & Power
  - The River Project
  - Others
- Continued collaboration on institutional and green solutions

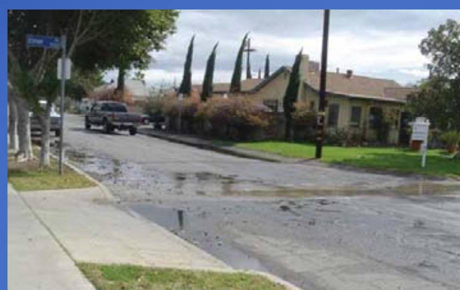
Important Stakeholder Themes

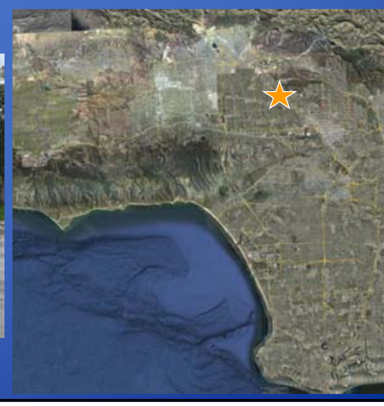
- Focus BMPs on multiple pollutants and provide multiple benefits
- Link green street retrofits schedule to regular street maintenance/upgrade activities
- Focus on industrial areas
- Collaborate with established community groups at the local/neighborhood level
- Increase collaboration among responsible agencies
- Build on existing opportunities identified in watershed plans and Integrated Resource Plans

Examples of Stakeholder Contributed Projects

Elmer Avenue

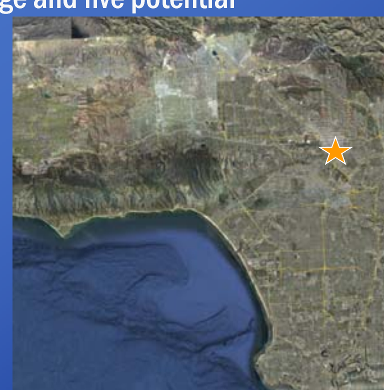
- Multi-stakeholder project in Sun Valley area
- Street retrofit to capture 16 acre-ft of wet and dry weather runoff
- Additional benefits: improve groundwater supplies, reduce local flooding, improve green space





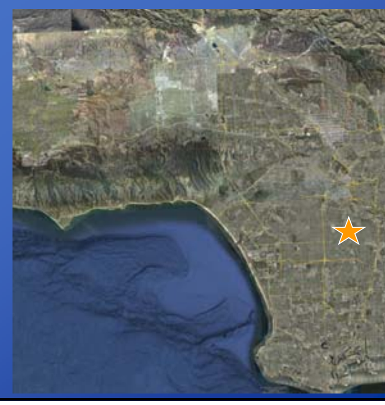
Fletcher Corridor

- Friends of the Los Angeles River concept plan
- Provide greenway and bikeway access from city streets while incorporating stormwater management BMPs
- Six potential projects in Atwater Village and five potential projects in Elysian Valley



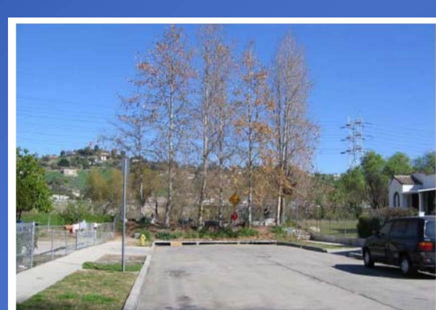
South LA Projects: Youth Opportunities High School

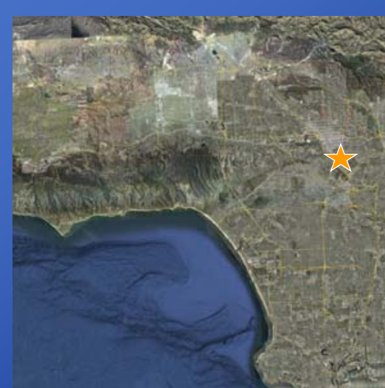
- Collaboration among NGOs and local community
- Retrofit of a large paved area
- Combine stormwater filtration function with new community amenities



Riverdale Avenue Retrofit

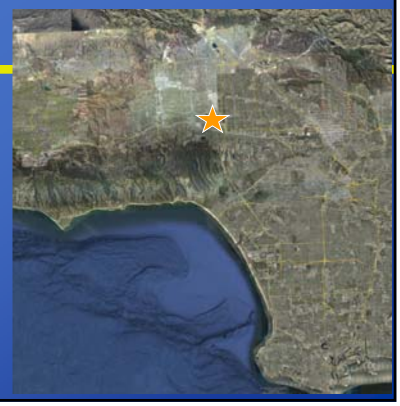
- City and Coastal Conservancy funded green street retrofit project in Elysian Valley neighborhood area
- 14.6 acre drainage area infiltrated into retrofitted street easement





Bull Creek Restoration

- Army Corps of Engineers funded project in Sepulveda Dam Recreation Area of San Fernando Valley
- Naturalized stream and created an oxbow with braided streams



Next Steps

Screen Potential BMP Sites to Develop Priority List

- Desktop-level screening
- Field-level screening to "ground truth"
  - Identify proximity to storm drain/channel
  - Flood control limitation
  - Slope/elevation limitations
  - Safety
  - Ownership
  - Other constraint features

Develop List of Recommended BMPs

- Quantify water quality benefits
- Evaluate benefits expected from watershed-wide extrapolation
  - Prepare cost analysis

Contacts

Watershed Protection Division

- Morad Sedrak, Project Manager
  Morad.Sedrak@lacity.org, 213-485-3951
- Seth Carr, Project Engineer
  Seth.Carr@lacity.org, 213-485-3961

53

Los Angeles River Metals TMDL Implementation Plan		
Stakeholder Workshop 2 - July 1, 2009		
Comment Response Matrix		
No.	**Comment**	**City of Los Angeles Response**
1	Are the lead weights used for car wheels being replaced with weights made with zinc? If so, we need to start having discussions regarding this potential given the zinc water quality impairments.	SB 757, a bill currently in the Assembly which will codify a prohibition on the sale of lead wheel weights in California, now has language to assure that any substitute product, (such as zinc) will not cause a similar water quality problem. This will analyzed through the State's Green Chemistry Initiative process.
2	If we recalculated for CTR, would we no longer have a lead impairment?	The City is funding a special study for lead recalculation in the LA River watershed. It is possible that the outcome of this study could result in the waterbody no longer having a lead impairment.
3	We need as much support for SB346 (replace copper in brake pads) as possible if it is going to be passed and for it to really make a difference.	The City continues to provide support to the process to replace copper in break pads.
4	Do you have studies on the information for zinc pollutants? Have studies been done on this as part of the development of this Plan and incorporation of source control measures?	Information on typical sources of zinc in urban environments has been compiled. The modelling software used for the implementation Plan contains an underlying dataset, the Event Mean Concentration, a County generated landuse-based runoff concentration calculation. This database shows that zinc is generated primarily from industrial and commercial land uses, so high priority catchments with these land uses will be targeted for BMP installation.
5	Where are your studies of traffic patterns, grandfathered in businesses, etc., all of which are potential metals sources?	The Regional Board developed a source assessment as part of the metals TMDL, which is available in the TMDL staff report on their website. This information coupled with land use, field investigation, and stakeholder-provided information is being used to identify areas with the highest potential to contribute metals to City waters. Areas with high traffic, e.g., freeways, are considered to have a high potential to contribute metals.
6	How do you address truck traffic that passes through an area without originating or ending there? Where are the studies that address traffic issues? Are there other contributing traffic elements to the study that have not been addressed in the information you already have?	See response to Comment #5. In addition, it is important to recognize that Caltrans is also required to develop a metals TMDL Implementation Plan that addresses metals that come from Caltrans properties. Implementation of this plan will contribute to reducing metals from truck traffic on freeways.

Los Angeles River Metals TMDL Implementation Plan		
Stakeholder Workshop 2 - July 1, 2009		
Comment Response Matrix		
No.	**Comment**	**City of Los Angeles Response**
7	The Watershed Protection Division (WPD) should work with City Planning Department on the implementation of porous pavers. We need to be conscious/stringent about what qualifies as porous pavement for new developments. If not properly designed, infiltration will not occur.	The City is working with all departments that have a role in developing and approving technical guidelines for green Best Management Practices (BMP) specifications. As part of the proposed Low impact Development (LID) ordinance, the City will incorporate specifications and standard plans to ensure infiltration BMPs are properly designed.
8	In grassy areas we need to think about how to store the water in the summer months.	Implementing BMPs that use significant amounts of water creates new problems that must be avoided.
9	Is this TMDL Implementation Plan part of the Planning Department's urban design standards? If not, will this plan be incorporated into those standards?	The City is working with the Planning Department on the development of standards for implementing green BMPs. This effort is consistent with recommendations contained in the City's Water Quality Compliance Master Plan for Urban Runoff.
10	WPD needs to make information on funding for projects available to the general public in a clear and public way	The implementation plan will provide cost estimates for prioritized BMPs. These costs will include estimates for design, construction, operation and maintenance. In addition, to the extent information is available at the time of implementation plan submittal, WPD will include information on the funding sources.
11	Regarding the Catchment Prioritization Index (CPI), what pollutant are you looking at? Are you looking at multiple pollutants/metals?	The analysis looked at all pollutants causing impairments of Los Angeles River watershed waterbodies for which there are sufficient data. These included copper, zinc, lead, nutrients, and bacteria.
12	What do you mean by "public ownership" (in regards to selection of BMP locations)?	The City's parcel ownership database identifies publicly owned lands. These are primarily parks and schools and also include city-owned parking lots.
13	Will new private developments be required to have low impact development (LID) BMPs incorporated into their projects?	Regardless of whether a new development or significant redevelopment project is private or public in nature, LID BMP principles are strongly encouraged. These requirements are part of the City's enhanced Standard Urban Stormwater Mitigation Program (SUSMP).
14	Los Angeles Unified School District (LAUSD) sites were mentioned as public sites, but doesn't the state have control of those sites?	The state is the permitting authority for stormwater discharge from LAUSD sites. However, the City is working with LAUSD on the potential to implement BMPs on school-owned properties.

Los Angeles River Metals TMDL Implementation Plan		
Stakeholder Workshop 2 - July 1, 2009		
Comment Response Matrix		
No.	Comment	City of Los Angeles Response
15	On the green street map, is it the blue or green areas that are preferred? Are you looking at areas with more or less pervious surfaces? Which are preferred? Will we eventually retrofit some of the less pervious streets?	The green street analysis map identified the best streets for priority implementation of green street retrofits. Lighter blue to green colored areas are locations considered best for implementation. These are streets that currently have a relative abundance of pervious areas, which is ideal because of the increased space available for infiltration of stormwater. Streets that currently have the least perviousness still have the potential to be retrofitted in the future; however, because of the lack of pervious space, implementing a green street retrofit will more challenging and costly.
16	We need to do look at all area plans, including the City's General Plan, to see where these projects coincide or overlap.	As was shown in the presentation, the City of Los Angeles currently looking at projects noted in other planning documents or recommended by stakeholders to minimize overlap and achieve as much collaboration during implementation as possible. Regarding the General Plan, this need is consistent with a recommendation contained in the City's Water Quality Compliance Master Plan for Urban Runoff. Discussions with the City Planning Department are ongoing.
17	The City of Los Angeles is not alone in trying to integrate its TMDL Implementation Plan with other plans that address water, e.g., statewide and interjurisdictional plans. The City should coordinate with these other planning efforts to minimize overlapping activities or responsibilities.	Comment noted. See response to #16
18	WPD should work with other jurisdictions and City departments to be sure that all possibilities for urban runoff management are covered	This comment is consistent with a recommendations contained in the City's Water Quality Compliance Master Plan for Urban Runoff. As a result of that plan, discussions with other City departments and jurisdictions are ongoing.
19	Do you know who the contact at the Army Corps was for the Bull Creek restoration project?	Nedenia C. Kennedy can be reached at 213-452-3856.

Los Angeles River Metals TMDL Implementation Plan		
Stakeholder Workshop 2 - July 1, 2009		
Comment Response Matrix		
No.	**Comment**	**City of Los Angeles Response**
20	What is the City focusing on treating when implementing BMP projects? Will the City only do what is necessary to meet the metals TMDL requirements or what is most effective for eliminating other pollutants from the water.	Although the TMDL Implementation Plan for metals will focus on metals to comply with Regional Board Plan submittal requirements, the City is identifying and siting BMPs that will effectively reduce loads from multiple pollutants.
21	Will BMP implementation be grant funded or funded through other sources? What does it cost for regional BMP versus local (distributed) BMP projects? City should look at the UC-Riverside study on the cost of regional versus distributed BMP implementation. What are the funding mechanisms identified for any of the potential projects related to the TMDL implementation plan?	Comment noted regarding information on costs of regional and distributed BMPs. While the funding mechanism for implementation of the Plan will be primarily from revenues generated from the City's Stormwater Abatement Fee, the City will certainly look for state and federal grant opportunities to fund BMP projects. Where grants provide stakeholder collaboration opportunities, the City looks forward to working with project partners as it has already done on a number of BMP projects.
22	How are you going to assess the effectiveness of BMPs in reaching water quality goals before they are actually put in the ground? In terms of effectiveness, is there a difference in large v. small storms?	The TMDL Implementation Plan will include a quantitative analysis that incorporates water quality benefits expected from implementation of non-structural and structural (regional and distributed) BMPs. These benefits will be estimated using a combination of BMP effectiveness data and load reductions that will occur where urban runoff is eliminated via infiltration. As historical rainfall data is an existing input into the BMP modeling tool (see response to #23) as well as BMP effectiveness, BMPs will be sized to meet the appropriate water quality requirements. BMP effectiveness will be different for large versus small storms because of the volume of runoff capture that can be achieved differs. Larger storms may need some runoff to be bypassed, since the BMP will only be able to control up to a certain amount of volume.

Los Angeles River Metals TMDL Implementation Plan		
Stakeholder Workshop 2 - July 1, 2009		
Comment Response Matrix		
No.	**Comment**	**City of Los Angeles Response**
23	What was the method used for analysis to set the initial baseline (in reference to modeling and prioritization)	The City is using the Structural BMP Prioritization Assessment Tool (SBPAT) which was developed jointly by the City, County and Heal the Bay. SBPAT relies on the use of land use characteristics and associated expected pollutant loadings from these land uses. The land use loadings data were obtained from Los Angeles County studies. More information can be found at http://www.labmpmethod.org/.
24	What factors determine whether we use regional or distributed BMPs?	The primary difference is associated with size of the BMP. Regional BMPs typically receive runoff from a relatively large area (20 to hundreds of acres). For regional BMPs there must be sufficient space to construct a BMP and route urban runoff via storm drains to a common location. Distributed BMPs typically receive runoff from areas of less than 10 acres. Often distributed BMPs are retrofits of existing developed sites where there is opportunity to locally capture and infiltrate urban runoff.
25	The City needs to provide more notices about federal funding. Notices are only given to those who request them currently	The City's recovery website has links to information about federal funding as well as links to state and federal recovery websites: http://recovery.lacity.org/OtherResources/index.htm
26	The California Stormwater Quality Association (CASQA) conference will occur in November. It will include a focus on TMDL planning and implementation.	Comment noted.
27	Underground there are contaminant plumes in some areas. Stormwater should not be infiltrated in these areas.	Part of the process for identifying good locations for BMP implementation is to verify that the location would not impact areas where groundwater contaminant plumes are present.
28	There are many open spaces in downtown LA that could potentially be used for BMPs.	The City is looking at a number of potential locations for implementation of distributed BMPs.
29	SUSMP requires BMPs in certain categories. Does the City have plans to capture runoff in smaller spaces and parking lots?	Capturing runoff from smaller spaces, including parking lots, is a key element associated with the implementation of distributed BMPs. These types of BMPs include green street retrofits which look for opportunities to redirect stormwater in local streets and parking lots to pervious areas for infiltration.

Los Angeles River Metals TMDL Implementation Plan		
Stakeholder Workshop 2 - July 1, 2009		
Comment Response Matrix		
No.	**Comment**	**City of Los Angeles Response**
30	You should look at areas that are more impervious to begin with in terms of street retrofits and infiltration	The City is initially targeting streetscapes with more pervious areas because these project areas are easier to retrofit. In due time, areas with more impervious areas will also be considered. See also response to #15.
31	Are you looking to work with the Planning Department to require developers to set aside land for some of these green street projects?	Green street projects are primarily implemented as retrofits of existing developments. However, where new or redevelopment activities are planned, SUSMP requirements must be met. Compliance with SUSMP provides the opportunity to implement green street projects in association with the planned development activities.
32	How will this implementation plan address compliance and coordinate with other plans such as Prop O?	The metals TMDL Implementation Plan will document any Prop O projects already planned for implementation in the watershed. The Plan will also include a quantitative analysis of how the Plan will move the City towards compliance with metals TMDL requirements. This analysis will factor in the water quality benefits expected from the Prop O projects.
33	For community outreach, issues and questions, who should be contacted at WPD?	The primary contact should be Seth Carr (seth.carr@lacity.org)

Stakeholder Workshop 3
September 30, 2009

Los Angeles River Metals Total Maximum Daily Load (TMDL) Implementation Plan

Stakeholder Workshop 3

September 30, 2009

WATERSHED PROTECTION
CITY OF LOS ANGELES

Opening Remarks

2

Stakeholder Introductions

Agenda

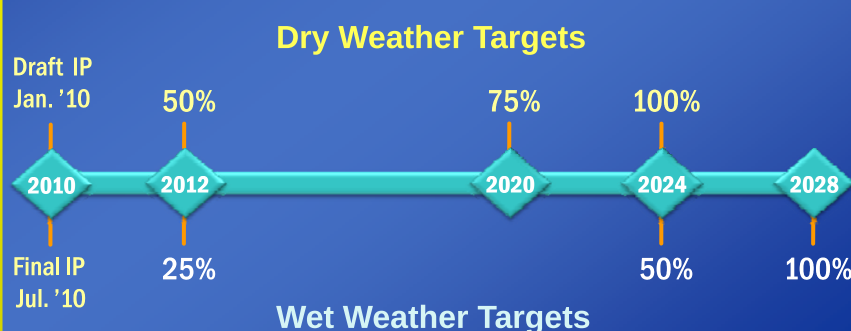
- Implementation Planning Overview
- BMP Selection Process
- Metals TMDL Implementation Plan
  - Overview
  - Priority BMPs
  - Quantitative Analysis & Phased Implementation
- Next Steps & Closing Remarks

Implementation Planning Overview

5

Compliance Timeline

- Targets: Percent of drainage area that must meet Wasteload Allocation by date shown



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Implementation Plan Development Process

Characterization

↓

Green BMP Strategies

↓

Development and Refinement of Alternatives

↓

Quantitative Nexus

↓

TMDL-specific Implementation Plan

7

BMP Selection Process

8

Institutional BMP Programs

- Potential Institutional Programs Evaluated for the Following Categories:
  - Direct Source Control
  - Program Development
  - Education & Outreach
  - Planning & Coordination
- Methods to Quantify Potential Benefits Evaluated

9

Green Structural BMPs

- Initial Pool of Screened BMP Opportunities
  - Approximately 200 Potential Regional BMP Sites
  - Approximately 400 Potential Distributed BMP Sites
- Subset Selected for Field Investigation
  - Desktop evaluation using GIS tools
  - Example evaluated factors include:
    - Drainage area size vs. available land area
    - Location of utility corridors
    - Local storm drain network
    - Environmentally sensitive concerns, e.g., trees

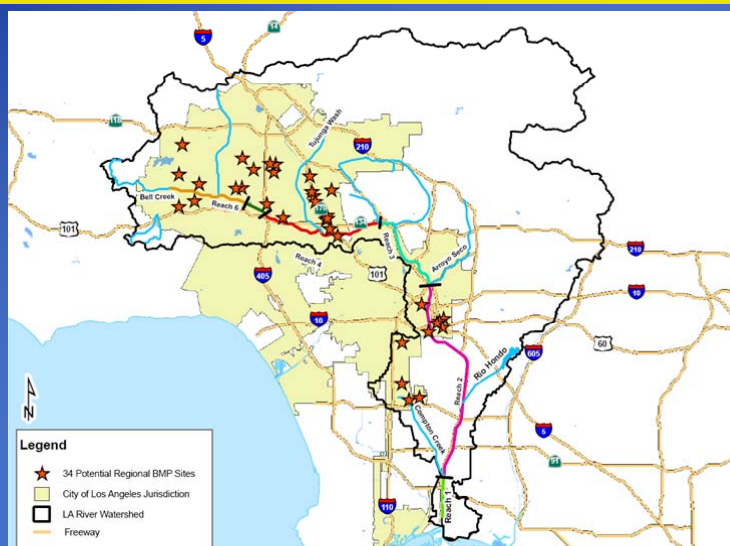
10

Green Structural BMPs

- Field Investigations Implemented on:
  - 34 regional BMP opportunities
  - 100 distributed BMP opportunities
- Selection Criteria for Priority Sites
  - Areas with highest expected pollutant loadings
  - Subwatersheds with most significant water quality concerns
  - Feasibility considerations
  - Multiple benefit & collaboration opportunities

11

Field Investigated Regional BMP Sites



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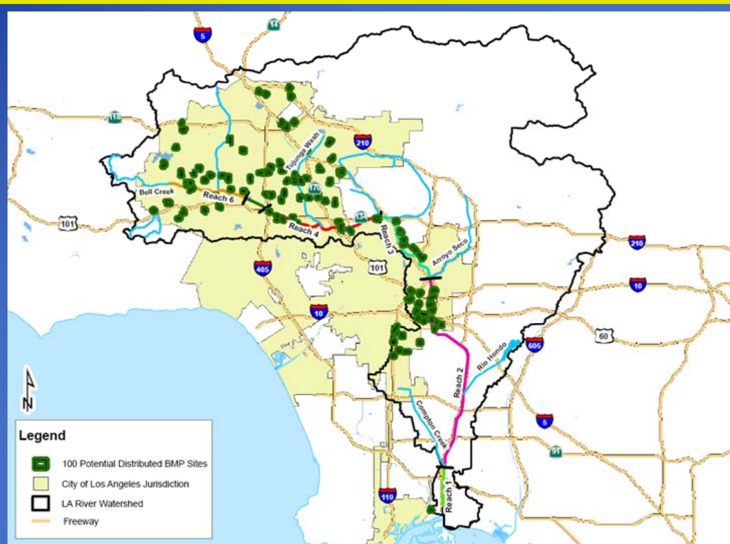
Field Investigated Distributed BMP Sites



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Metals TMDL Implementation Plan - Overview

14

Implementation Principles

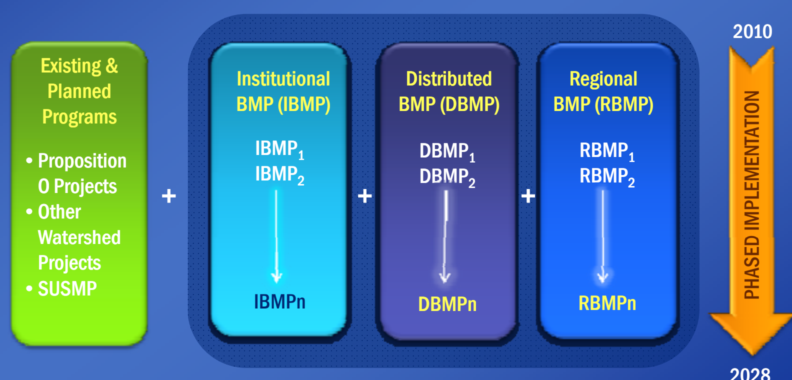
- Implementation Plan Incorporates Four Principles:
  - Comprehensive Program – Incorporates combination of institutional and green structural BMPs
  - Integrated Water Resources Approach - Consider potential recycled water and conservation benefits of rainwater reuse

  - Green Solutions - Enhances other public goals, such as increased acreage of parks, greenways, and open space
  - Phased Approach – Implement BMPs in phases while evaluating associated water quality improvements; revise BMP priorities as needed

15

Implementation Overview

Integrated Comprehensive BMP Implementation



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Metals TMDL Implementation Plan – Priority BMPs

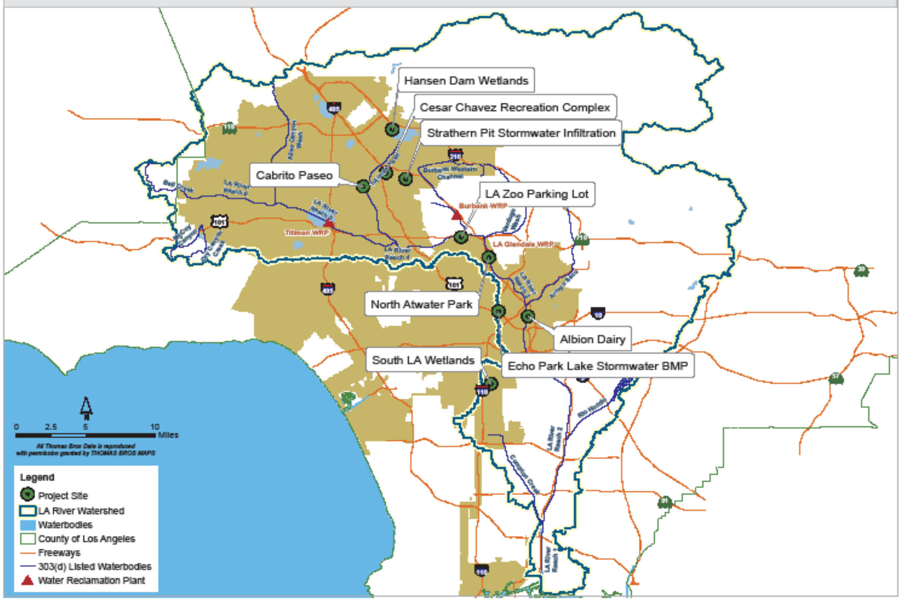
17

Existing & Planned BMPs – Ongoing Watershed Projects

- Implementation Plan incorporates water quality benefits of ongoing watershed projects
- Expected benefits linked to TMDL compliance target dates
- Compliance analysis includes estimated acres of runoff treated by BMPs associated with each project

18

Existing & Planned BMP Projects – Proposition O

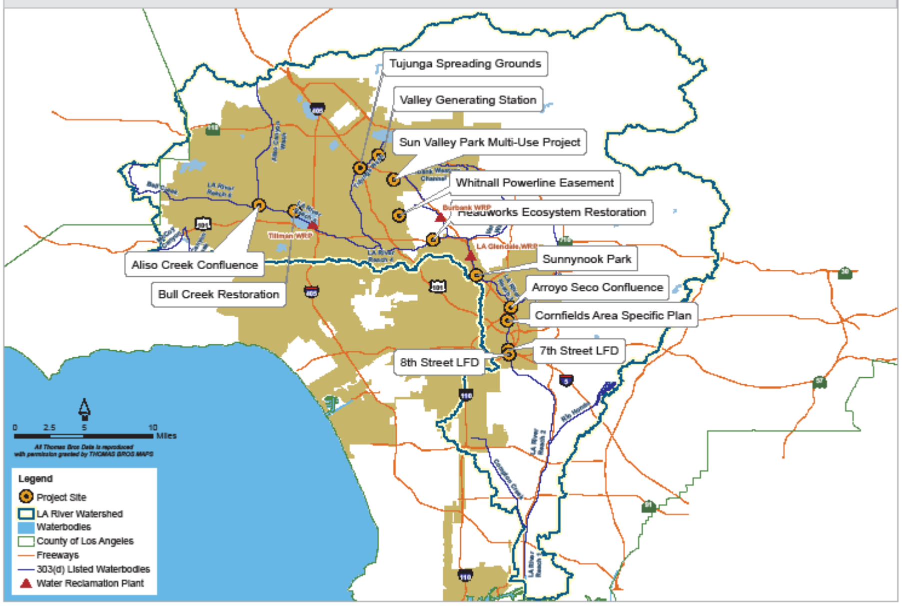


Prop O Projects - Water Quality Benefits

Proposition O Project	Expected Completion Date	Acres Tributary
Cabrito Paseo Walkway	2012	502
Cesar Chavez Recreational Complex	2012	679
Echo Park Lake Restoration	2012	356
Hansen Dam Wetlands Restoration	2012	235
LA Zoo Parking Lot	2012	33
North Atwater Park	2012	62
South Los Angeles Wetland Park	2012	525
Albion Dairy Park	2024	255
Strathern Pit Stormwater Infiltration	2028	929
	Total Acres Treated	**3,576**

20

Existing & Planned BMPs – Other Watershed Projects



Water Quality Benefits - Other Major Watershed Projects

Other Watershed Projects	Expected Completion Date	Acres Tributary
LADWP Whitnall Powerline Easement Stormwater Capture	2010	185
Tujunga Spreading Grounds	2012	4,800 (est.)
Low Flow Diversions (7th & 8th Streets)	2012	155
Bull Creek Restoration	2012	2,800 (est.)
Headworks Ecosystem Restoration	2012	4,300 (est.)
Sun Valley Park Multi-Use Park	2024	45
LADWP Valley Generating Station Stormwater Recharge	2024	155
Cornfield-Arroyo Seco Specific Plan	2024	433
Sunnynook Park	2028	133
Aliso Creek Confluence/Reseda River Loop	2028	153 (est.)
Arroyo-Seco Confluence Restoration Greenway	2028	193 (est.)
	Total Acres Treated	13,352

22

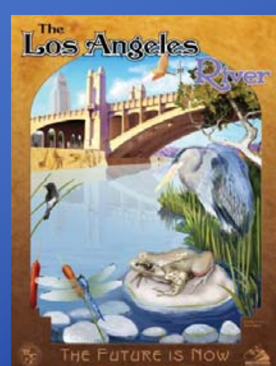
Existing & Planned BMPs – Enhanced SUSMP

- Implement Enhanced SUSMP Program
  - Require developers to maximize pervious surfaces to allow percolation of rainwater into the ground
  - Establish rainwater infiltration requirement guidelines to be approved by the Board of Public Works
- Water Quality Benefit
  - Additional 250 acres treated/year

23

Institutional BMPs

- Institutional BMP Program includes a combination of existing, enhanced, and new programs
- Activities coordinated across all watersheds, jurisdictions, and TMDL Implementation Plans
- Institutional BMPs categorized into four areas:
  - Direct Source Control
  - Program Development
  - Education & Outreach
  - Planning & Coordination



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Institutional BMPs – Direct Source Control Elements

- Direct Source Control
  - Product Replacement – Brake pad and lead wheel weight replacement legislation
  - Downspout Disconnect – Targeted implementation after pilot program
  - Improved Sediment Removal – Enhanced street sweeping program
  - Source Control Incentives – Encourage BMPs to reduce wet weather runoff from commercial/ industrial properties

25

Institutional BMPs – Other Elements

- Program Development –Ordinance and guidance documents
- Education & Outreach – Continued enhancements to education and outreach activities
- Planning & Coordination – Stakeholder collaboration activities; general plan updates

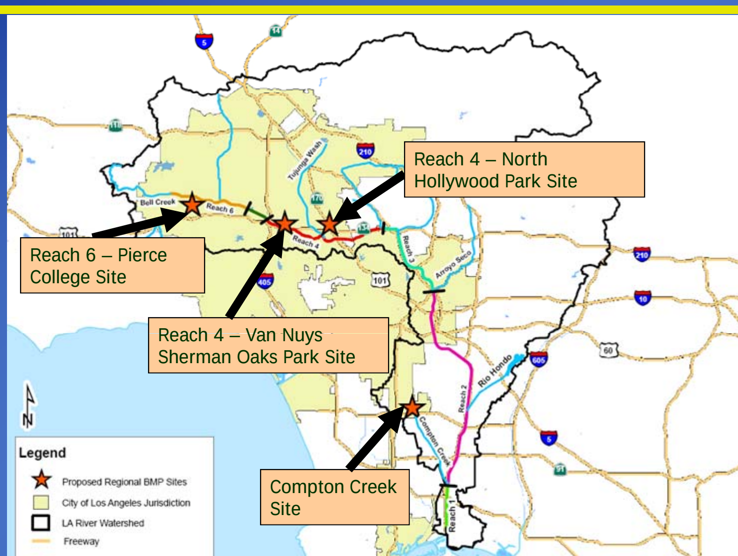
26

Green Structural Regional BMPs

- Four Regional BMPs Selected for Priority Implementation
- Additional Regional BMPs - Lower Priority
  - Need for additional BMPs determined by ongoing evaluation of compliance
  - Regional BMPs will be targeted as needed in subwatersheds with highest metals concentrations
  - Second tier priority list developed

27

Four Priority Regional BMPs



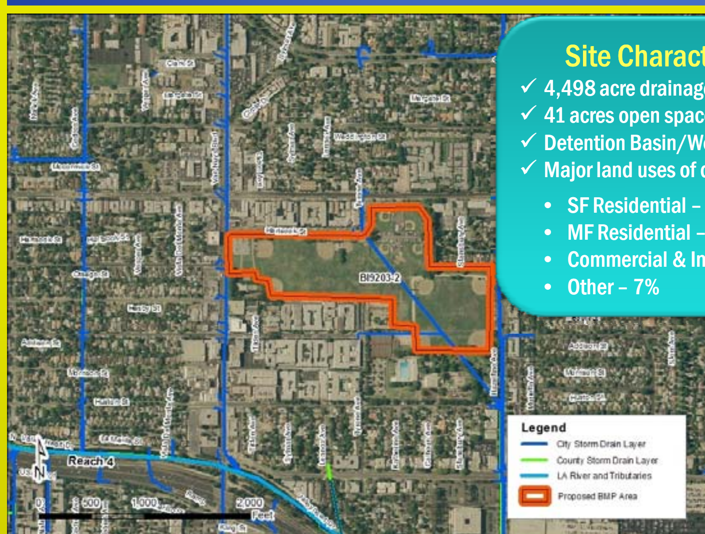
Priority Regional BMP – Pierce College

Site Characteristics

- ✓ 1,761 acre drainage area
- ✓ 41 acres open space
- ✓ Detention Basin
- ✓ Major land uses of drainage area
  - SF Residential – 46%
  - MF Residential – 2%
  - Commercial & Industrial – 27%
  - Other – 25%

29

Priority Regional BMP – Van Nuys/Sherman Oaks Park



Site Characteristics

- ✓ 4,498 acre drainage area
- ✓ 41 acres open space
- ✓ Detention Basin/Wetland
- ✓ Major land uses of drainage area
  - SF Residential – 42%
  - MF Residential – 27%
  - Commercial & Industrial – 24%
  - Other – 7%

30

Priority Regional BMP – North Hollywood Park

Site Characteristics

- ✓ 4,363 acre drainage area
- ✓ 15 acres open space
- ✓ Infiltration BMP
- ✓ Major land uses of drainage area
  - SF Residential – 48%
  - MF Residential – 14%
  - Commercial & Industrial – 25%
  - Other – 13%

31

Priority Regional BMP – Compton Creek

Site Characteristics

- ✓ 7,100 acre drainage area
- ✓ 9 acres open space
- ✓ Wetland/detention basin BMP
- ✓ Major land uses of drainage area
  - SF Residential – 19%
  - MF Residential – 49%
  - Commercial & Industrial – 15%
  - Other – 17%

32

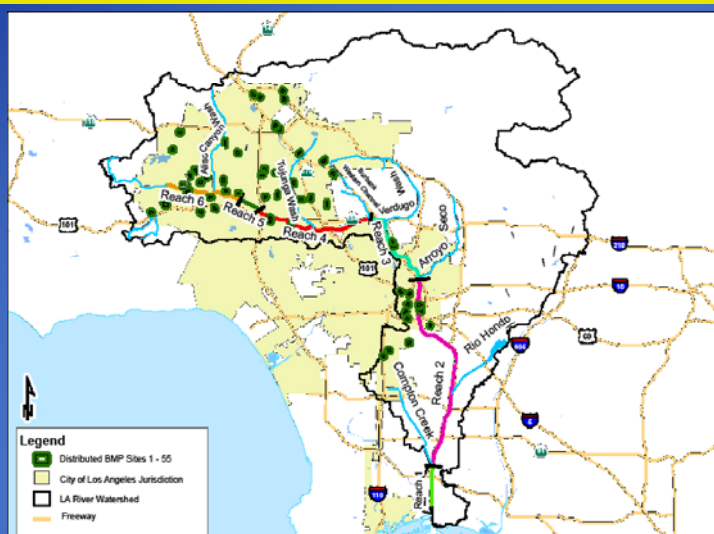
Green Structural Distributed BMPs

- Approximately 50 Distributed BMPs Selected for Priority Implementation
  - Phased implementation to support compliance targets
  - Implementation priority based on areas with highest metals concentrations
- Additional Distributed BMPs
  - Plan will include second tier priority list
  - Need for additional BMPs evaluated over time
  - BMPs targeted where highest metals concentrations observed

Oros St. – Complete

Elmer Street Construction

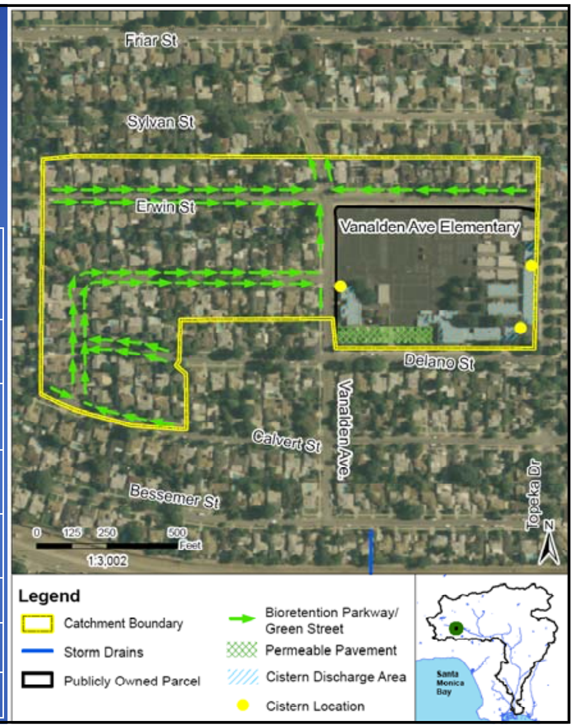
Priority Distributed BMP Sites



34

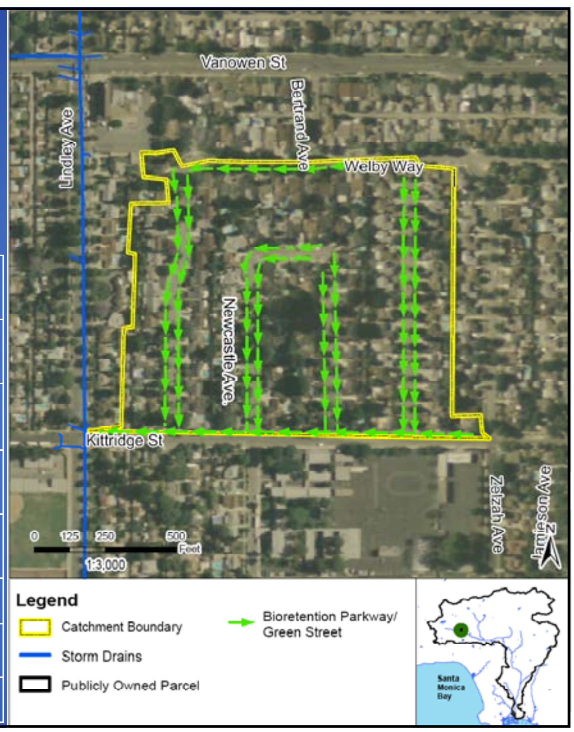
LAR Reach 6 Vanalden Ave Reseda

Ownership	Publicly-owned right-of-way; LAUSD school property (Vanalden Avenue Elementary)	
Green Street/ BMP Size	Bioretention Parkway (ft)	6,748
	Bioretention Parkway (ac)	0.5
	Porous Pavement (ac)	0.5
BMP Tributary Area (ac)	Bioretention Parkway	22.9
	Porous Pavement	1.0
	Cistern	1.0
Acres Treated by All BMPs		24.9



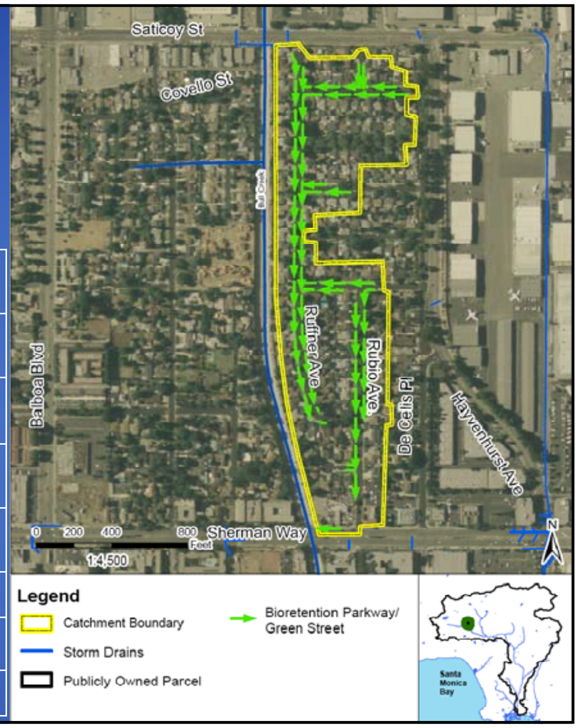
LAR Reach 6 New Castle Avenue Reseda

Ownership	Publicly-owned right-of-way	
Green Street/ BMP Size	Bioretention Parkway (ft)	8,629
	Bioretention Parkway (ac)	0.6
	Porous Pavement (ac)	0.0
BMP Tributary Area (ac)	Bioretention Parkway	25.3
	Porous Pavement	0.0
	Cistern	0.0
Acres Treated by All BMPs		25.3



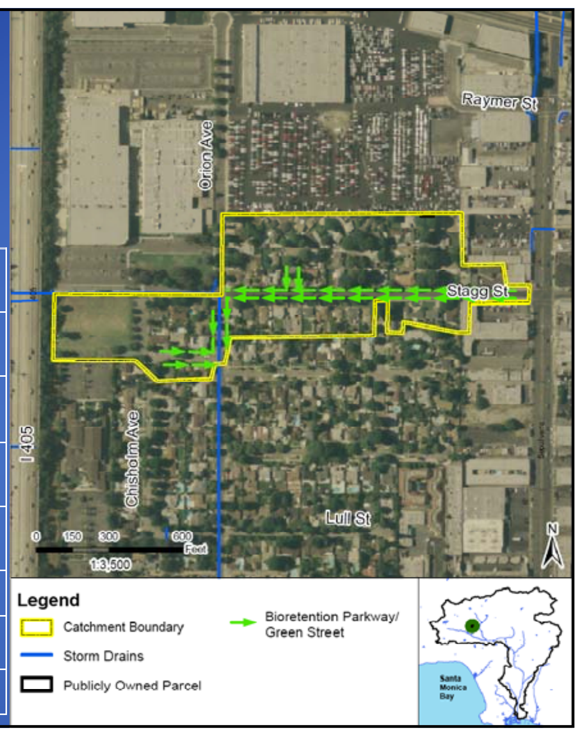
LAR Reach 5 Rubio Avenue Van Nuys

Ownership	Publicly-owned right-of-way	
Green Street/ BMP Size	Bioretention Parkway (ft)	8,628
	Bioretention Parkway (ac)	0.6
	Porous Pavement (ac)	0.0
BMP Tributary Area (ac)	Bioretention Parkway	29.9
	Porous Pavement	0.0
	Cistern	0.0
Acres Treated by All BMPs		29.9



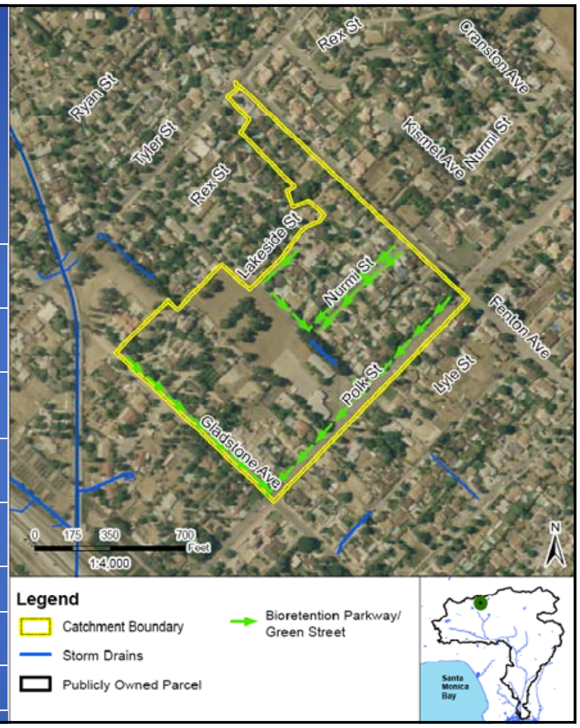
LAR Reach 4 Stagg Street Van Nuys

Ownership	Publicly-owned right-of-way	
Green Street/ BMP Size	Bioretention Parkway (ft)	3,619
	Bioretention Parkway (ac)	0.1
	Porous Pavement (ac)	0.0
BMP Tributary Area (ac)	Bioretention Parkway	13.5
	Porous Pavement	0.0
	Cistern	0.0
Acres Treated by All BMPs		13.5



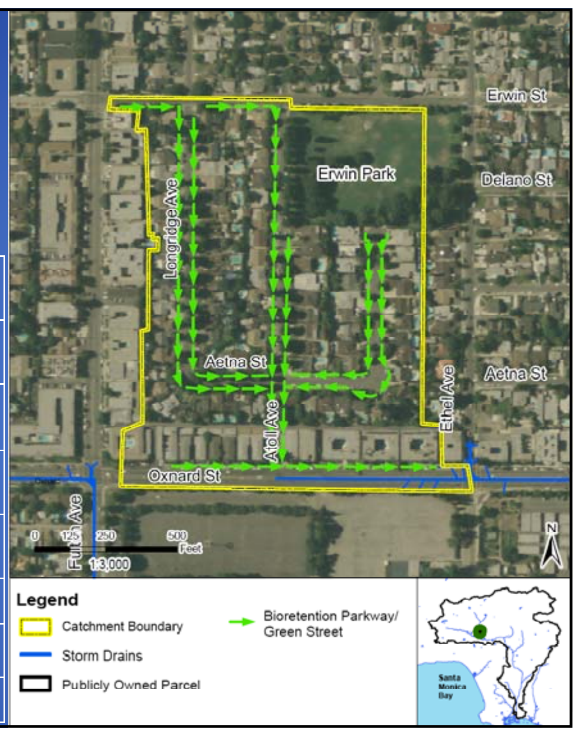
Tujunga Wash Polk Street Sylmar

Ownership	Publicly-owned right-of-way	
Green Street/ BMP Size	Bioretention Parkway (ft)	4,098
	Bioretention Parkway (ac)	0.1
	Porous Pavement (ac)	0.0
BMP Tributary Area (ac)	Bioretention Parkway	22.9
	Porous Pavement	0
	Cistern	0
Acres Treated by All BMPs		22.9



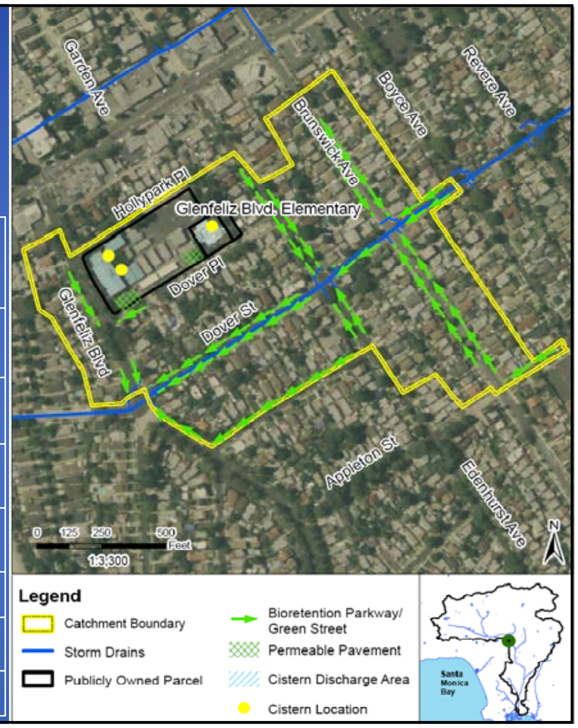
Tujunga Wash Oxnard Street Van Nuys

Ownership	Publicly-owned right-of-way	
Green Street/ BMP Size	Bioretention Parkway (ft)	7,881
	Bioretention Parkway (ac)	0.5
	Porous Pavement (ac)	0.0
BMP Tributary Area (ac)	Bioretention Parkway	25.7
	Porous Pavement	0.0
	Cistern	0.0
Acres Treated by All BMPs		25.7



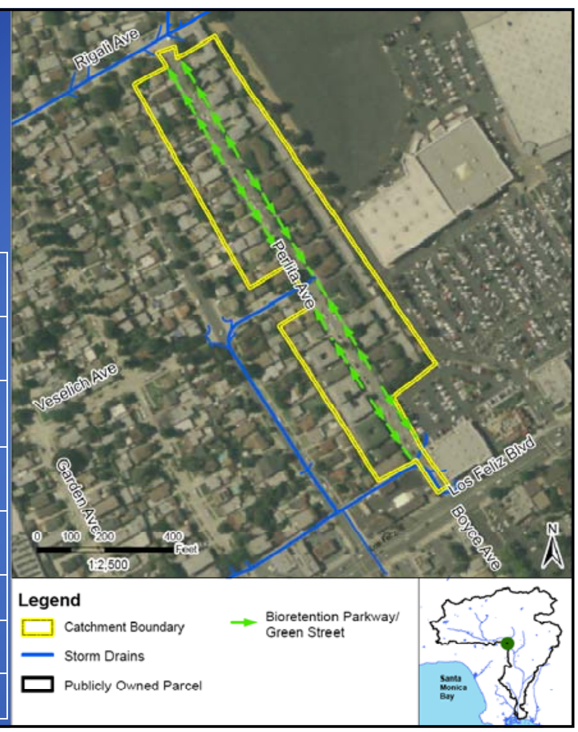
LAR Reach 3 Dover Street Atwater Village

Ownership	Publicly-owned right-of-way; LAUSD school property (Glenfeliz Blvd Elementary)	
Green Street/ BMP Size	Bioretention Parkway (ft)	7,723
	Bioretention Parkway (ac)	0.6
	Porous Pavement (ac)	0.2
BMP Tributary Area (ac)	Bioretention Parkway	29.7
	Porous Pavement	0.4
	Cistern	0.6
Acres Treated by All BMPs		30.7



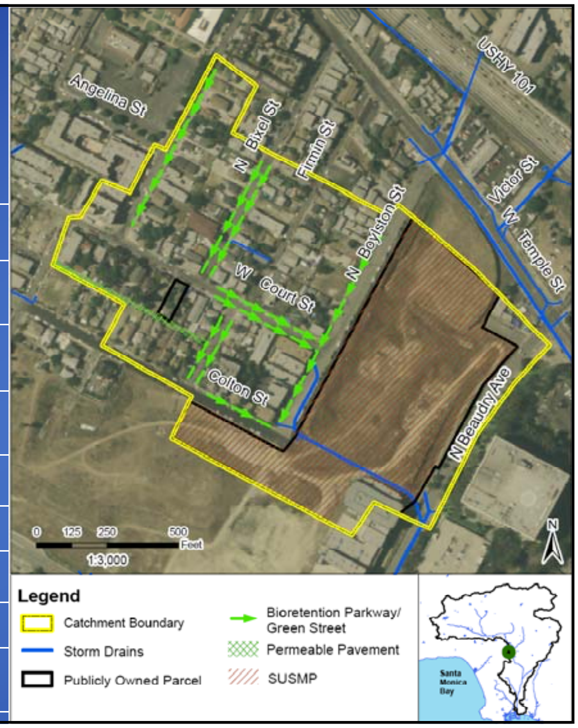
LAR Reach 3 Perlita Avenue Atwater Village

Ownership	Publicly-owned right-of-way	
Green Street/ BMP Size	Bioretention Parkway (ft)	2,501
	Bioretention Parkway (ac)	0.1
	Porous Pavement (ac)	0.0
BMP Tributary Area (ac)	Bioretention Parkway	8.7
	Porous Pavement	0.0
	Cistern	0.0
Acres Treated by All BMPs		8.7



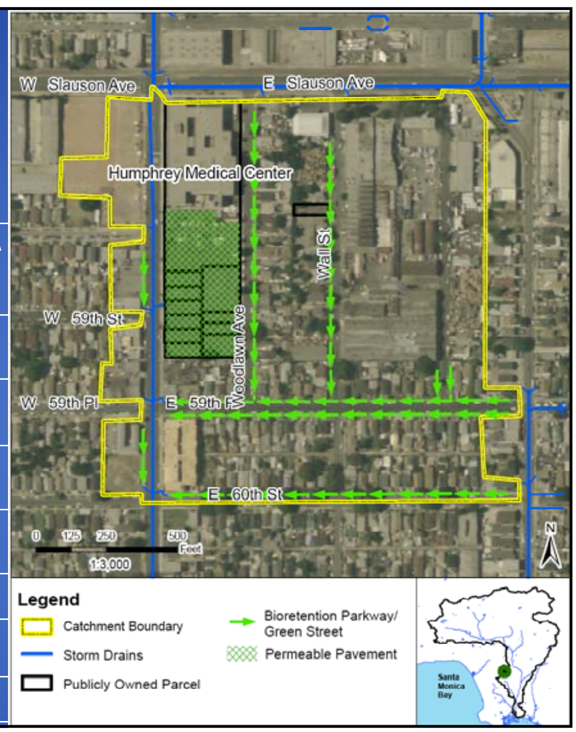
LAR Reach 2 Beaudry Avenue Downtown

Ownership	Publicly-owned right of way	
Green Street/ BMP Size	Bioretention Parkway (ft)	4,193
	Bioretention Parkway (ac)	0.2
	Porous Pavement (ac)	0.3
BMP Tributary Area (ac)	Bioretention	18.1
	Porous Pavement	0.6
	Cistern	0.0
SUSMP Area (ac)		11.6
Acres Treated by All BMPs + SUSMP		30.3



Compton Creek Slauson Avenue South Los Angeles

Ownership	Publicly-owned right-of-way; LA County-owned medical center property	
Green Street/ BMP Size	Bioretention Parkway (ft)	6,395
	Bioretention Parkway (ac)	0.3
	Porous Pavement (ac)	3.0
BMP Tributary Area (ac)	Bioretention Parkway	34.3
	Porous Pavement	5.5
	Cistern	0.0
Acres Treated by All BMPs		39.8

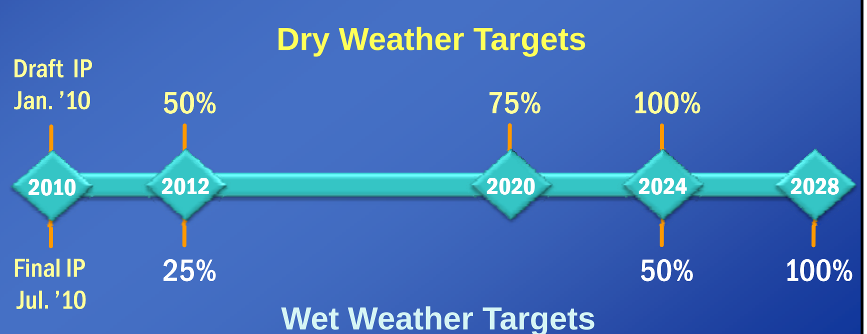


Metals TMDL Implementation Plan – Quantitative Analysis & Phased Implementation

45

Quantitative Analysis - Compliance with TMDL Targets

- Analysis based on City of Los Angeles drainage area that must meet Wasteload Allocation interim target dates



46

Quantitative Analysis – Dry Weather Compliance

- Existing dry weather water quality data used to estimate treatment requirements to comply with TMDL targets
- Quantitative analysis input data:
  - City of Los Angeles drainage area in LA River Watershed (236 sq. mi.)
  - Coordinated Monitoring Program data
  - Calculated percent of Los Angeles area currently compliant with dry weather targets
  - Dry weather flow benefits from any BMP projects

City of Los Angeles MS4 Drainage Area

CMP Dry Weather Sample Location	Dry Weather Target (Total Copper µg/L)	% of City's MS4 Drainage Area
LAR at White Oak Ave.	30	24.8%
LAR at Sepulveda Blvd.	26	16.3%
LAR at Tujunga Ave.	26	7.8%
LAR at Zoo Dr.	22	6.8%
LAR at Figueroa St.	26	6.8%
LAR at Washington Blvd.	22	9.5%
LAR at 710 Freeway	22	2.0%
Tujunga Wash at Moorpark St.	19	16.9%
Burbank Western Channel at Riverside Dr.	19	2.1%
Compton Creek at Del Amo Blvd.	19	7.0%
	Total	**100%**

48

Percent of City Drainage Area in Compliance with TMDL Dry Weather Targets

Sample Month	Total Copper	Dissolved Copper	Total Lead	Dissolved Lead
10/2008	81%	81%	100%	100%
11/2008	81%	83%	100%	100%
12/2008	83%	83%	100%	100%
1/2009	83%	83%	100%	100%
4/2009	100%	100%	100%	100%
5/2009	83%	100%	76%	100%
6/2009	100%	100%	100%	100%
7/2009	93%	100%	100%	100%
8/2009	100%	100%	100%	100&

- Recent Sample Results Indicate:
  - 2012 (50%) and 2020 (75%) dry weather targets will be met
  - Implementation will focus on meeting 2024 (100%) target

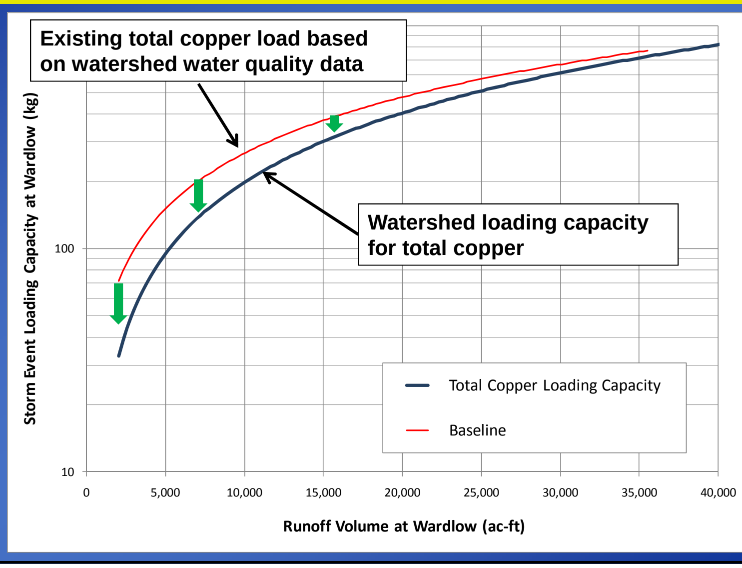
49

Quantitative Analysis - Wet-Weather Compliance

- Step 1 – Review TMDL wasteload allocations – what is the loading capacity for each metal
- Step 2 – Evaluate baseline water quality – how are we doing vs. loading capacity
- Step 3 – Estimate load reduction targets for the City to bring existing water quality in line with the loading capacity
- Step 4 – Estimate load reduction from:
  - Existing/planned watershed projects
  - SUSMP (development/redevelopment)
  - Distributed BMPs
  - Regional BMPs
  - Institutional BMPs

50

Load Reduction Needed



Load Reduction Summary – Structural BMPs

BMP Category	2012 Target (acres)	2024 Target (acres)	2028 Target (acres)
Existing / Planned Projects	8,100	6,300	500
SUSMP on Development	250 acres / year		
Distributed BMPs	1,500	5,000	
Regional BMPs	11,500	2,900	15,000

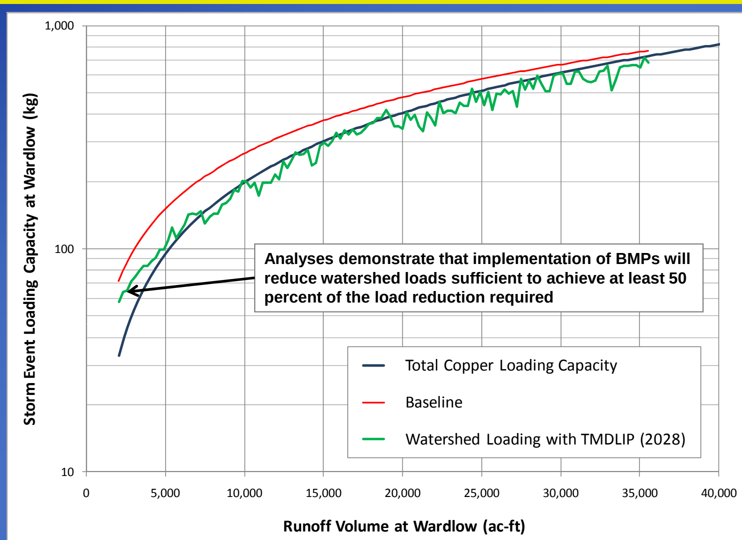
52

Load Reduction Summary - Institutional

BMP Category	2012 Target	2024 Target	2028 Target
Brake Pad Replacement	Estimate from BPP (~ 6.5% Cu)	5.7% Cu	5.0% Cu (Initial BPP Goal)
Enhanced Street Sweeping	Total sediment removal increased by 5%		
Downspout Disconnects	2,500/year		
Other BMPs	Benefits expected, but not quantified for purposes of compliance analysis		

53

Load Reduction Result – All BMPs



54

Next Steps

55

Plan Review and Submittal Process

- Internal draft Implementation Plan currently in preparation
- WPD and City Council Review
- Draft Implementation Plan due to the Regional Board by January 11, 2010

56

Contacts

Watershed Protection Division

- Morad Sedrak, Project Manager
  Morad.Sedrak@lacity.org, 213-485-3951
- Seth Carr, Project Engineer
  Seth.Carr@lacity.org, 213-485-3961

57

Los Angeles River Metals TMDL Implementation Plan, Stakeholder Workshop #3 - Comment Response Matrix		
No.	**Comment**	**Response**
1	Would you provide examples of institutional BMPs?	Institutional BMPs are categorized into four areas. These categories and example BMPs include: (1) Direct Source Control - product replacement programs (e.g., brake pads, wheel weights), downspout disconnection, and enhanced street sweeping; (2) Program Development - ordinance development (e.g., stream protection), policy guidance documents (e.g., rainwater harvesting, green building, low impact development); (3) Education & Outreach - ongoing public education programs to reduce sources of metals (e.g., used oil disposal, car washing, car repair) and school education programs; and (4) Planning & Coordination - review of the City's General Plan to incorporate urban runoff management principles, collaboration activities with stakeholders to maximize opportunities for joint BMP implementation.
2	Are utility corridors a detriment?	The BMP selection process took into account the location of major utility corridors. Their presence can be a detriment to siting BMPs because of the potential increased cost of re-routing utilities. Utility corridors in some cases could be a benefit. For example, the LADWP Whitnall Powerline Easement Stormwater Capture project utilizes available land located along the powerline corridor.
3	How are "regional" vs. "distributed" categories defined?	For the purposes of developing the Implementation Plan, regional BMPs are defined as centralized stormwater facilities, typically placed near the outlet of a catchment or subwatershed and designed to treat urban runoff from a relatively large drainage area (from about 50 acres to several hundred or 1,000+ acres). These BMPs may include, for example, infiltration basins, detention basins, and constructed wetlands. Distributed BMPs are defined as stormwater devices and landscaping practices dispersed throughout a catchment and typically serving relatively small drainage areas (typically less than 50 acres). Example distributed BMPs include vegetated swales, bioretention, porous pavement, green roofs, and cisterns.
4	Regarding SUSMP, we encourage you to look at AB 1881. This law may affect your planning and implementation of BMPs. Unless science is incorporated more clearly, the TMDL plans won't have an impact.	The City appreciates the comment and will evaluate AB 1881 requirements (water conservation and land use) in the context of the urban runoff management elements needed to comply with the metals TMDL targets.
5	Is the BMP location on Compton Creek in the soft bottom portion of the creek?	The Compton Creek regional BMP is located adjacent to the concrete-lined portion of the creek.
6	What do you plan to accomplish with the detention basins? What will you remove? How much? Should the nomenclature for detention basins be expanded to include 24-hour storage?	The detention basin used for equalization at the Compton Creek wetland site will provide hydrograph attenuation. The treatment capacity of a SSF wetland is limited by the hydraulic retention time, therefore upstream storage is necessary to maximize pollutant removal at this site. Some particle settling will also occur in this detention storage, which will prevent clogging of the wetland system.

Los Angeles River Metals TMDL Implementation Plan, Stakeholder Workshop #3 - Comment Response Matrix		
No.	**Comment**	**Response**
7	Do you have other charts related to compliance dates for the four major regional BMP projects?	As was noted in the workshop presentation, the Implementation Plan identifies the number of tributary acres requiring regional BMP treatment to achieve compliance with the TMDL targets. The four major regional BMP projects are proposed for implementation to support compliance with the wet weather TMDL targets for 2012 and 2024, respectively.
8	What will be the level of community involvement during the design of the BMPs?	As projects move from the current conceptual stage into the design phase, the City will incorporate community involvement into the implementation process.
9	Regarding the bioretention parkway, what does "25.3" mean? How will that affect the design/plan for the BMPs? Will it require an EIR?	"25.3" is the tributary area to a bioretention parkway. Construction would only occur within the footprint of the parkway and the environmental review process will be implemented as part of the project implementation phase.
10	Beaudry distributed BMP project- is that where the new Roybal HS is and if so, are you working with them?	The SUSMP area shown on the Beaudry St. distributed BMP project map is the Edward Roybal Learning Center. The City is coordinating with LAUSD on school construction projects.
11	Regarding the Compton Creek regional BMP, is 0.125 inches the amount of rainfall volume you are treating? Does modeling show that there is nothing "coming out" at that point? Will that put us in compliance?	This is a rough approximation of the runoff depth that can be captured, treated, and returned to Compton Creek at this site.
12	Are similar TMDLs expected for other watersheds? Will you be working with them to piggyback on BMPs?	Currently, the City is also developing TMDL Implementation Plans for bacteria and metals in the Ballona Creek watershed. While the selection of distributed and regional BMPs is specific to the watershed, institutional BMP implementation will be coordinated throughout the City regardless of the watershed.
13	Are you looking at street structures as they pertain to drainage? How will you keep storm drains clear of debris?	The Los Angeles River Trash TMDL Implementation Plan includes projects and activities to address debris in the stormwater collection system
14	Does control of fine sediment allow you to achieve compliance?	TMDL metals targets include total lead, total copper and total zinc, which measure metals associated with particulate matter including fine sediments. Any BMPs that reduce sediment loading will support compliance with the metals TMDL.
15	Regarding the Brake Pad Partnership, a study is coming out that models the washout of watersheds. There is industry opposition. We encourage you to contact your local legislative representatives.	Comment noted. We will review the results of the study when they become available.
16	Does the City have a monitoring plan for these projects and overall implementation? Can you share it with us?	The City is currently evaluating the Coordinated Monitoring Plan (CMP) in the context of its TMDL Implementation Plan. Any recommendations for modifications to the CMP will be incorporated into the Implementation Plan
17	You need to consider the maintenance of these projects -- now, not later, after the projects are built and done.	The City will develop a cost estimate to support the TMDL Implementation Plan. This estimate will incorporate operation and maintenance costs.

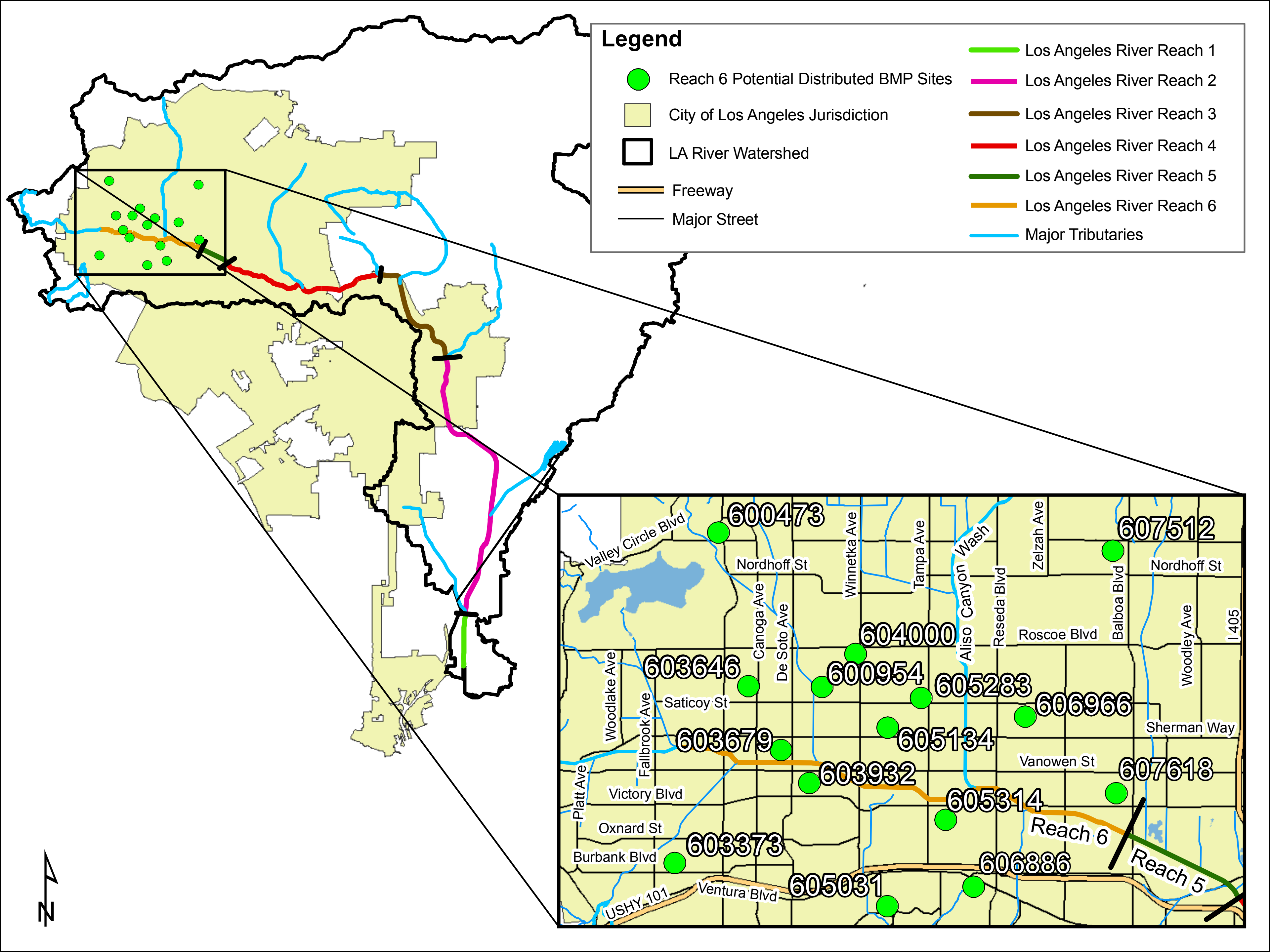
Los Angeles River Metals TMDL Implementation Plan, Stakeholder Workshop #3 - Comment Response Matrix		
No.	**Comment**	**Response**
18	Two days/week watering - does this help to cause subsidence?	While this is an important question, the Watershed Protection Division does not currently have any information regarding this issue.
19	Is the North Hollywood Park zone part of the superfund aquifer system? Do LAR TMDL BMPs encroach on the superfund boundary?	According to analyses completed to date, the North Hollywood Park project site is near, but not part of, the area where the contaminated plume is present. The potential impact of plume on this project will be further investigated during the next phase of implementation.
20	Have you done any research on generative or vacuum sweepers? Are they effective?	The City is relying on information in published literature. Although the City has not conducted its own research, it will consider such studies in the future as part of its efforts to increase the water quality benefits that may be obtained through sediment removal.
21	When looking at the big picture, we have to look at all aspects to balance lawns vs. trees health vs. runoff. Scientists should inform our elected officials.	The City continues to collaborate with other agencies to balance various water resource issues. We continue to use the best scientific information to inform city officials.
22	We encourage you to review and comment on LAUSD's draft reference manual. Contact Josette.Tin@lausd.net or call 213-241-0475.	The City appreciates this information and will follow-up with LAUSD.
23	When we refer to "Green Streets" and permeable pavement, are we replacing bad streets in LA with permeable pavement?	Green street projects will modify the existing street design to capture and treat local runoff. Currently the emphasis of this effort is on draining water to bioretention facilities to be constructed adjacent to the street. Urban runoff will be directed to these facilities. At this time, permeable pavement is not planned for use on primary streets. However, if the project area includes parking lots, the lots may be retrofitted with permeable pavement.
24	Do these recommendations require on EIR?	At this time, the City is only submitting t a plan for achieving compliance with TMDL targets. When plan elements move into implementation, the City will work with the Bureau of Engineering Environmental group to satisfy environmental documentation requirements.

Los Angeles River Metals TMDL Implementation Plan, Stakeholder Workshop #3 - Comment Response Matrix		
No.	**Comment**	**Response**
25	How is SUSMP monitored? Are reports issued that the public can check? Who does the plan checking and how is this overseen? How is it reported? Is monitoring reported by Building and Safety?	As a requirement under the LA County Municipal Stormwater Permit, Standard Urban Stormwater Mitigation Plans (SUSMP) are mandatory on new development and redevelopment projects. SUSMP requires infiltration or reuse of runoff water on-site, if possible. SUSMP plans are checked by a team of engineers from the City's Watershed Protection Division (WPD) located within the City's One-Stop Permit centers under the supervision of an assistant division manager. The City's annual report for its Municipal Stormwater permit contains a compilation of the number and type of SUSMP projects approved during that period, which is reported to the Regional Board. A Stormwater observation Form, which details the type of stormwater device or measure installed on the development site, is required to be certified by the developer's engineer prior to issuance of a certificate of occupancy by the Department of Building and Safety. Additionally, a covenant and agreement for maintenance of this device or measure is recorded with the County Recorder and filed with WPD before the SUSMP is approved. The program at large is monitored by WPD management through monthly reports and bi-monthly reports to the City Council as part of the stormwater program status update.
26	Do any of the sites receive water or drainage from sources other than City of LA?	BMP selection has focused on sites which receive 100% of their drainage from within the City of Los Angeles. However, if opportunities arise for multi-jurisdictional BMP implementation that collect drainage from more than one jurisdiction, the City will consider participation.
27	Regarding Group 6, did you talk with Pierce College? Santa Susana is doing metals remediation under the Regional Board, but is on the border of jurisdiction. Are we in contact with the Regional Board and other agencies?	The City has met with Pierce College regarding the regional BMP opportunity; Pierce College representatives will discuss our proposal with the College administration to see if we can partner on this project. Based on LA River Metals data, Reach 6 does **not** appear to have an unexplained source of metals contamination (like the Santa Susana Lab site). The City in conjunction with other agencies in the watershed continues to monitor ambient conditions of the River as part of its coordinated monitoring plan requirements. Our contact with Regional Board 4 is limited to our implementation efforts.
28	Have we done cost estimates and analysis for estimation in decreases in pollutant loadings?	The City will soon prepare a cost estimate to support the elements of the Implementation Plan. As was presented at the workshop, an estimate of decreases in pollutant loadings has been developed based on the combination of BMPs planned for implementation.
29	Based on dry weather data, have we reached goal for 2024 target?	Based on existing dry weather data from the CMP monitoring locations, the City is currently in compliance with the 2012 (50% of the City drainage area) and 2020 (75% of the City drainage area) TMDL targets. Additional urban runoff management is needed to comply with the 100% dry weather target (2024). Data collection and analysis will continue to provide regular updates on City compliance status.

Los Angeles River Metals TMDL Implementation Plan, Stakeholder Workshop #3 - Comment Response Matrix		
No.	**Comment**	**Response**
30	One challenge with trees is where streets are designed to drain well, but tree growth raises sidewalks and paving. Then we get ponding. Regular inspections are needed.	The City agrees that this is an important issue and appreciates the comment.
31	People hose down cul-de-sacs after wind storms cause leaf drops. They also hose down streets after fires to get rid of ash and debris.	As was noted during the workshop discussion, this type of activity creates water quality problems in urban runoff. This is an example where implementation of additional public education and outreach activities can provide water quality benefits.
32	Will the TMDL implementation plan include costs associated with institutional and other BMPs?	The City will soon prepare a cost estimate to support the elements of the Implementation Plan.
33	A lot of cities are doing flow reductions which reduces the volume of runoff and pollutants. Have we taken flow reduction into account as a way to reduce pollution?	Dry weather flow reductions from reduced or better managed outdoor water use is an effective means of reducing dry weather pollutant loads. We have not quantified the water quality benefits from public education / outreach or potential ordinances associated with outdoor water use. However, the Implementation Plan will note that these benefits exist and that they contribute to the margin of safety built into the quantitative analysis associated with the Plan.
34	On October 10th, Neighborhood Councils will hold the Congress of Neighborhoods. Will Public Works attend?	The City will determine who plans to attend from Public Works
35	Go to neighborhood councils and share your plan to implement green projects. Share this information early. Provide Summary sheet to show background and reasons why citizens should support these projects.	Comment noted.

Appendix E
Priority 1 Distributed BMP Project Sites

Priority 1 Distributed BMP Project Sites
Los Angeles River Reach 6


Legend
Reach 6 Potential Distributed BMP Sites
City of Los Angeles Jurisdiction
LA River Watershed
Freeway
Major Street
Los Angeles River Reach 1
Los Angeles River Reach 2
Los Angeles River Reach 3
Los Angeles River Reach 4
Los Angeles River Reach 5
Los Angeles River Reach 6
Major Tributaries
600473
607512
604000
603646
600954
605283
606966
605134
603679
603932
607618
605314
603373
606886
605031
Reach 6
Reach 5
Valley Circle Blvd
Nordhoff St
Canoga Ave
De Soto Ave
Winnetka Ave
Tampa Ave
Aliso Canyon Wash
Reseda Blvd
Zelzah Ave
Balboa Blvd
Woodley Ave
I 405
Roscoe Blvd
Saticoy St
Sherman Way
Vanowen St
Victory Blvd
Oxnard St
Burbank Blvd
Ventura Blvd
USHY 101
Woodlake Ave
Fallbrook Ave
Platt Ave
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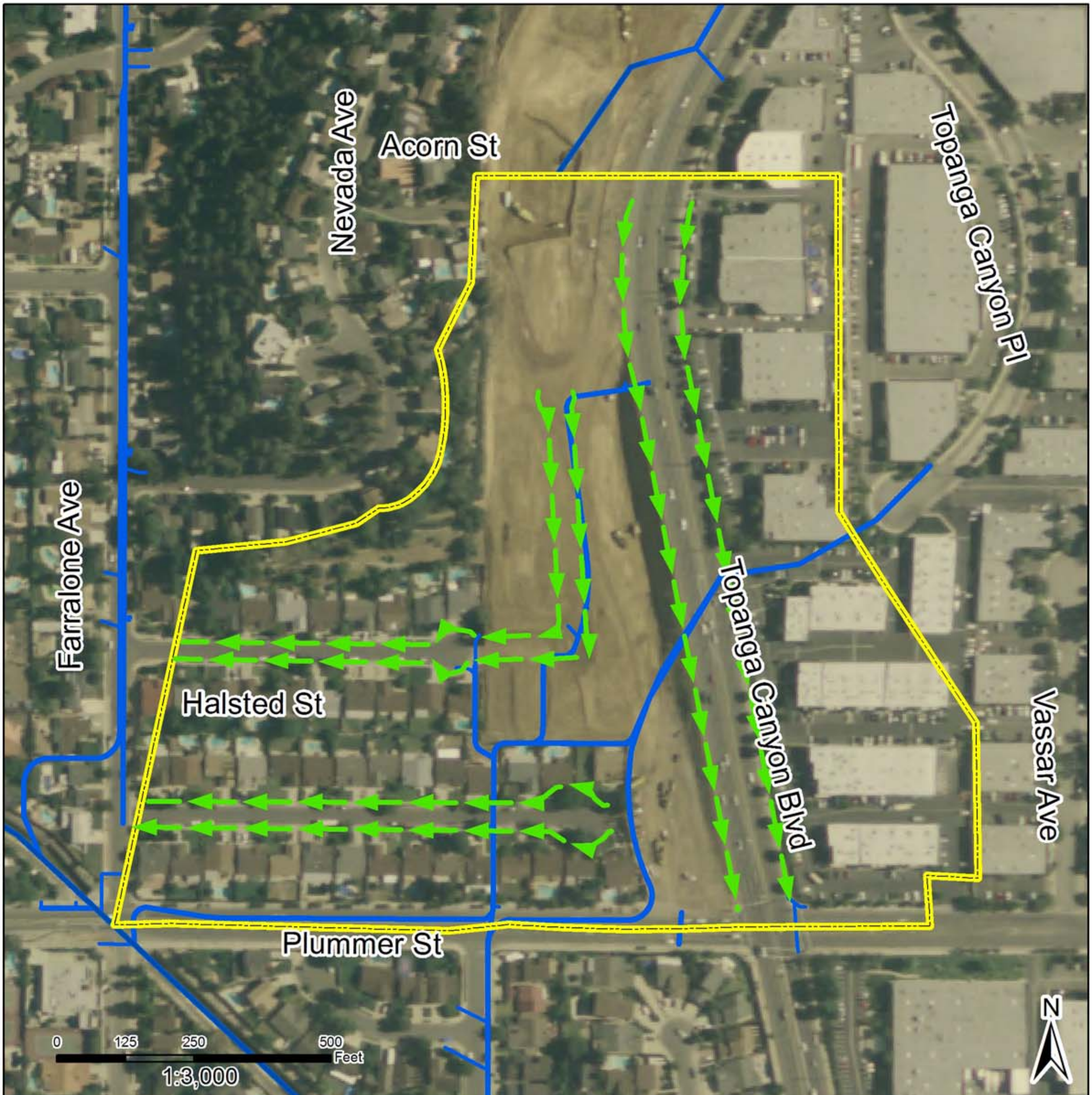


Legend

Catchment Boundary

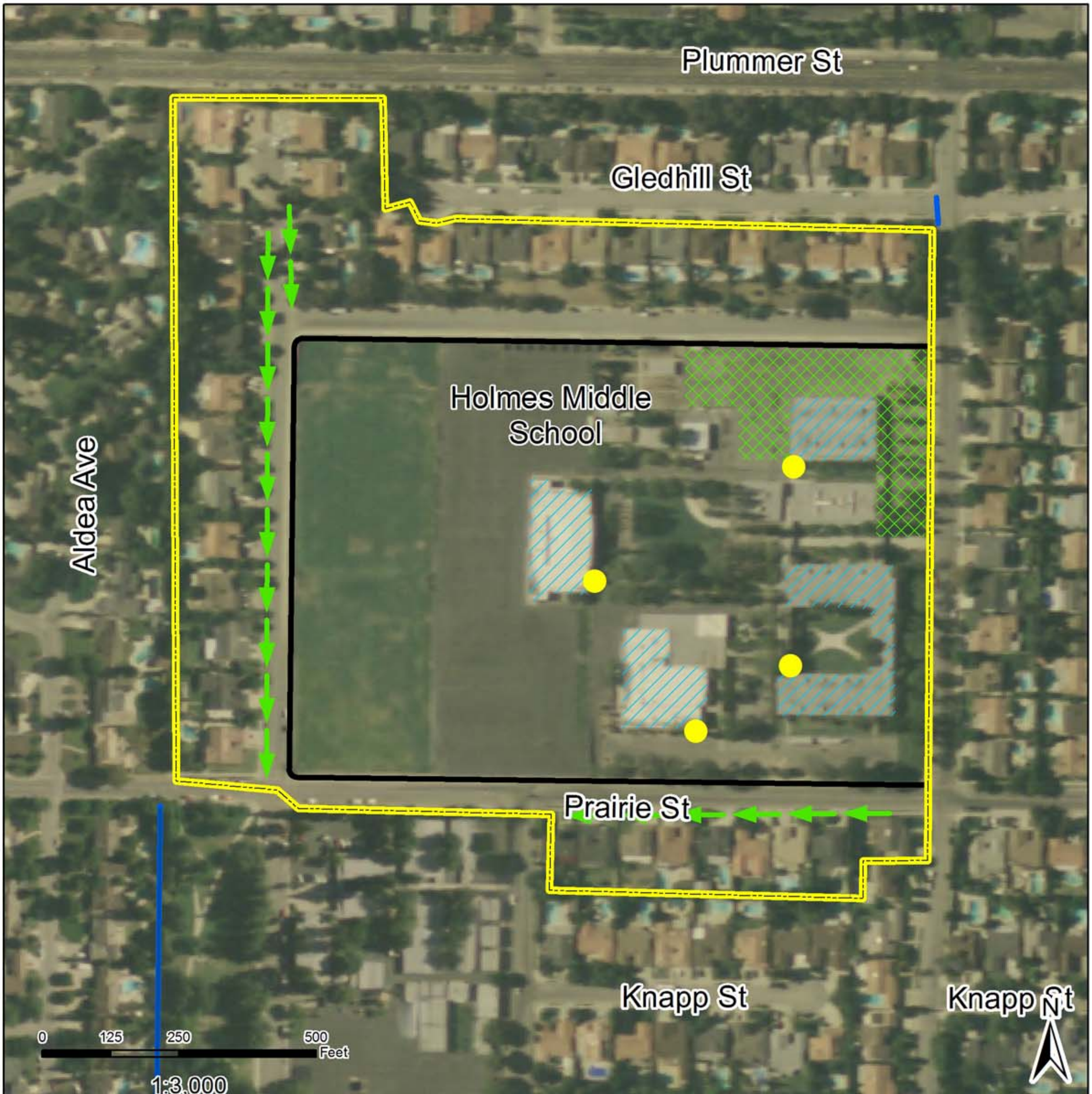
Storm Drains

Publicly Owned Parcel

Bioretention Parkway/Green Street

Catchment ID: 600473
Waterbody: LA River Reach 6

Site Name: Topanga Canyon Blvd Site
Neighborhood: Chatsworth

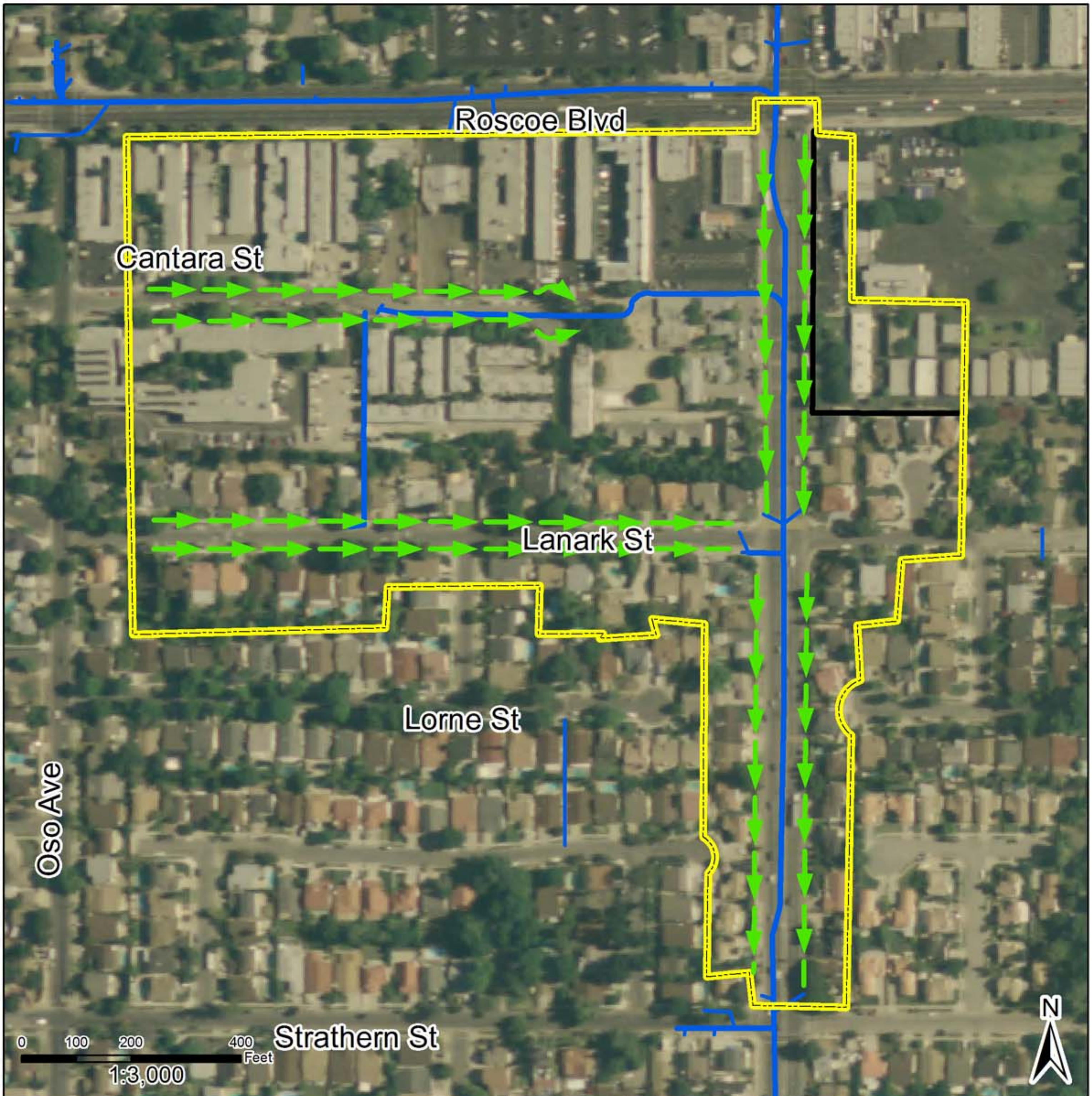


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 607512
Waterbody: LA River Reach 6

Site Name: Holmes Middle School Site
Neighborhood: Northridge

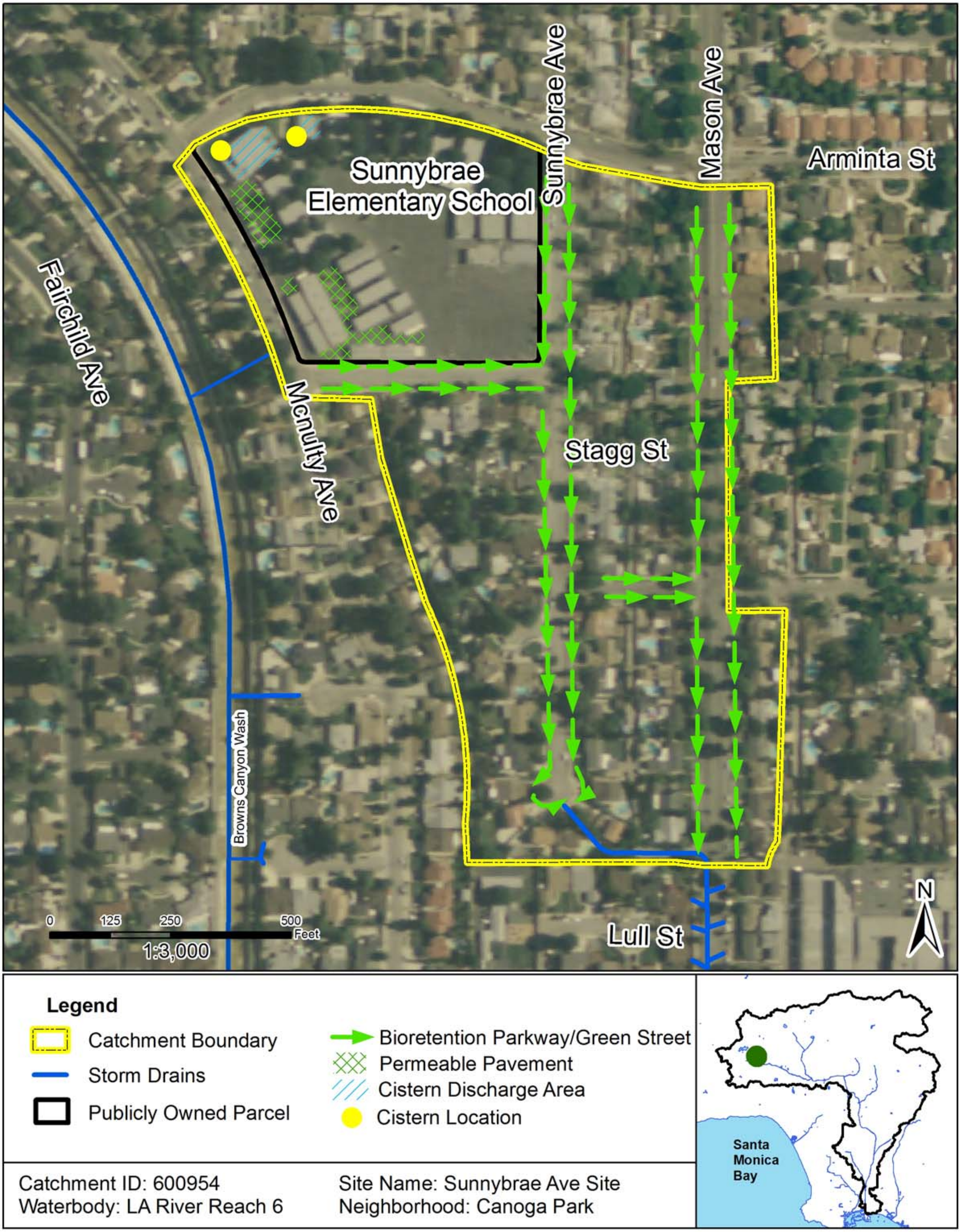


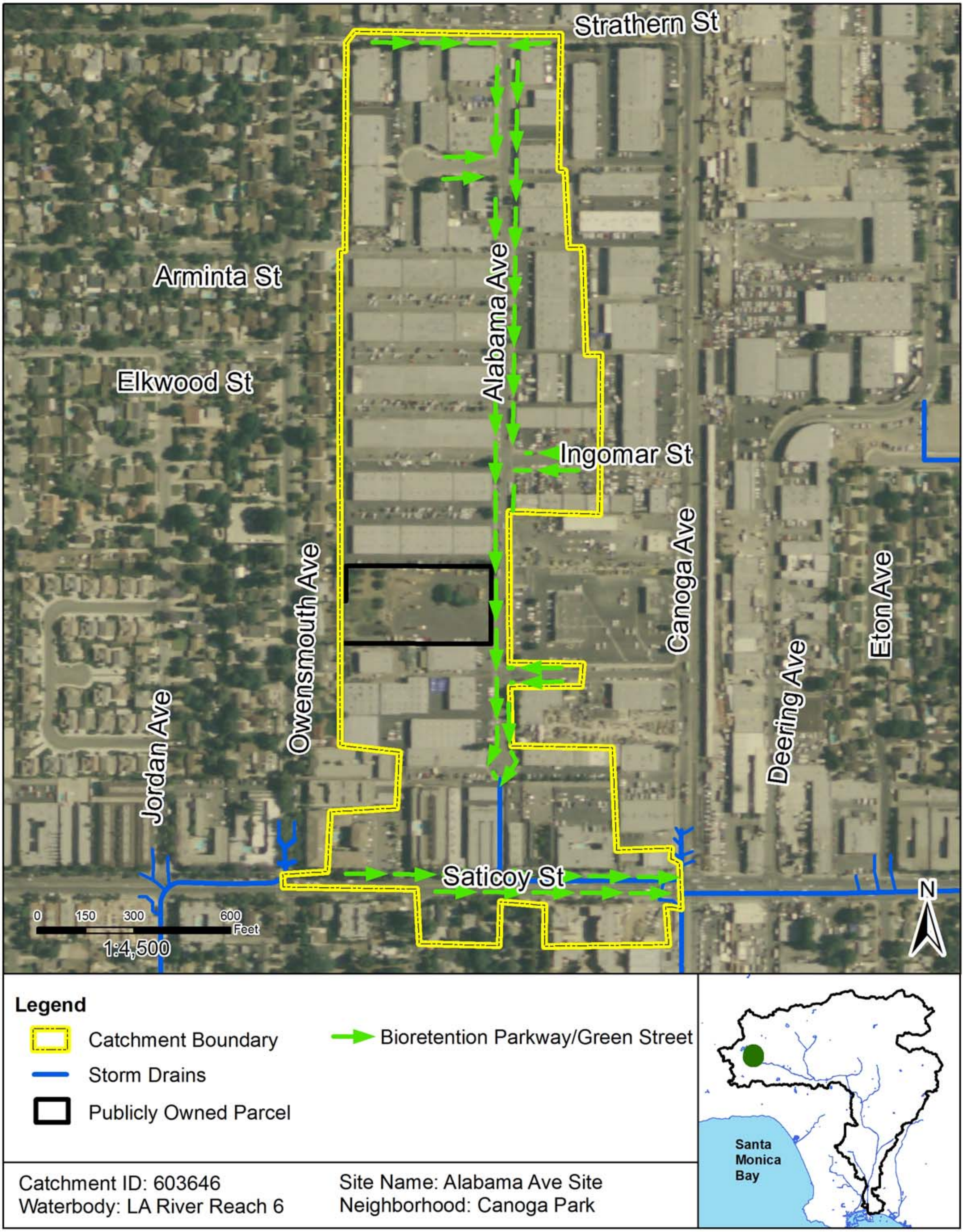
Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street

Catchment ID: 604000
Waterbody: LA River Reach 6

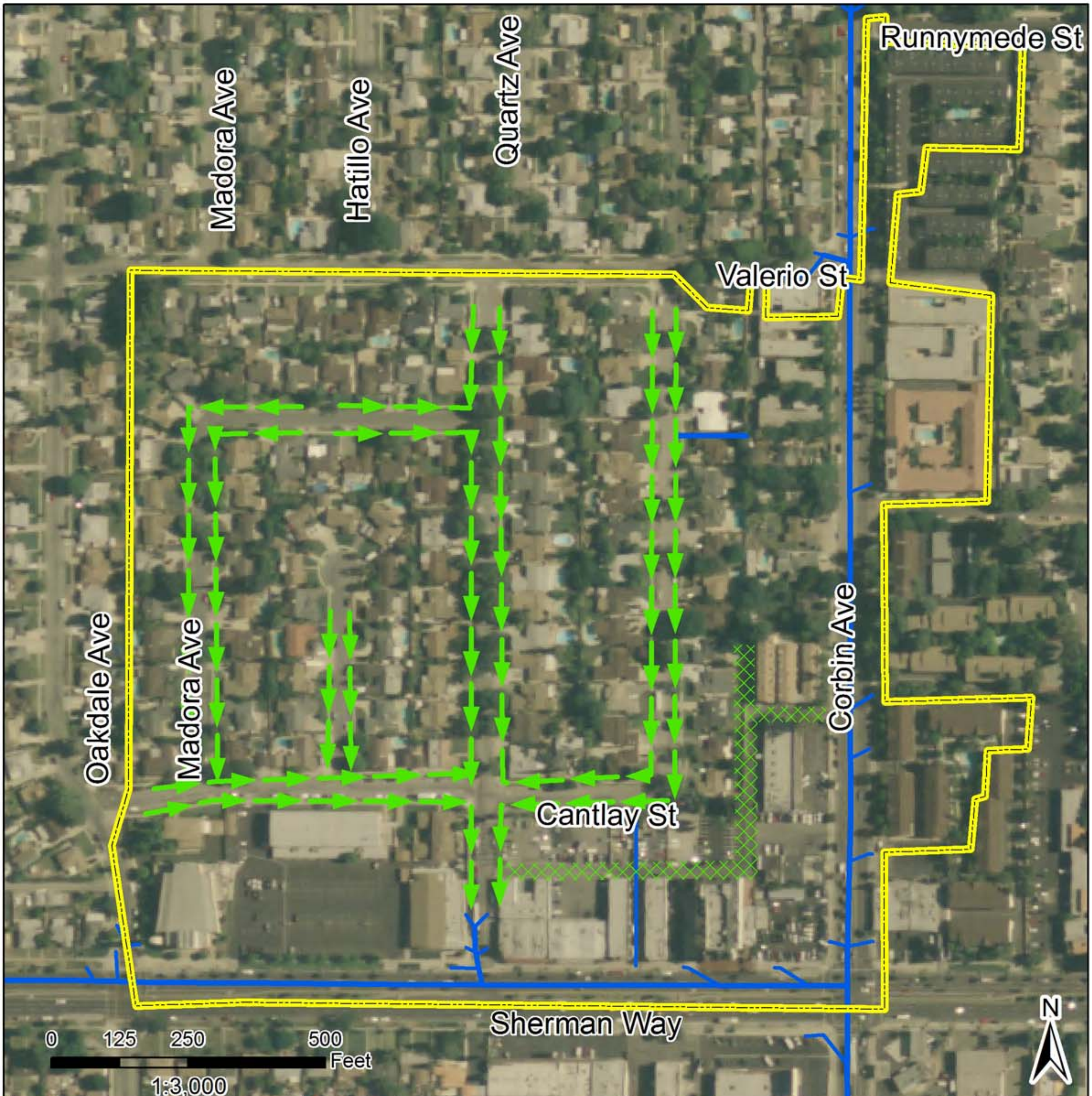
Site Name: Cantara St Site
Neighborhood: Winnetka


Sunnybrae Elementary School
Sunnybrae Ave
Mason Ave
Arminta St
Fairchild Ave
Mcnulty Ave
Stagg St
Browns Canyon Wash
Lull St
0
125
250
500
Feet
1:3,000
N
Legend
Catchment Boundary
Storm Drains
Publicly Owned Parcel
Bioretention Parkway/Green Street
Permeable Pavement
Cistern Discharge Area
Cistern Location
Santa Monica Bay
Catchment ID: 600954
Waterbody: LA River Reach 6
Site Name: Sunnybrae Ave Site
Neighborhood: Canoga Park


Strathern St
Arminta St
Elkwood St
Alabama Ave
Ingomar St
Owensmouth Ave
Canoga Ave
Jordan Ave
Deering Ave
Eton Ave
Saticoy St
0 150 300 600
Feet
1:4,500
N
Legend
Catchment Boundary
Storm Drains
Publicly Owned Parcel
Bioretention Parkway/Green Street
Santa Monica Bay
Catchment ID: 603646
Waterbody: LA River Reach 6
Site Name: Alabama Ave Site
Neighborhood: Canoga Park

Catchment ID: 605283
Waterbody: LA River Reach 6

Site Name: Lull St Site
Neighborhood: Reseda



Legend

Catchment Boundary

Storm Drains

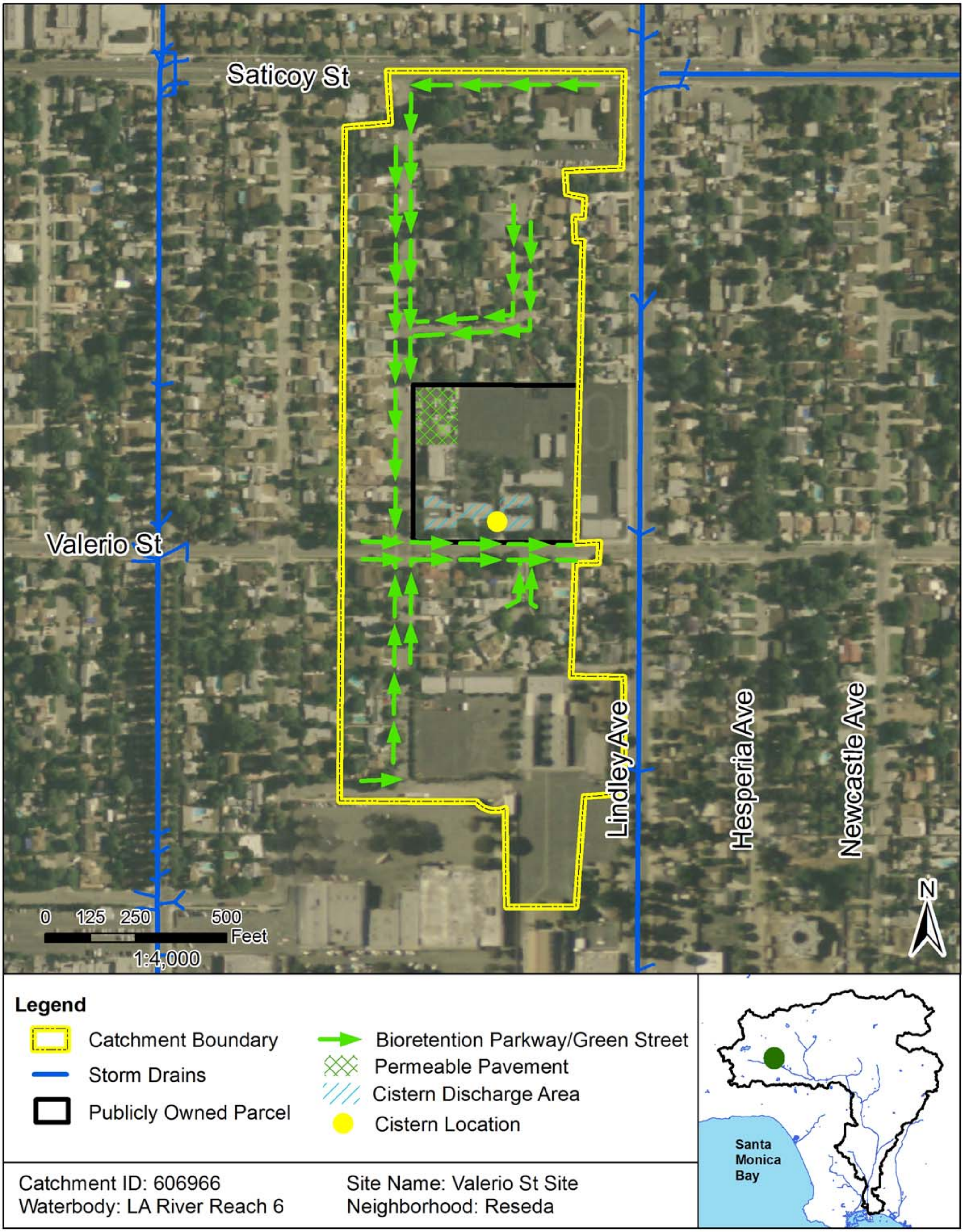
Publicly Owned Parcel

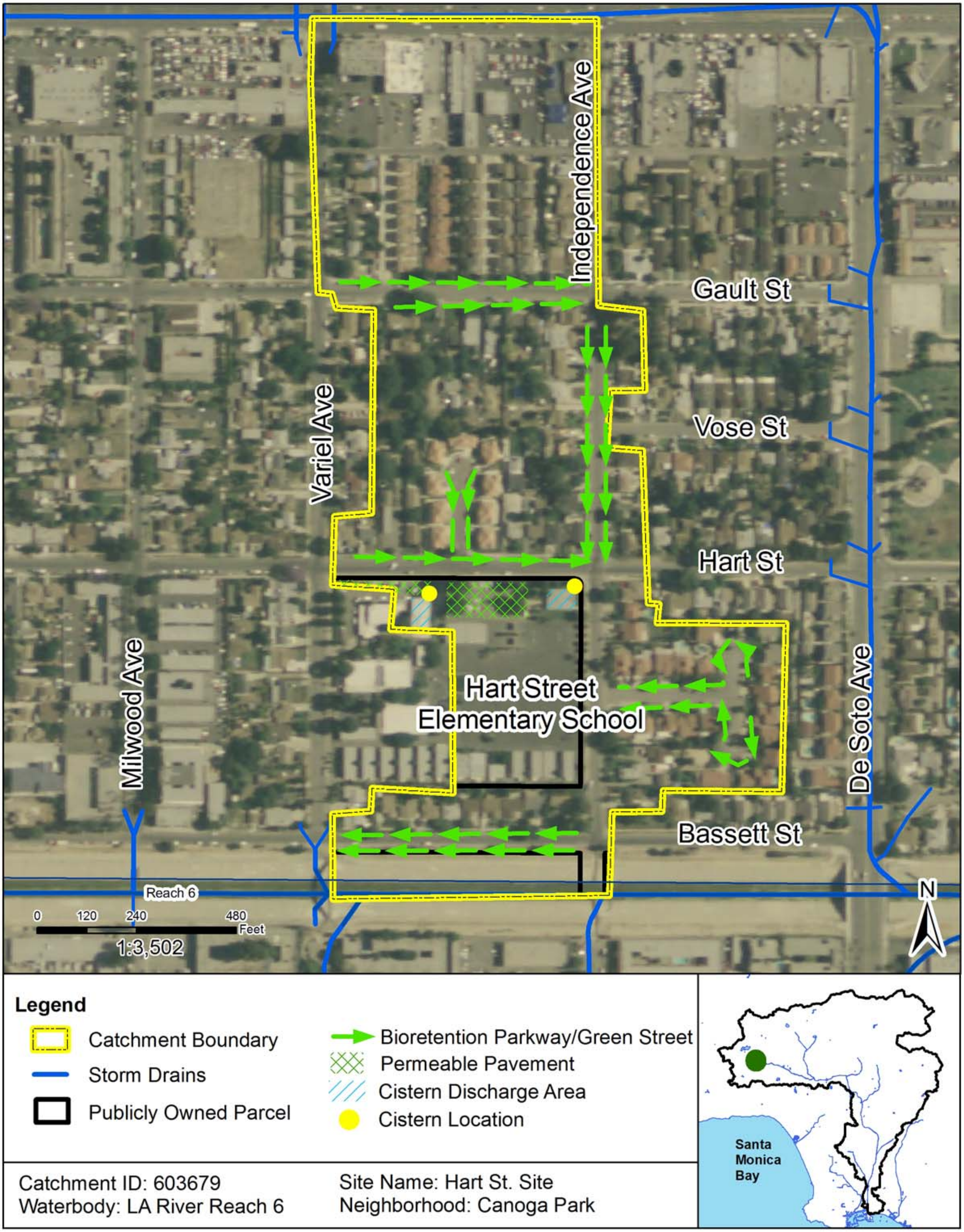
Bioretention Parkway/Green Street

Permeable Pavement

Catchment ID: 605134
Waterbody: LA River Reach 6

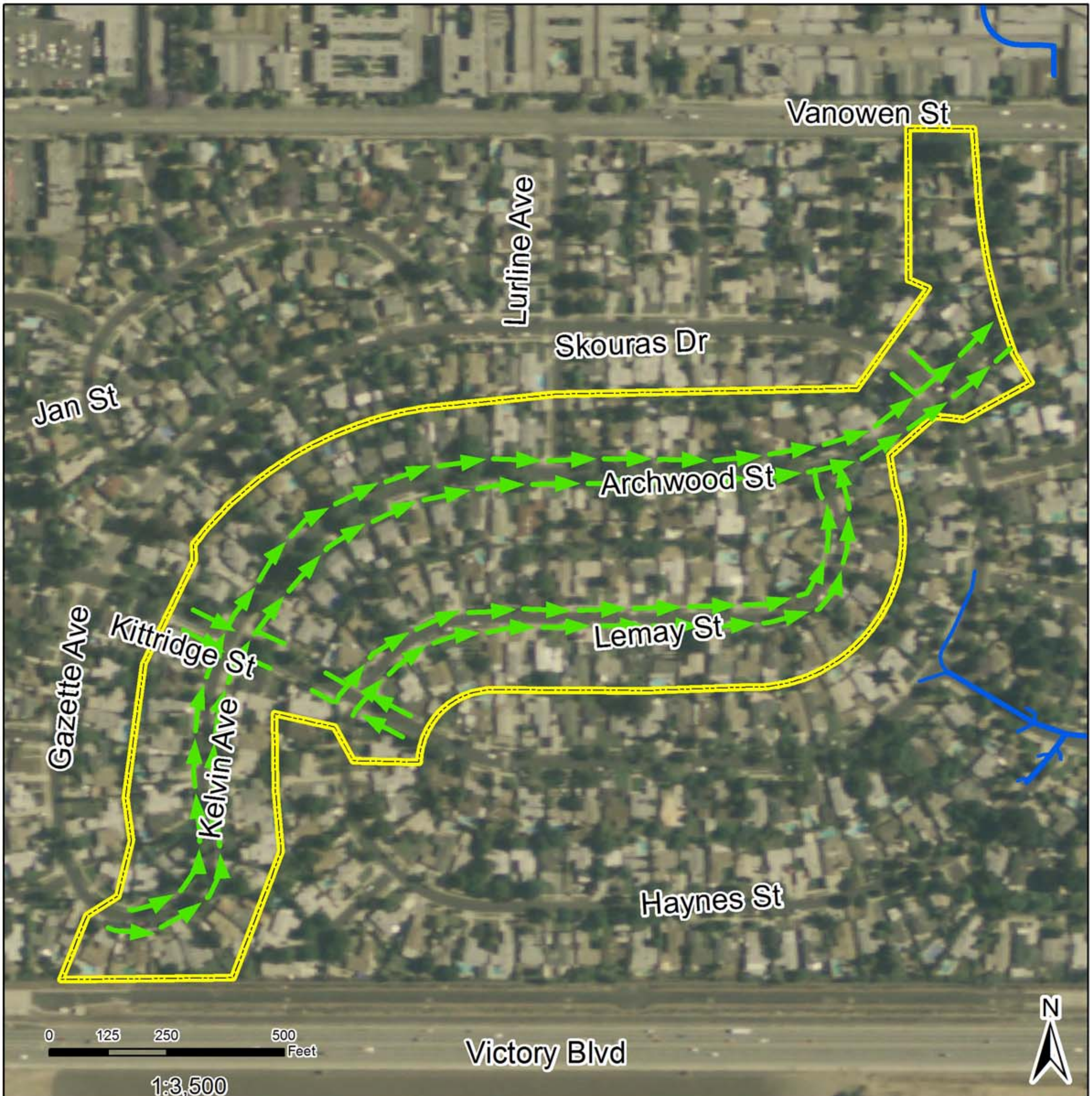
Site Name: Cantlay St Site
Neighborhood: Winnetka


Saticoy St
Valerio St
Lindley Ave
Hesperia Ave
Newcastle Ave
0 125 250 500
Feet
1:4,000
N
Legend
Catchment Boundary
Storm Drains
Publicly Owned Parcel
Bioretention Parkway/Green Street
Permeable Pavement
Cistern Discharge Area
Cistern Location
Santa Monica Bay
Catchment ID: 606966
Waterbody: LA River Reach 6
Site Name: Valerio St Site
Neighborhood: Reseda



Catchment ID: 603679
Waterbody: LA River Reach 6

Site Name: Hart St. Site
Neighborhood: Canoga Park



Legend

Catchment Boundary

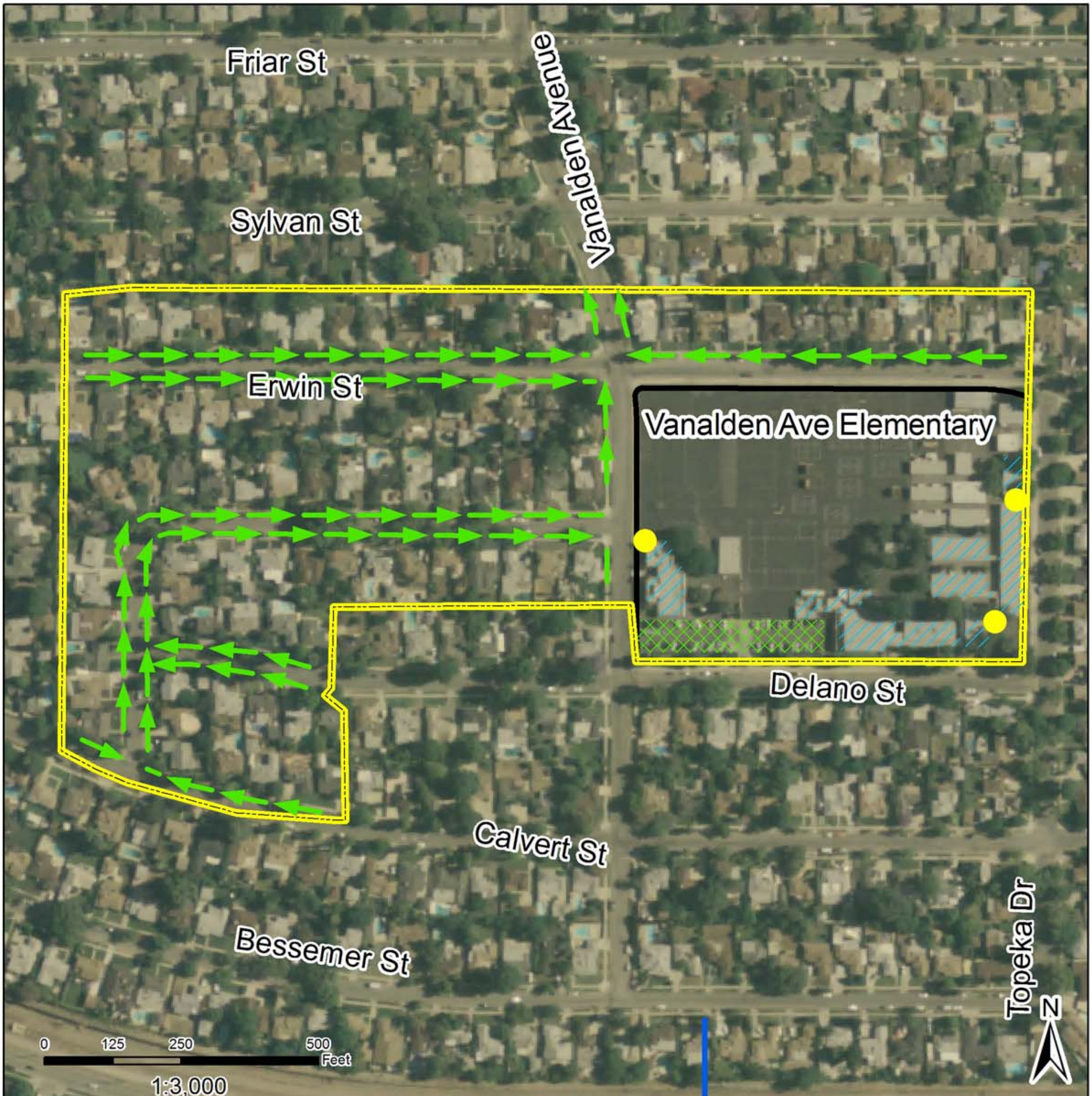
Bioretention Parkway/Green Street

Storm Drains

Publicly Owned Parcel

Catchment ID: 603932
Waterbody: LA River Reach 6

Site Name: Archwood St Site
Neighborhood: Winnetka

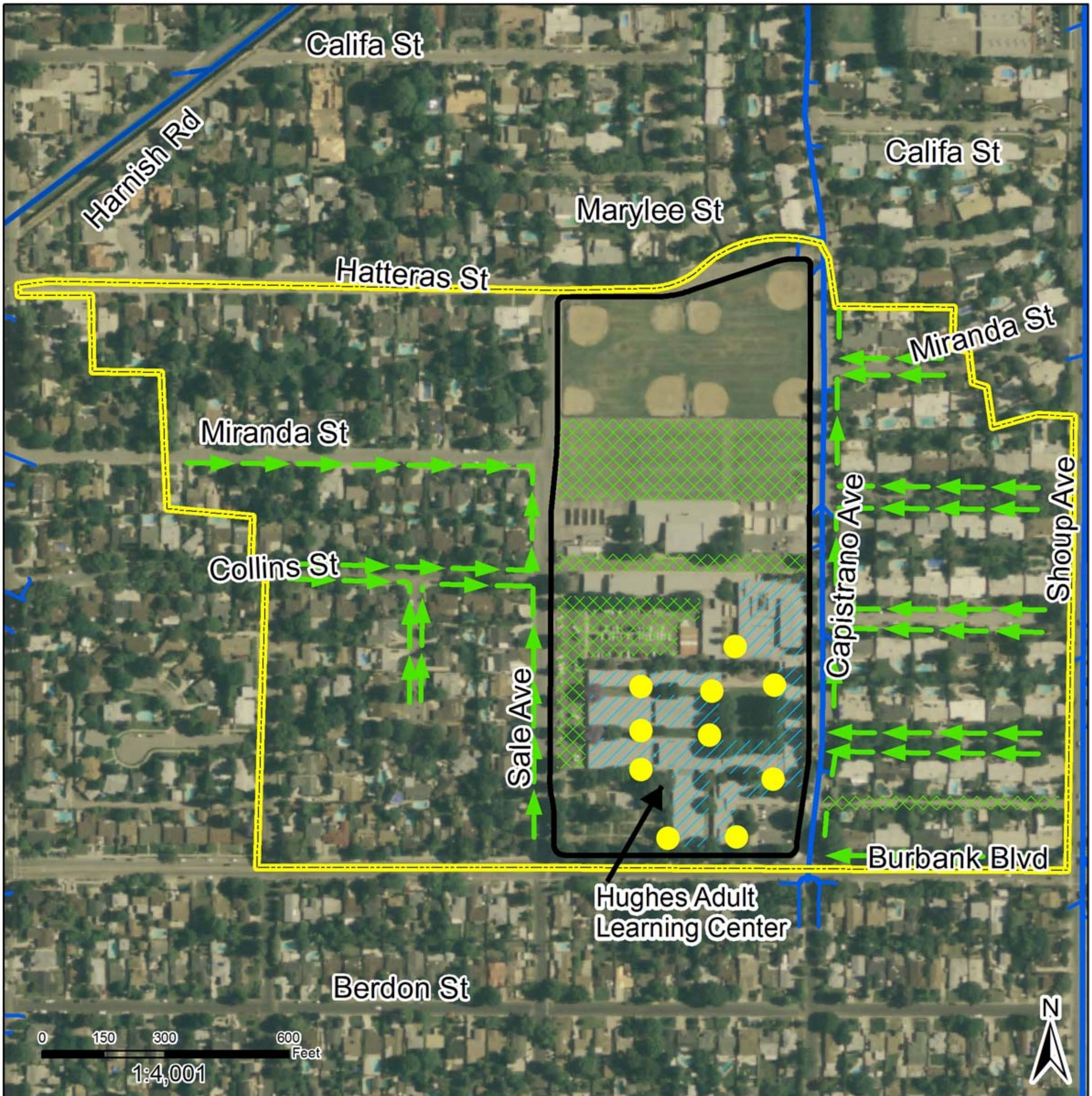


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 605314
Waterbody: LA River Reach 6

Site Name: Vanalden Ave
Neighborhood: Reseda

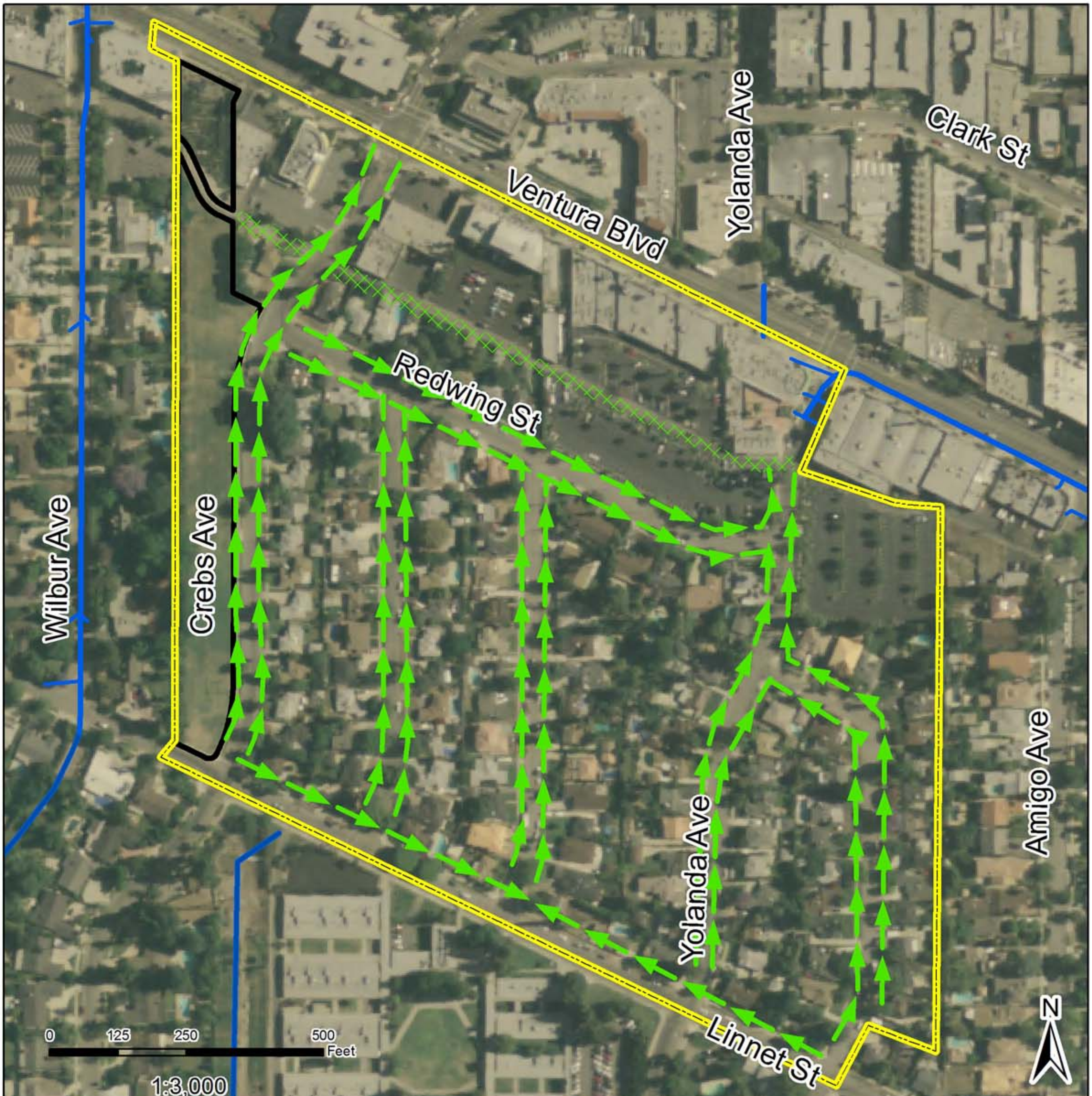


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 603373
Waterbody: LA River Reach 6

Site Name: Capistrano Ave Site
Neighborhood: Winnetka/Canoga Park

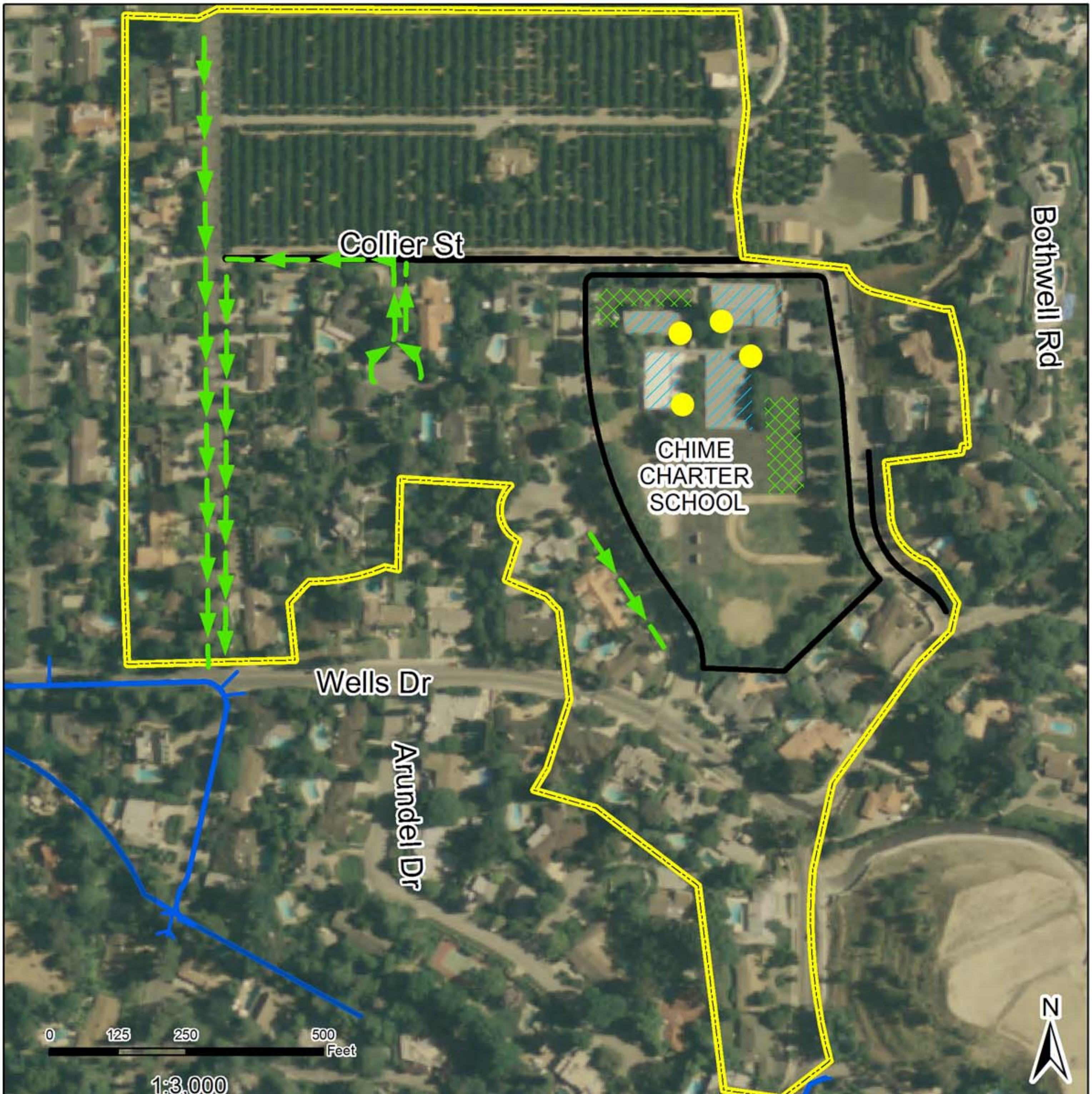


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement

Catchment ID: 606886
Waterbody: Caballero Creek

Site Name: Crebs Ave Site
Neighborhood: Tarzana



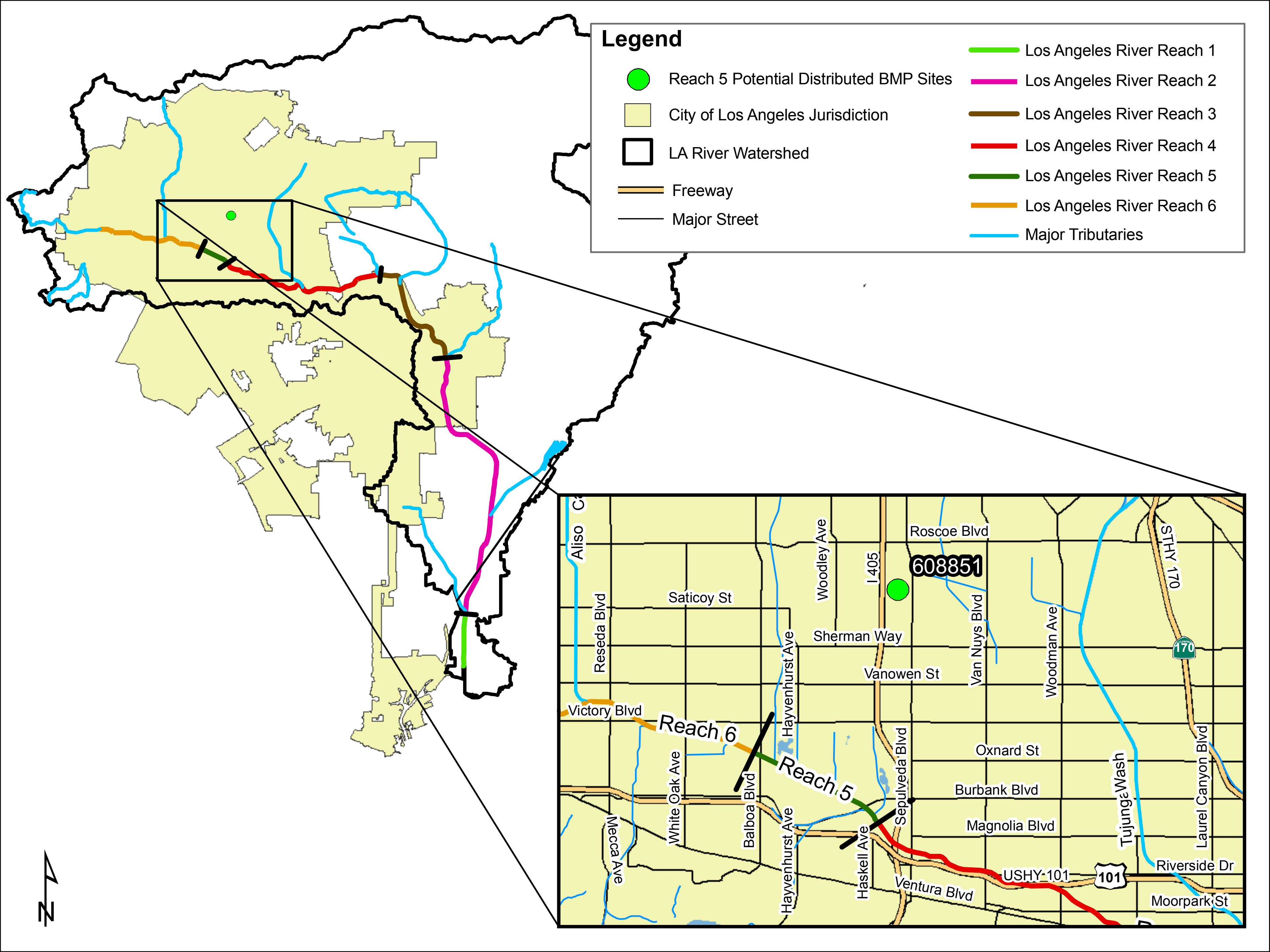
Legend

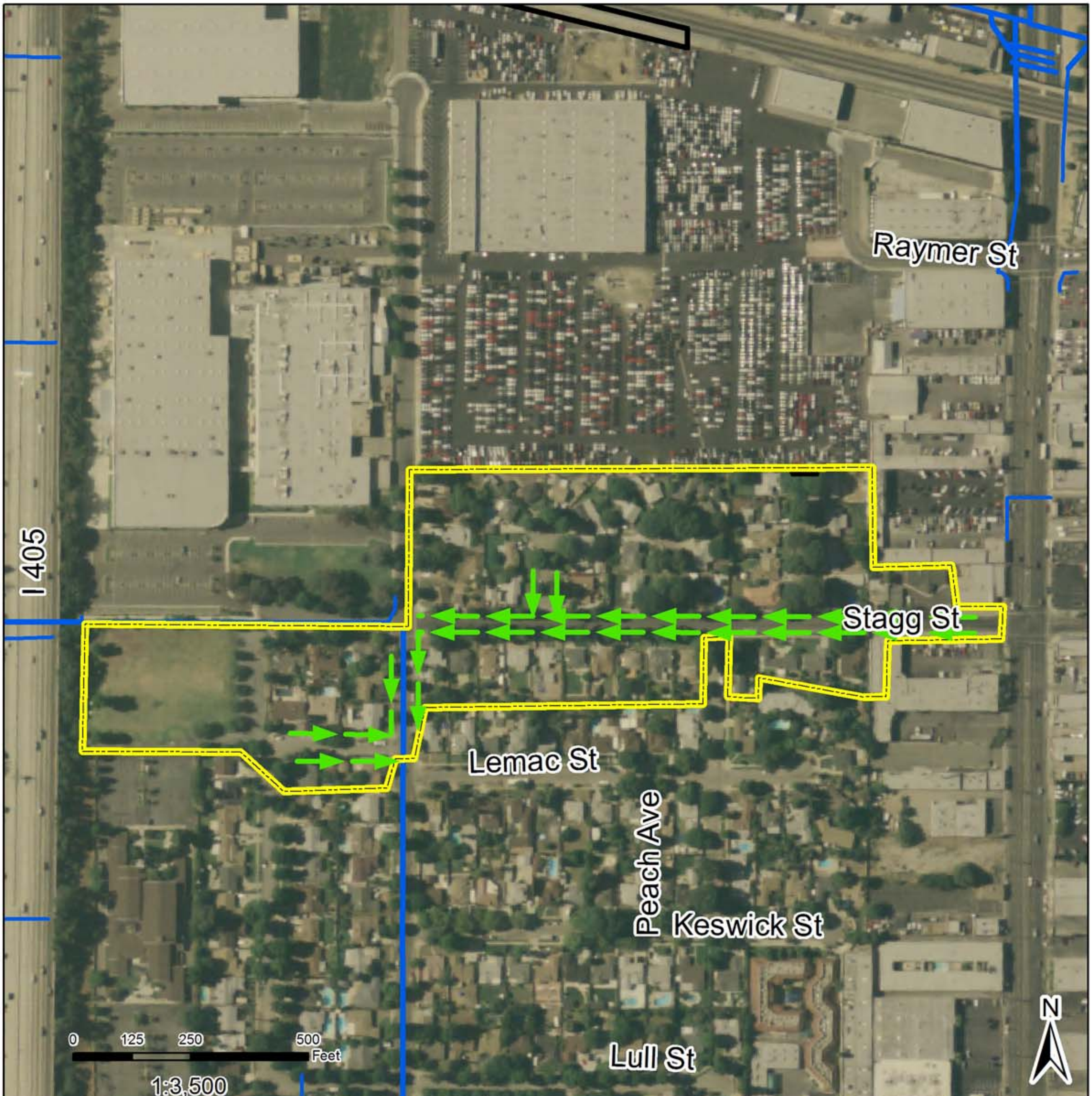
- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 605031
Waterbody: LA River Reach 6

Site Name: Collier St Site
Neighborhood: Tarzana/Woodland Hills

Priority 1 Distributed BMP Project Sites
Los Angeles River Reach 5


Legend
Reach 5 Potential Distributed BMP Sites
City of Los Angeles Jurisdiction
LA River Watershed
Freeway
Major Street
Los Angeles River Reach 1
Los Angeles River Reach 2
Los Angeles River Reach 3
Los Angeles River Reach 4
Los Angeles River Reach 5
Los Angeles River Reach 6
Major Tributaries
608851
Roscoe Blvd
Saticoy St
Sherman Way
Vanowen St
Victory Blvd
Oxnard St
Burbank Blvd
Magnolia Blvd
Riverside Dr
Moorpark St
Ventura Blvd
USHY 101
101
170
STHY 170
Reach 6
Reach 5
Aliso
Reseda Blvd
Woodley Ave
I 405
Van Nuys Blvd
Woodman Ave
Hayvenhurst Ave
White Oak Ave
Balboa Blvd
Mecca Ave
Haskell Ave
Sepulveda Blvd
Tujunga Wash
Laurel Canyon Blvd
N



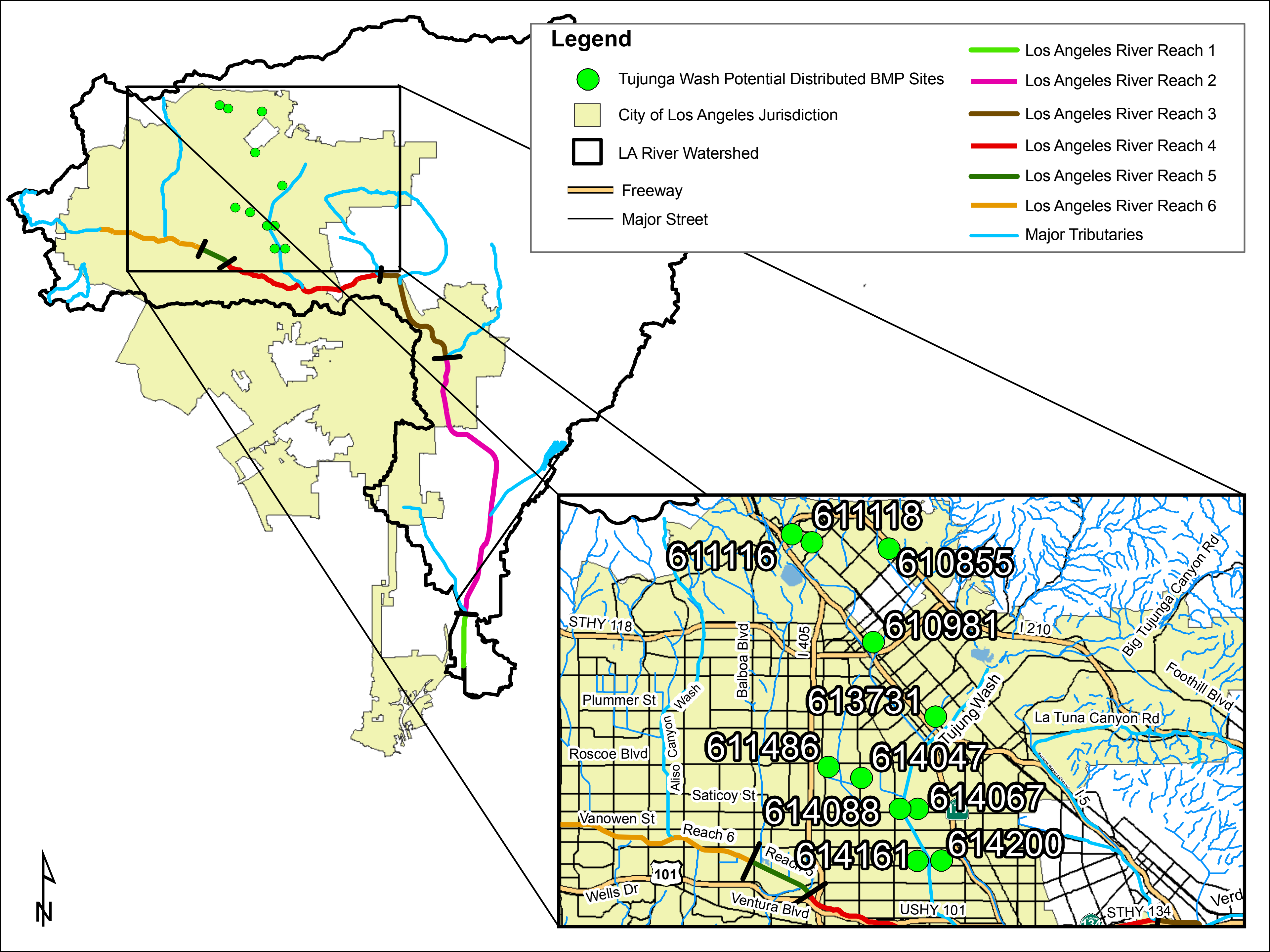
Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street

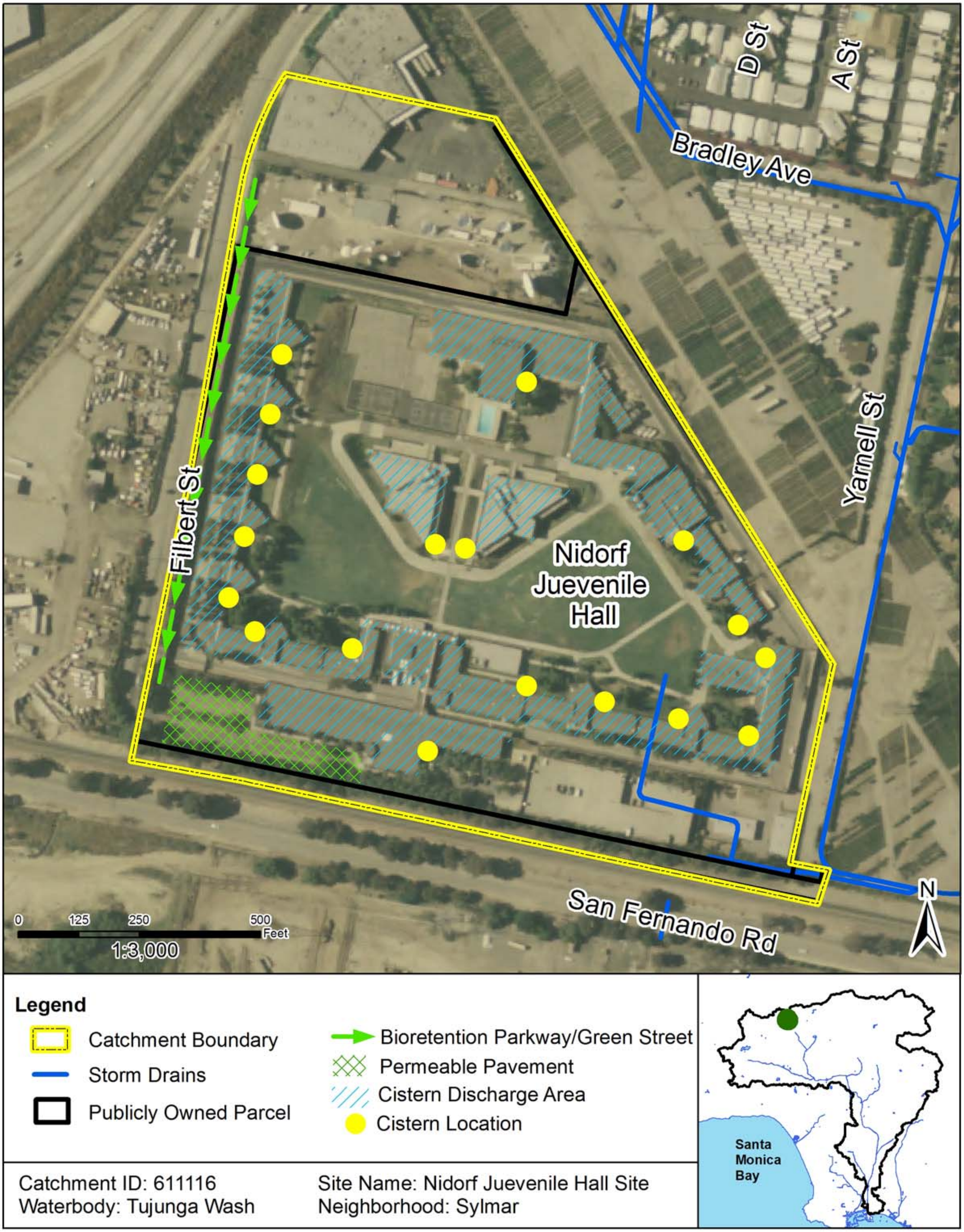
Catchment ID: 608851
Waterbody: LA River Reach 5

Site Name: Stagg Street
Neighborhood: Van Nuys

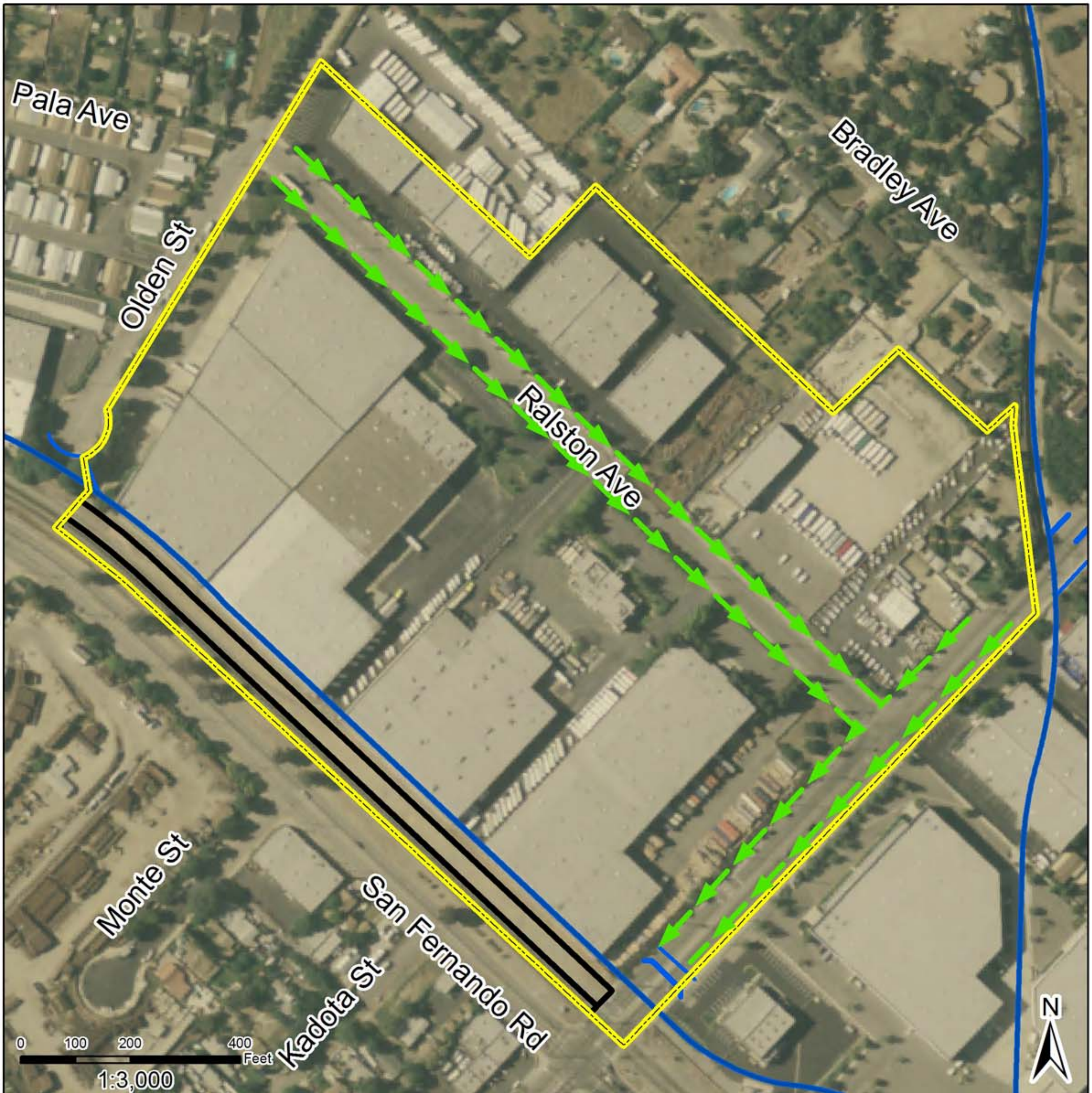
Priority 1 Distributed BMP Project Sites
Tujunga Wash



Legend
Tujunga Wash Potential Distributed BMP Sites
City of Los Angeles Jurisdiction
LA River Watershed
Freeway
Major Street
Los Angeles River Reach 1
Los Angeles River Reach 2
Los Angeles River Reach 3
Los Angeles River Reach 4
Los Angeles River Reach 5
Los Angeles River Reach 6
Major Tributaries
611118
611116
610855
610981
613731
611486
614047
614067
614088
614161
614200
STHY 118
I 405
Balboa Blvd
I 210
Big Tujunga Canyon Rd
Foothill Blvd
Tujunga Wash
La Tuna Canyon Rd
Plummer St
Aliso Canyon Wash
Roscoe Blvd
Saticoy St
Vanowen St
Reach 6
Reach 5
I 5
101
Wells Dr
Ventura Blvd
USHY 101
STHY 134
Verd
N



D St
A St
Bradley Ave
Yarnell St
Filbert St
Nidorf
Juevenile
Hall
San Fernando Rd
0
125
250
500
Feet
1:3,000
N
Legend
Catchment Boundary
Storm Drains
Publicly Owned Parcel
Bioretention Parkway/Green Street
Permeable Pavement
Cistern Discharge Area
Cistern Location
Santa
Monica
Bay
Catchment ID: 611116
Waterbody: Tujunga Wash
Site Name: Nidorf Juevenile Hall Site
Neighborhood: Sylmar

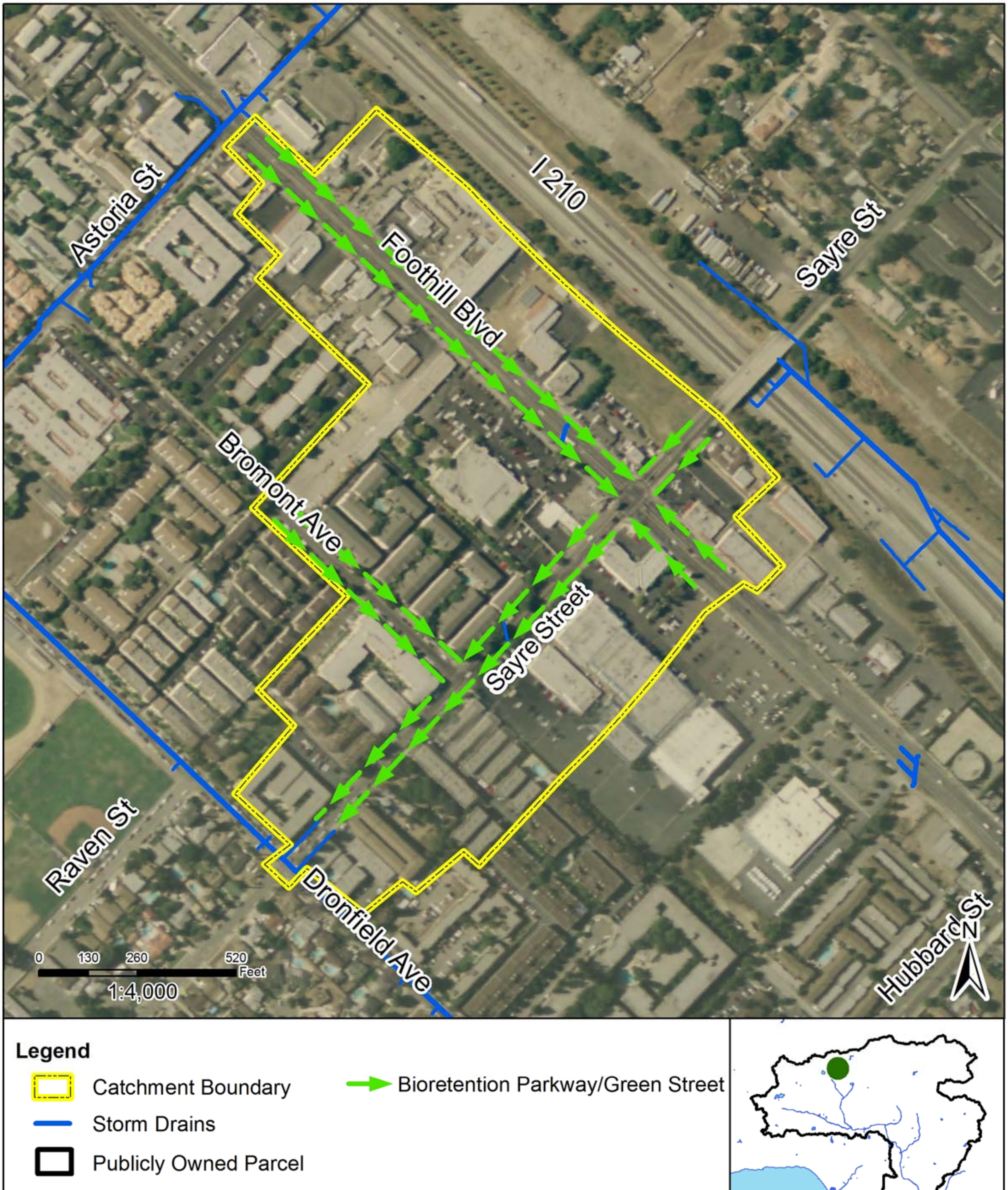


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street

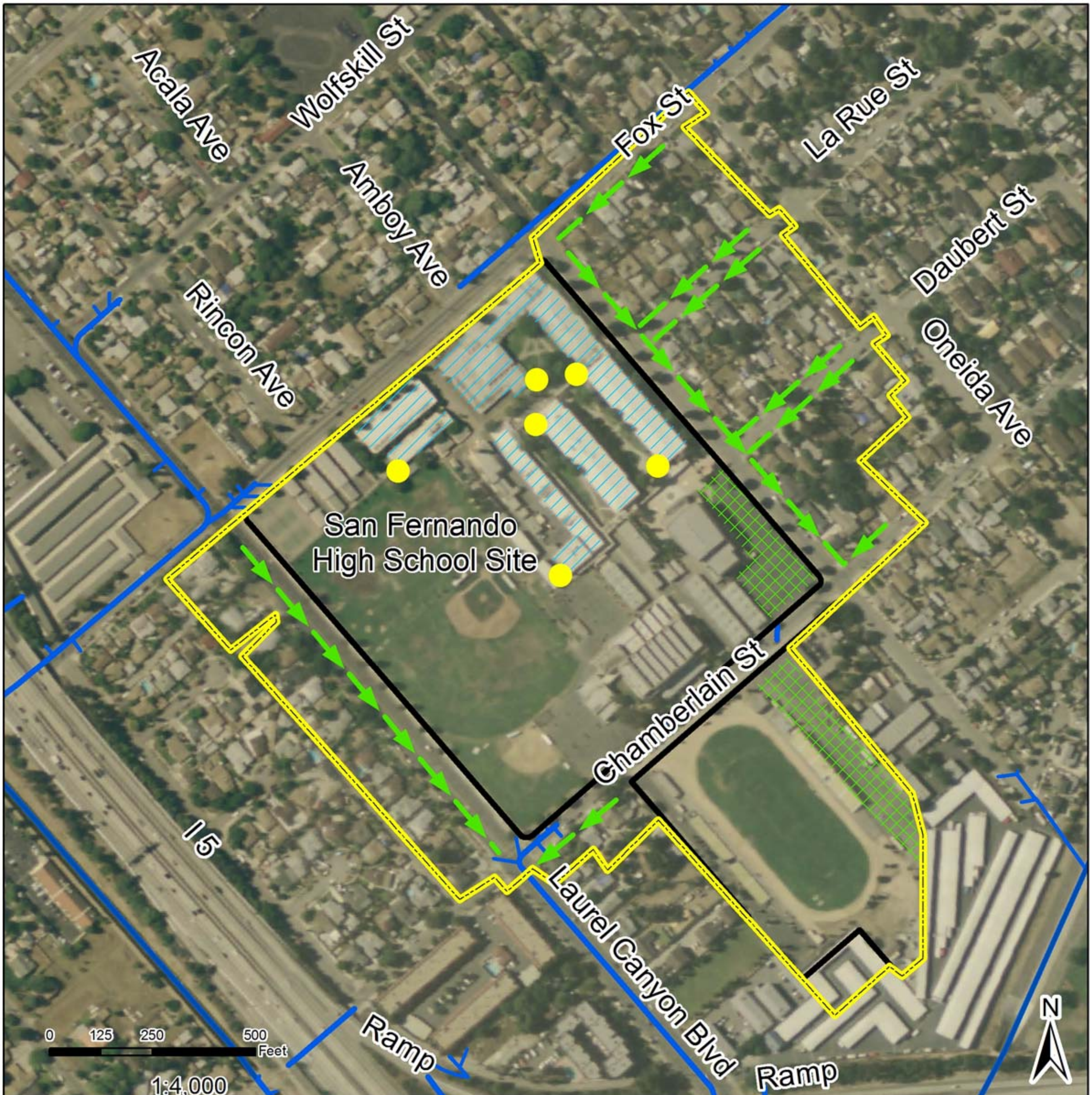
Catchment ID: 611118
Waterbody: Tujunga Wash

Site Name: Ralston Ave Site
Neighborhood: Sylmar



Catchment ID: 610855
Waterbody: Tujunga Wash

Site Name: Sayre St Site
Neighborhood: Sylmar

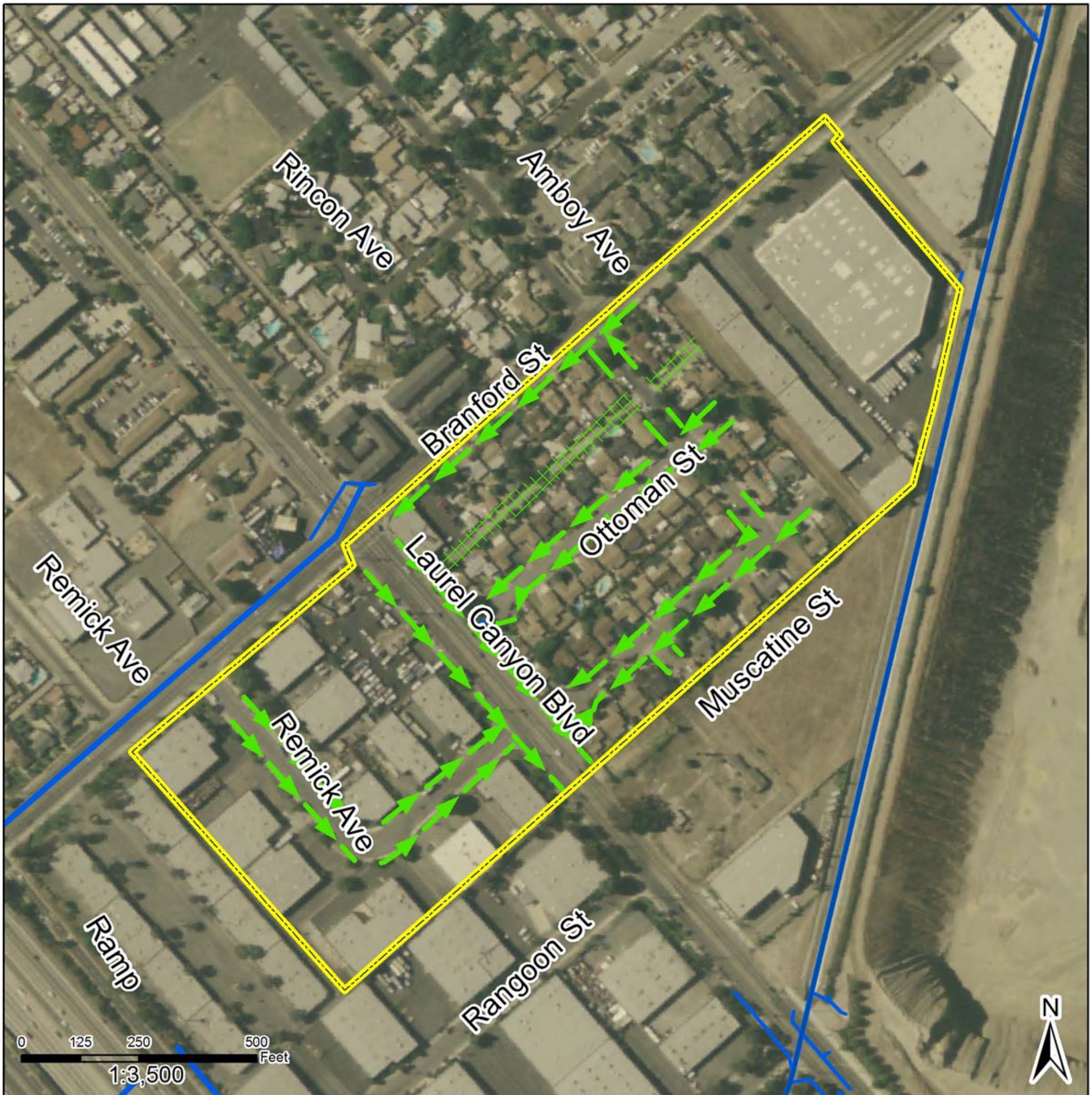


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 610981
Waterbody: Tujunga Wash

Site Name: San Fernando High School Site
Neighborhood: Pacoima

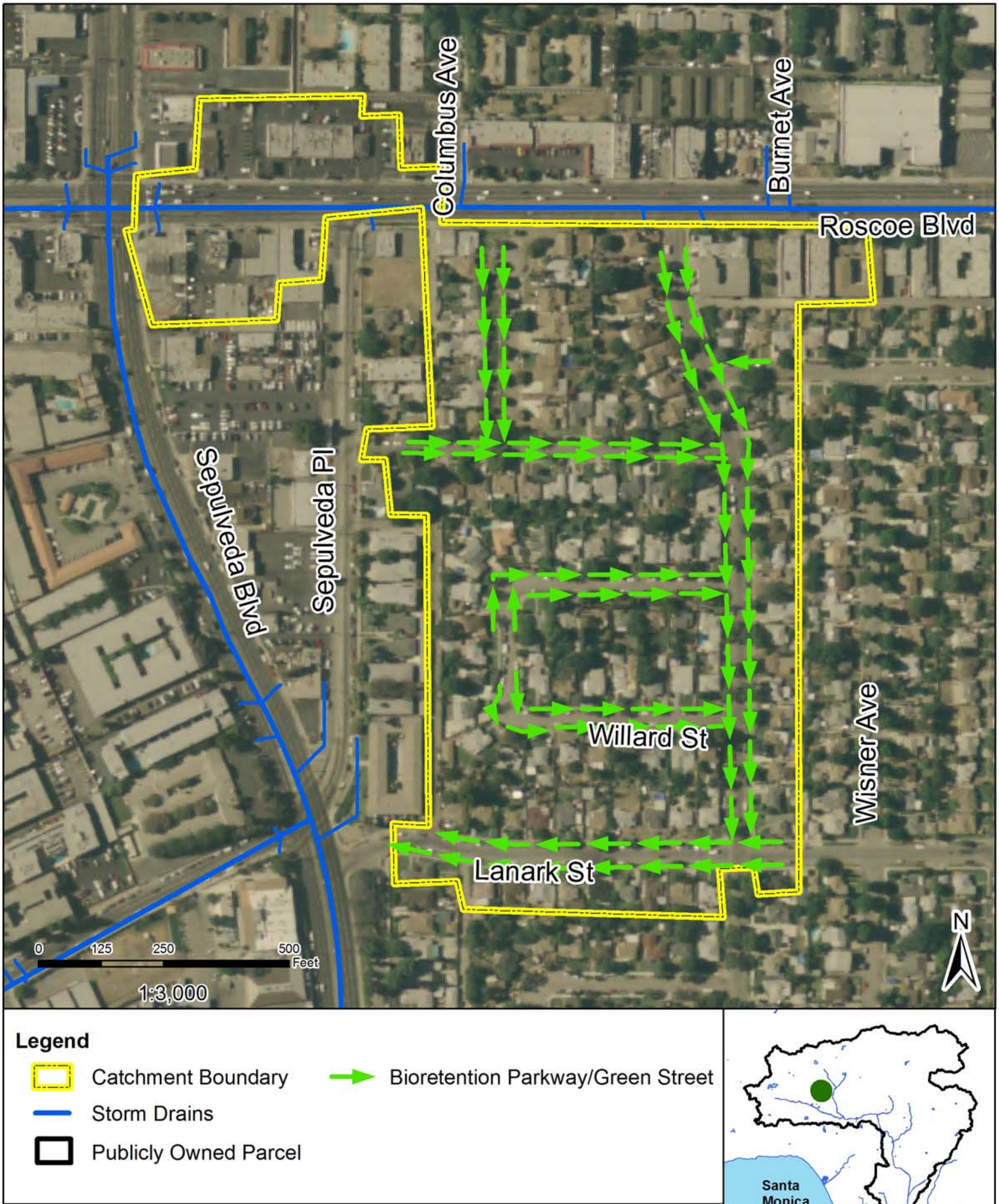


Legend

Catchment Boundary
Storm Drains
Publicly Owned Parcel
Bioretention Parkway/Green Street
Permeable Pavement

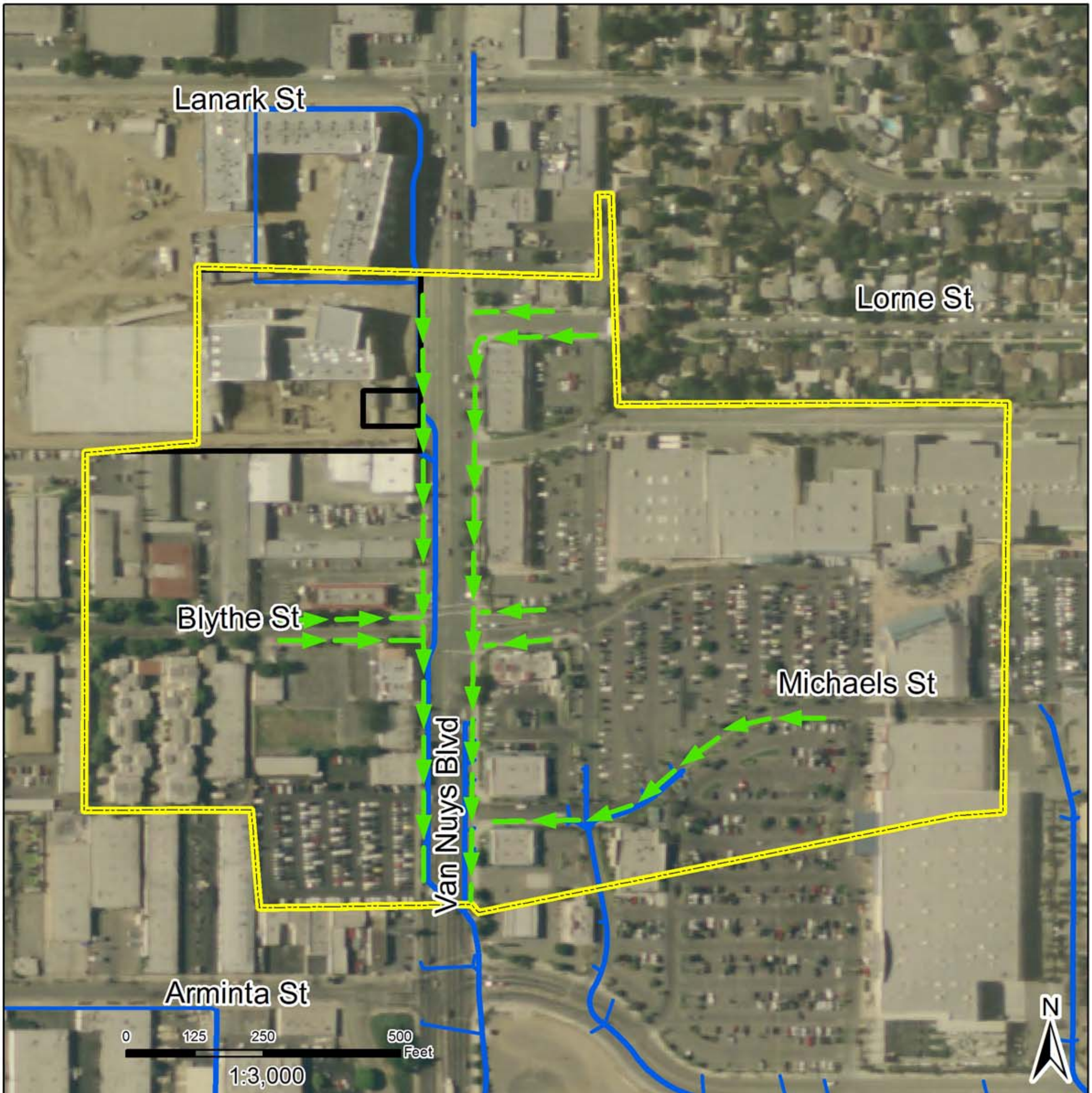
Catchment ID: 613731
Waterbody: Tujunga Wash

Site Name: Laurel Canyon Blvd Site
Neighborhood: Pacoima



Catchment ID: 611486
Waterbody: Tujunga Wash

Site Name: Lanark St Site
Neighborhood: Panorama City



Legend

Catchment Boundary

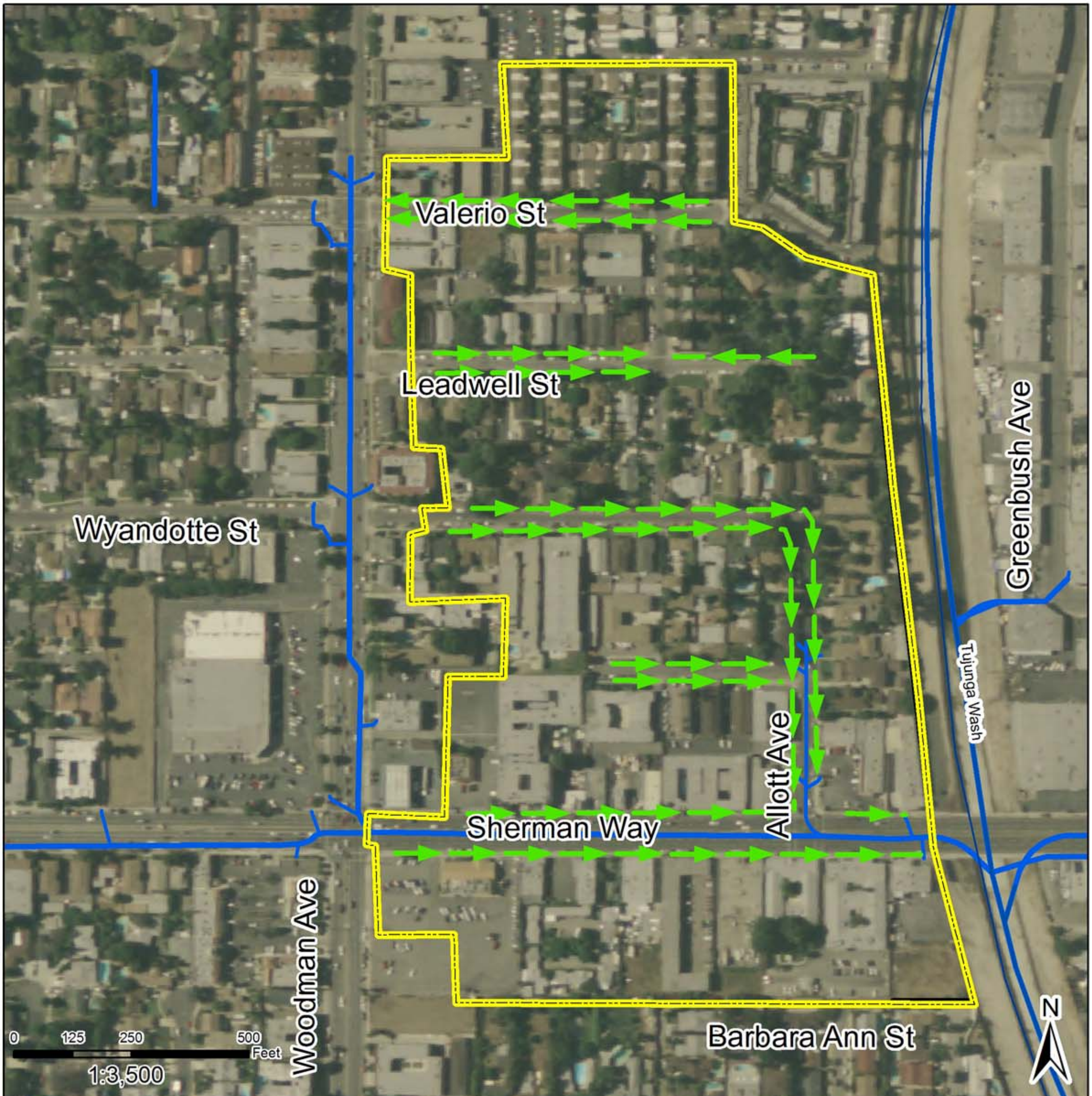
Storm Drains

Publicly Owned Parcel

Bioretention Parkway/Green Street

Catchment ID: 614047
Waterbody: Tujunga Wash

Site Name: Blythe St. Site
Neighborhood: Panorama City

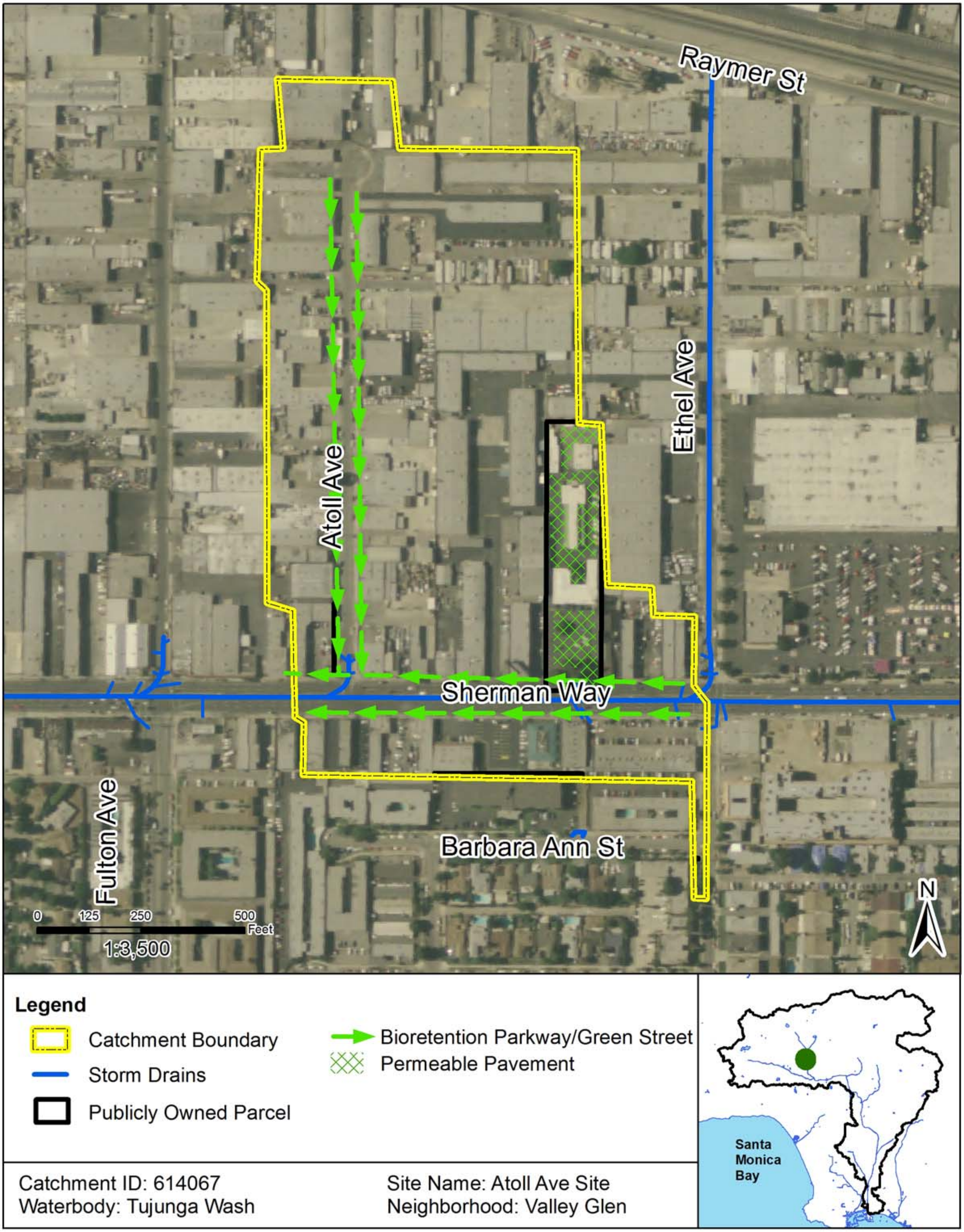


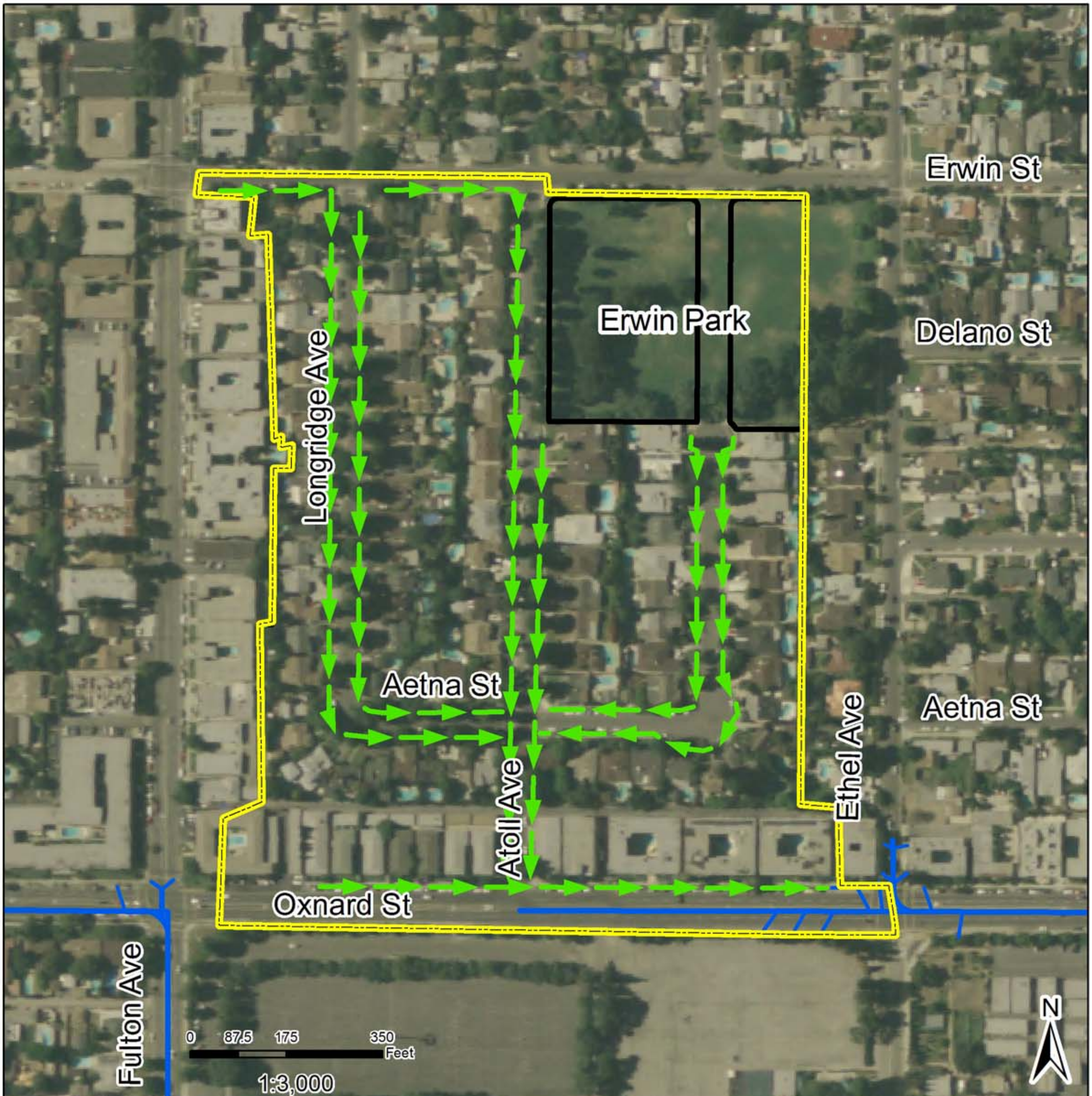
Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street

Catchment ID: 614088
Waterbody: Tujunga Wash

Site Name: Sherman Way Site
Neighborhood: Van Nuys/Valley Glen


Raymer St
Ethel Ave
Atoll Ave
Sherman Way
Barbara Ann St
Fulton Ave
0 125 250 500
Feet
1:3,500
N
Legend
Catchment Boundary
Storm Drains
Publicly Owned Parcel
Bioretention Parkway/Green Street
Permeable Pavement
Santa Monica Bay
Catchment ID: 614067
Waterbody: Tujunga Wash
Site Name: Atoll Ave Site
Neighborhood: Valley Glen

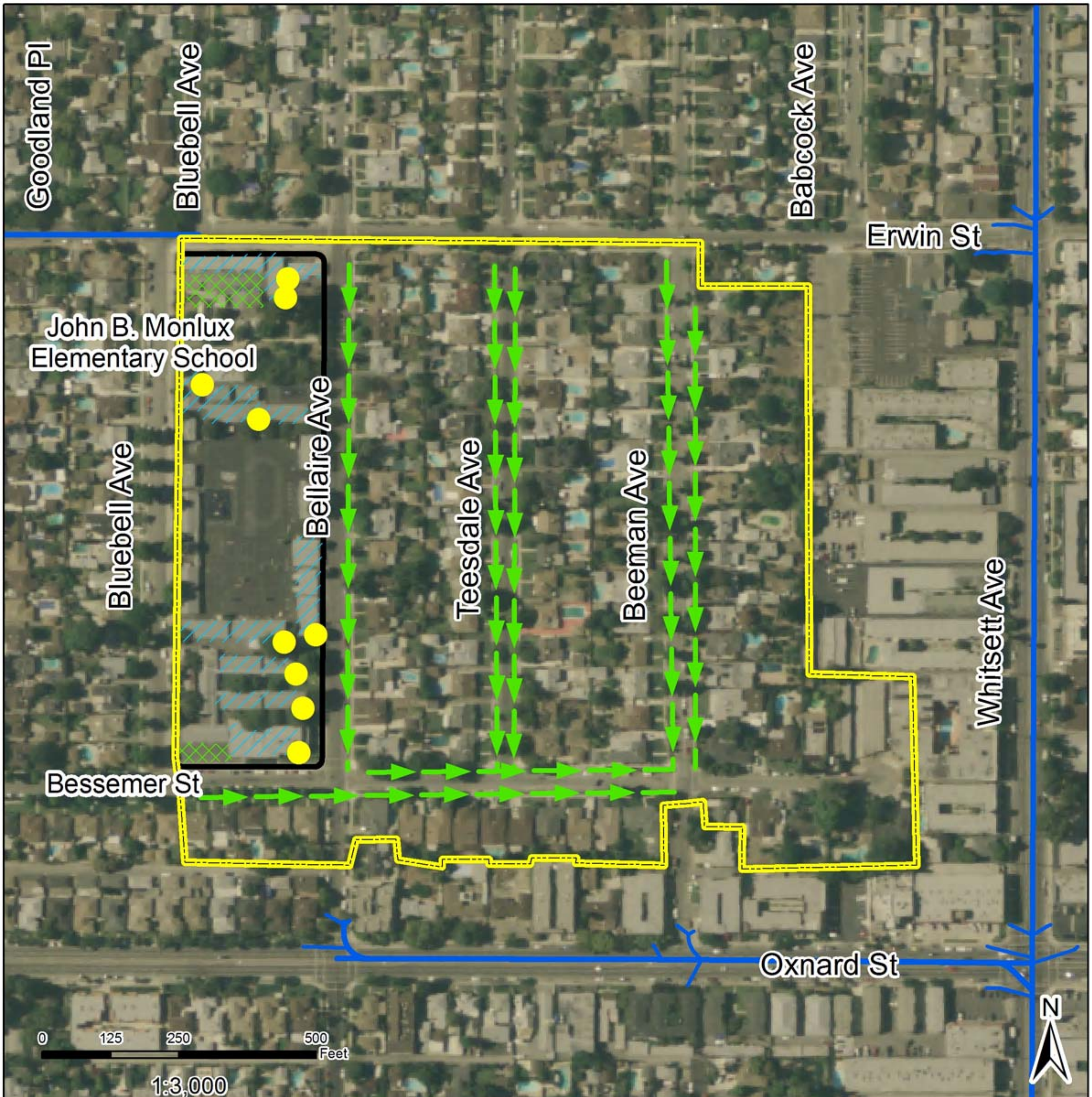


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street

Catchment ID: 614161
Waterbody: Tujunga Wash

Site Name: Oxnard Street
Neighborhood: Van Nuys



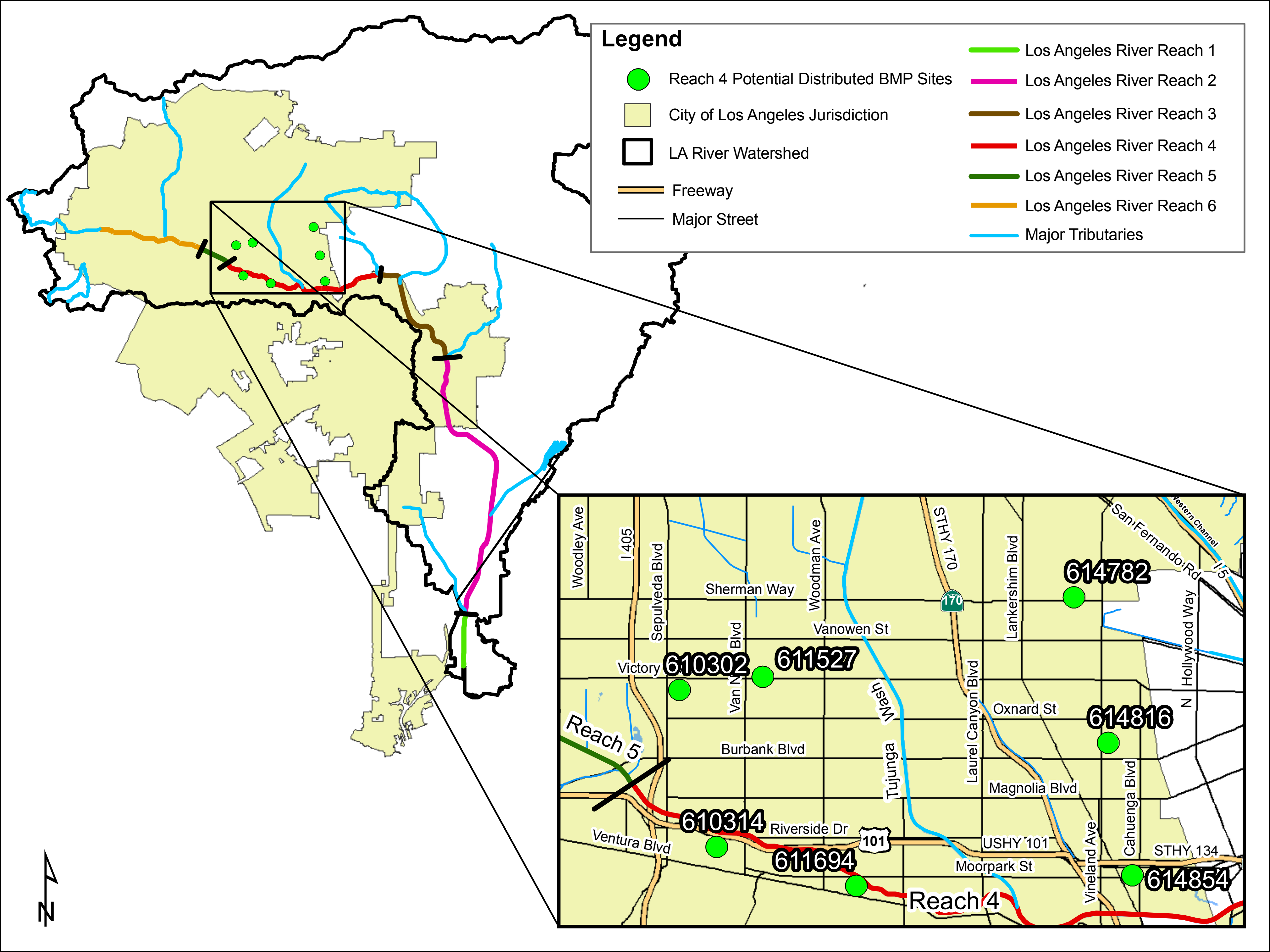
Legend

Catchment Boundary	Bioretention Parkway/Green Street
Storm Drains	Permeable Pavement
Publicly Owned Parcel	Cistern Discharge Area
	Cistern Location

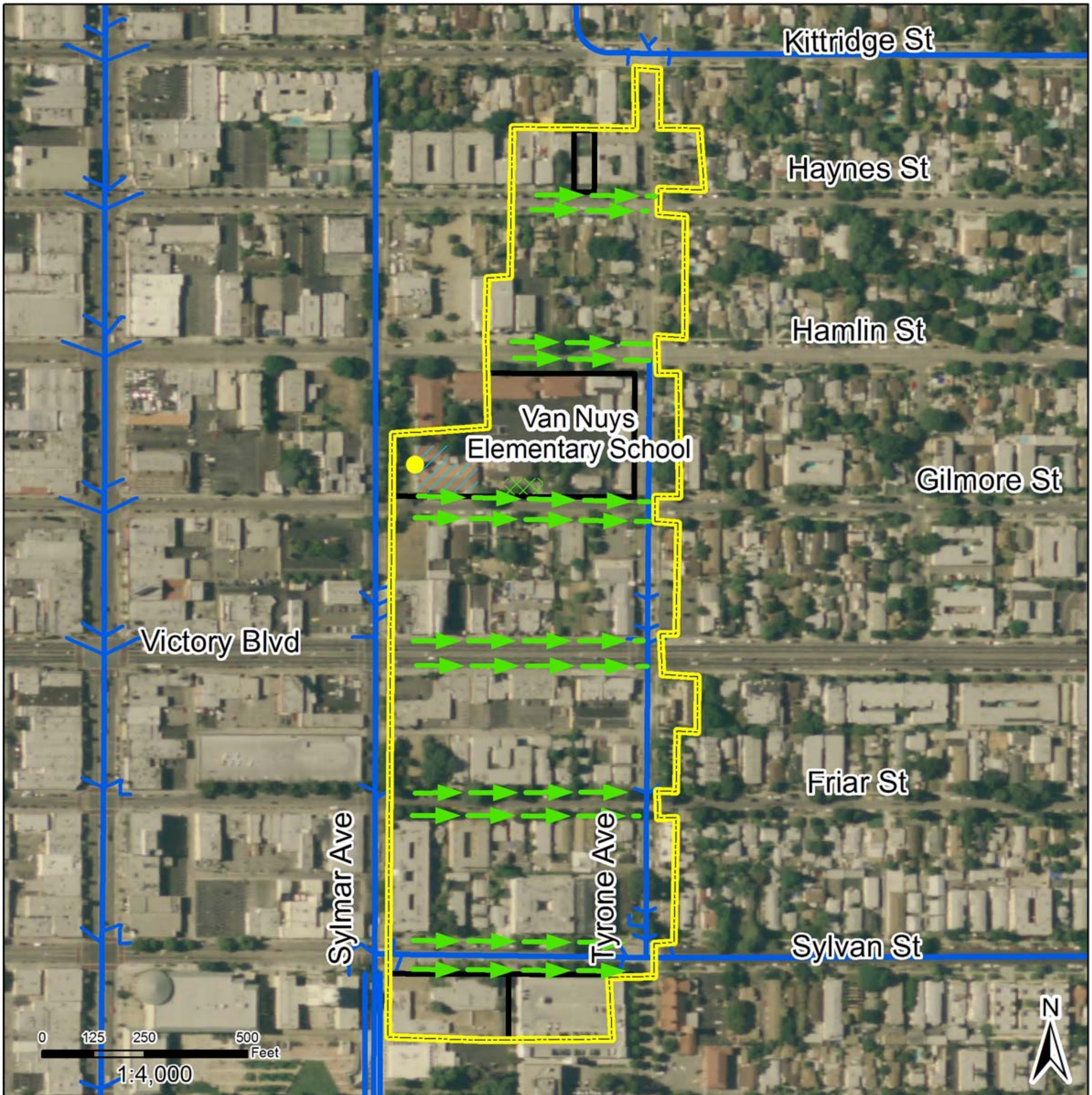
Catchment ID: 614200
Waterbody: Tujunga Wash

Site Name: Bessemer St. Site
Neighborhood: Valley Glen

Priority 1 Distributed BMP Project Sites
Los Angeles River Reach 4



Legend
Reach 4 Potential Distributed BMP Sites
City of Los Angeles Jurisdiction
LA River Watershed
Freeway
Major Street
Los Angeles River Reach 1
Los Angeles River Reach 2
Los Angeles River Reach 3
Los Angeles River Reach 4
Los Angeles River Reach 5
Los Angeles River Reach 6
Major Tributaries
Woodley Ave
I 405
Sepulveda Blvd
Sherman Way
Woodman Ave
Van Nuys Blvd
Vanowen St
Victory
610302
611527
614782
STHY 170
Lankershim Blvd
San Fernando Rd
I 5
N Hollywood Way
Tujunga Wash
Laurel Canyon Blvd
Oxnard St
614816
Burbank Blvd
Reach 5
Magnolia Blvd
Cahuenga Blvd
610314
Riverside Dr
Ventura Blvd
611694
USHY 101
Moorpark St
Vineland Ave
STHY 134
614854
Reach 4
N

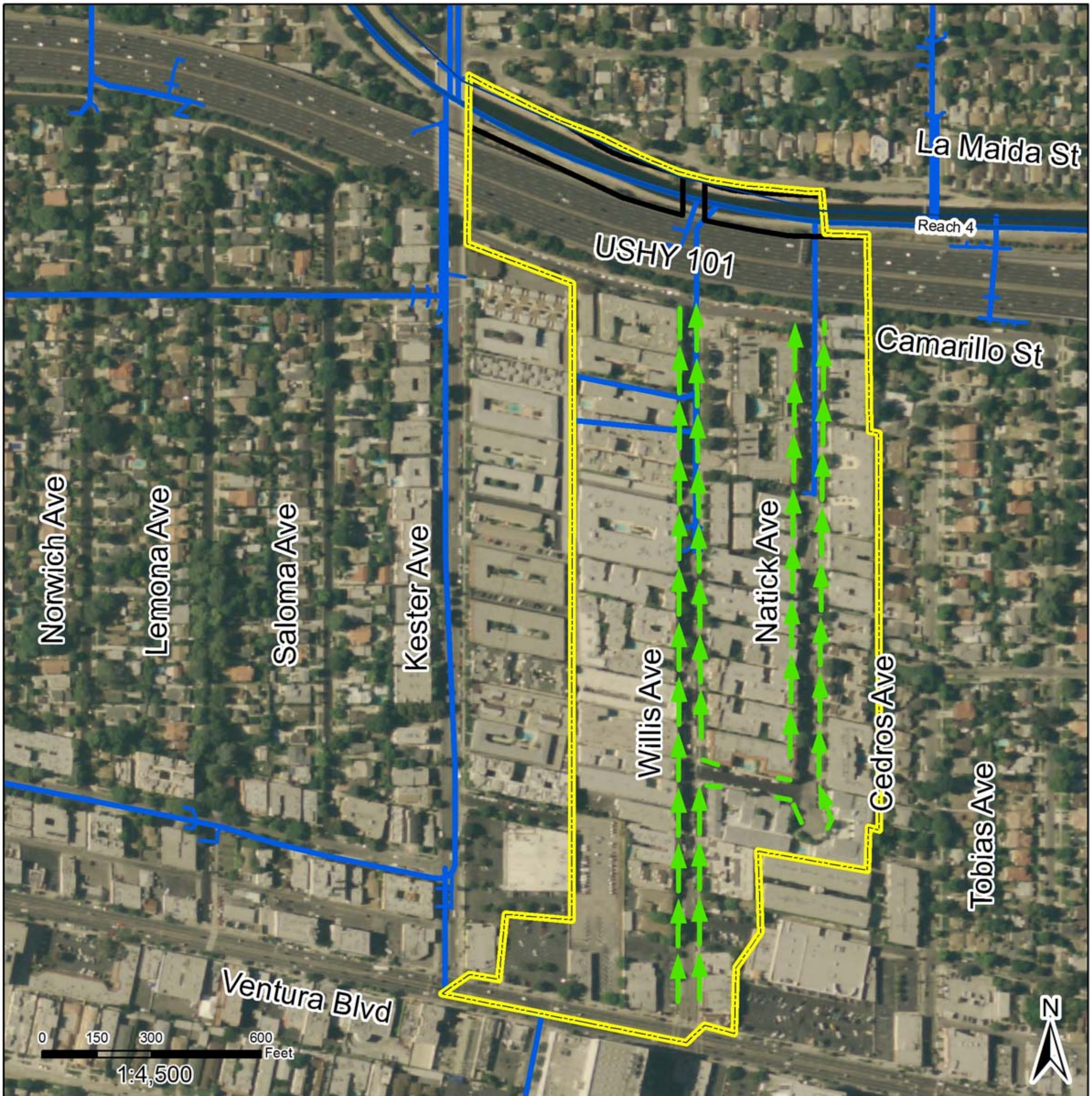


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 611527
Waterbody: LA River Reach 4

Site Name: Tyrone Ave
Neighborhood: Van Nuys



Legend

Catchment Boundary

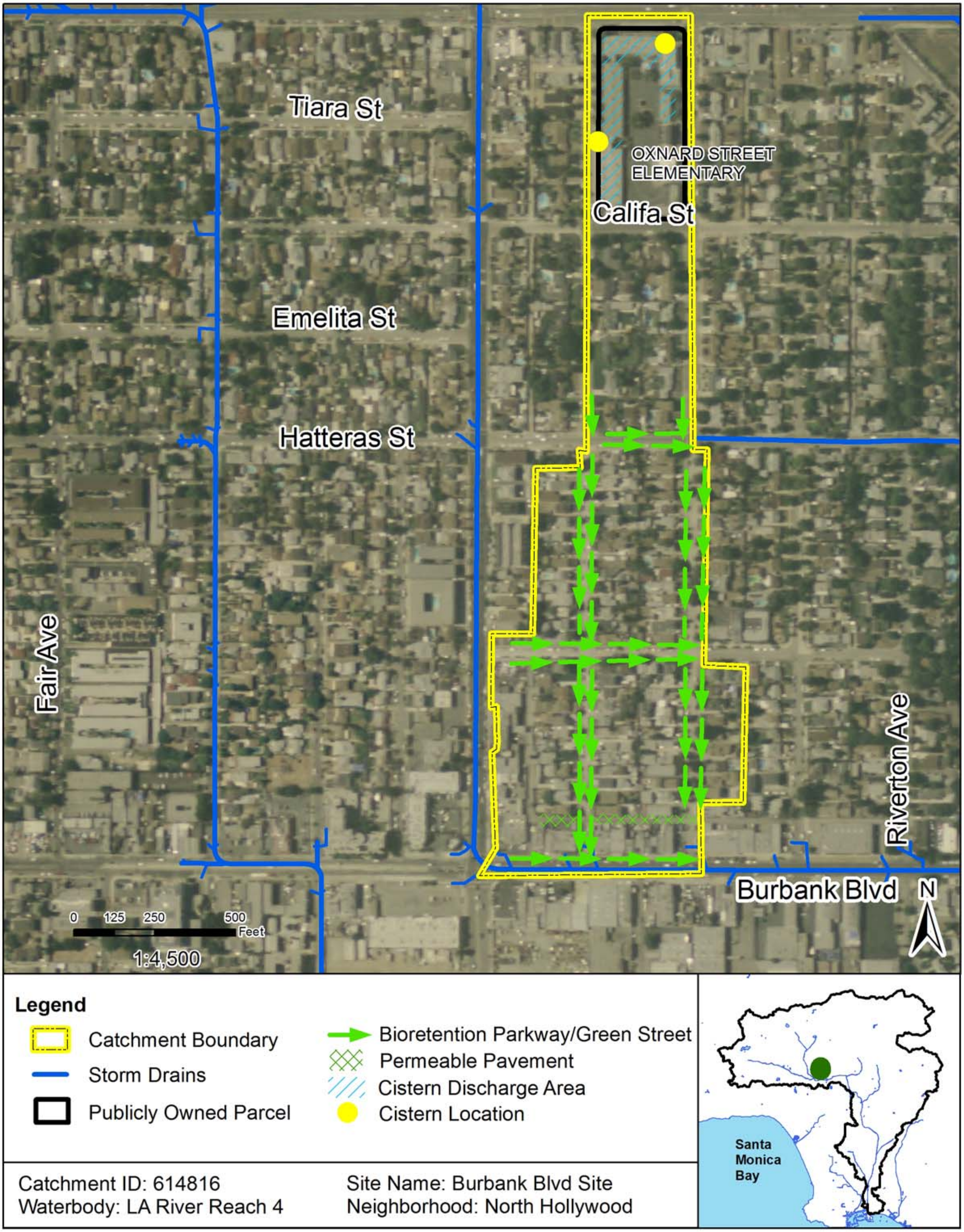
Storm Drains

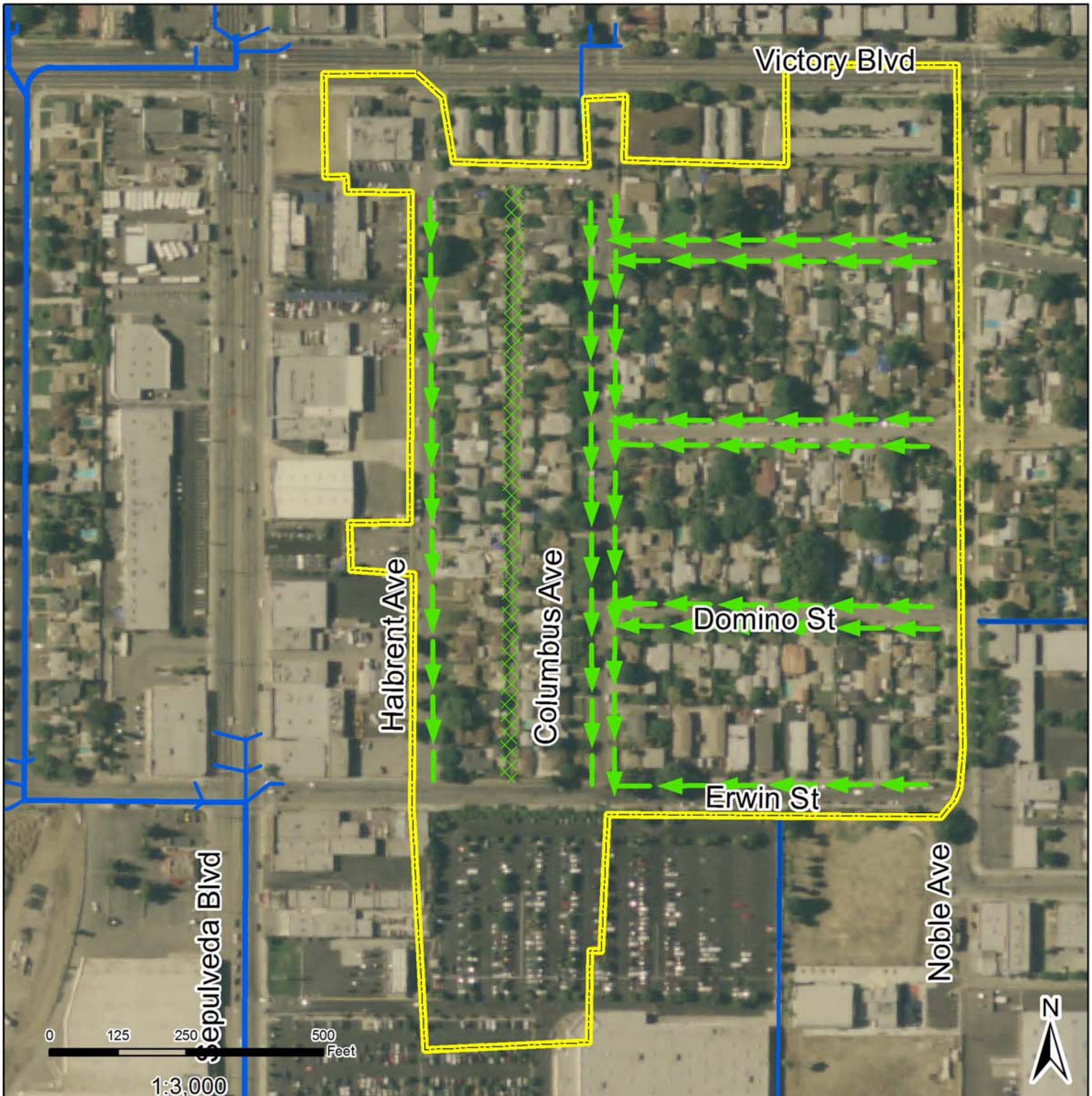
Publicly Owned Parcel

Bioretention Parkway/Green Street

Catchment ID: 610314
Waterbody: LA River Reach 4

Site Name: Willis Ave Site
Neighborhood: Sherman Oaks


Tiara St
OXNARD STREET
ELEMENTARY
Califa St
Emelita St
Hatteras St
Fair Ave
Riverton Ave
Burbank Blvd
N
0
125
250
500
Feet
1:4,500
Legend
Catchment Boundary
Storm Drains
Publicly Owned Parcel
Bioretention Parkway/Green Street
Permeable Pavement
Cistern Discharge Area
Cistern Location
Santa
Monica
Bay
Catchment ID: 614816
Waterbody: LA River Reach 4
Site Name: Burbank Blvd Site
Neighborhood: North Hollywood



Legend

Catchment Boundary

Storm Drains

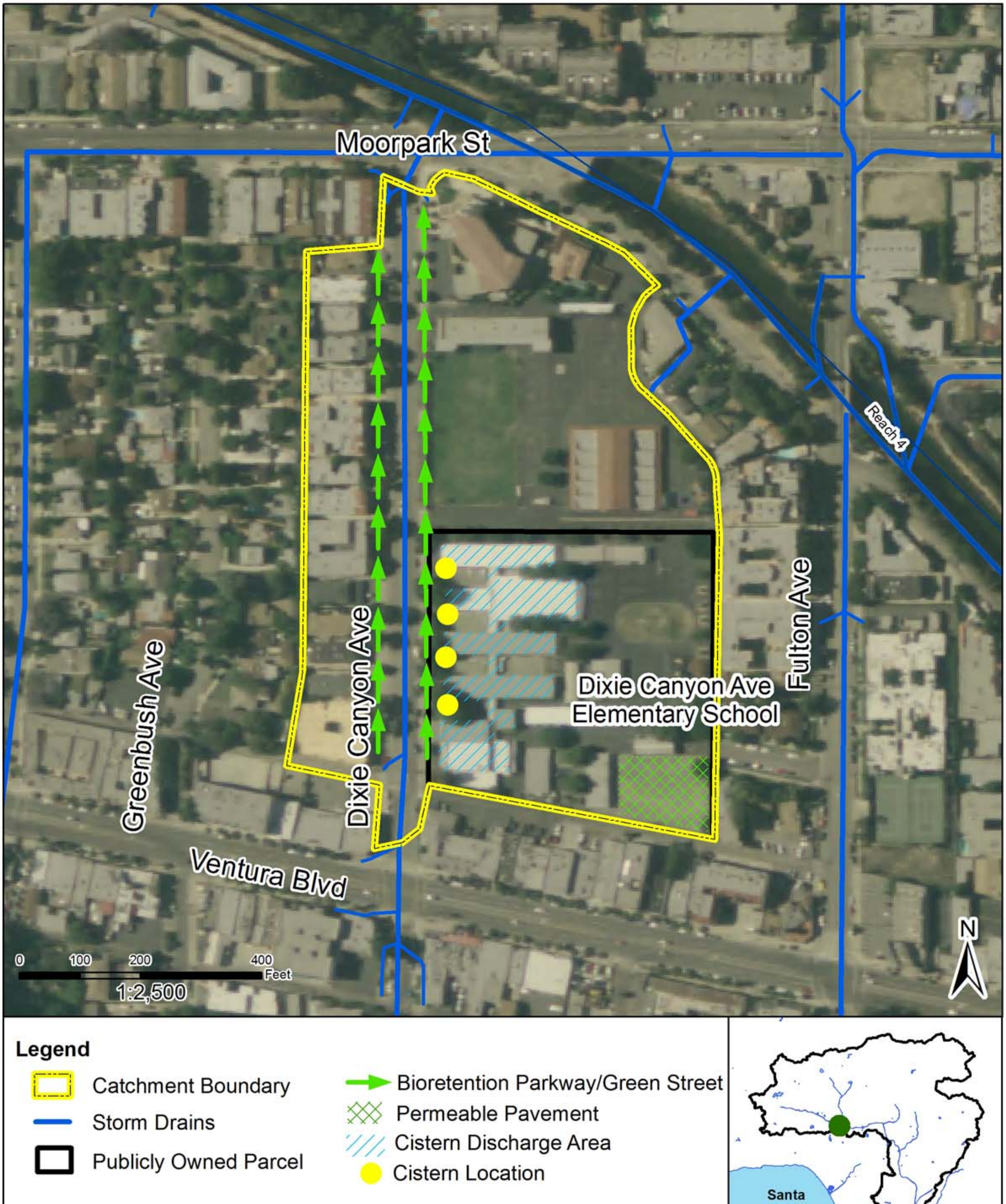
Publicly Owned Parcel

Bioretention Parkway/Green Street

Permeable Pavement

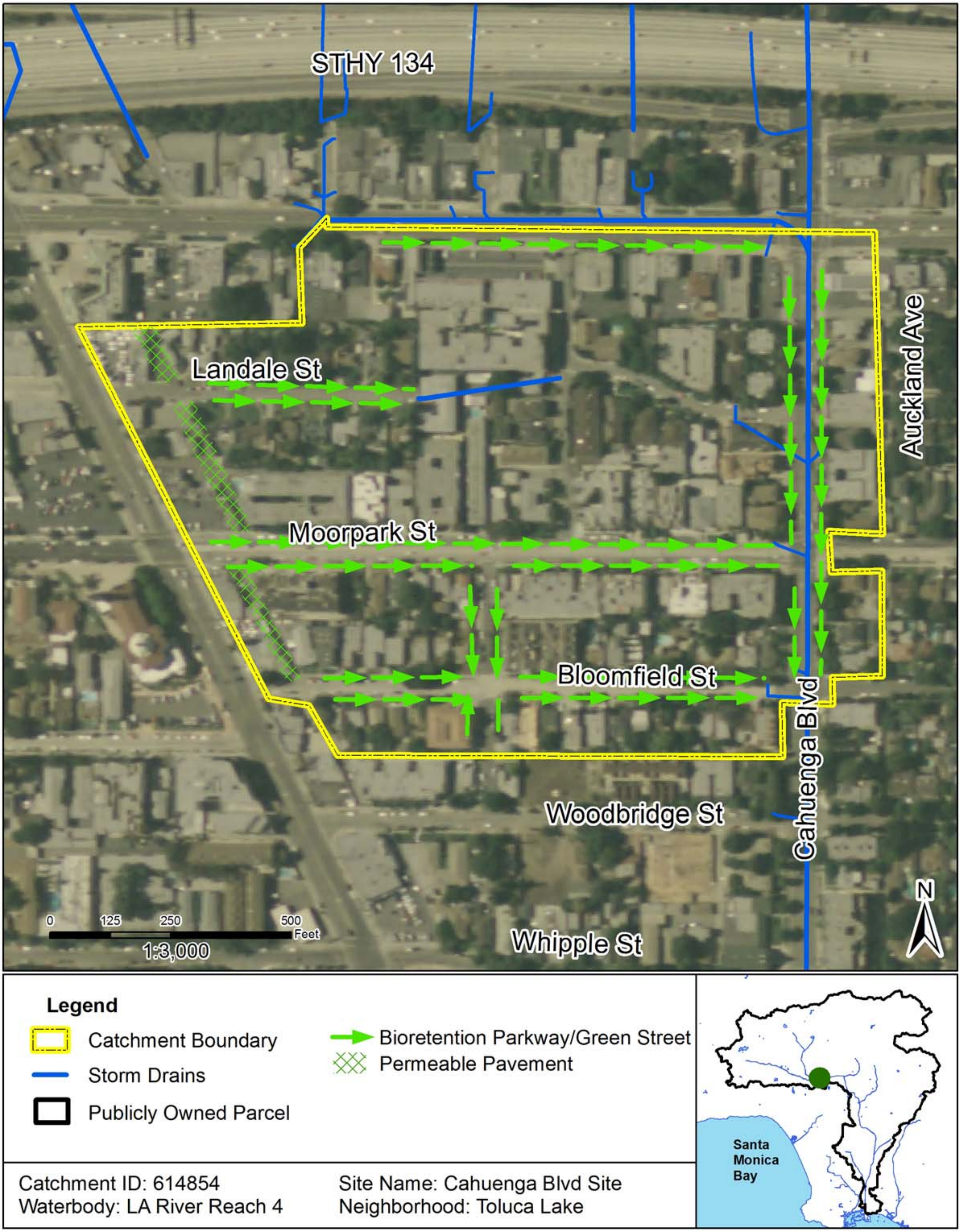
Catchment ID: 610302
Waterbody: LA River Reach 4

Site Name: Colombus Ave Site
Neighborhood: Van Nuys



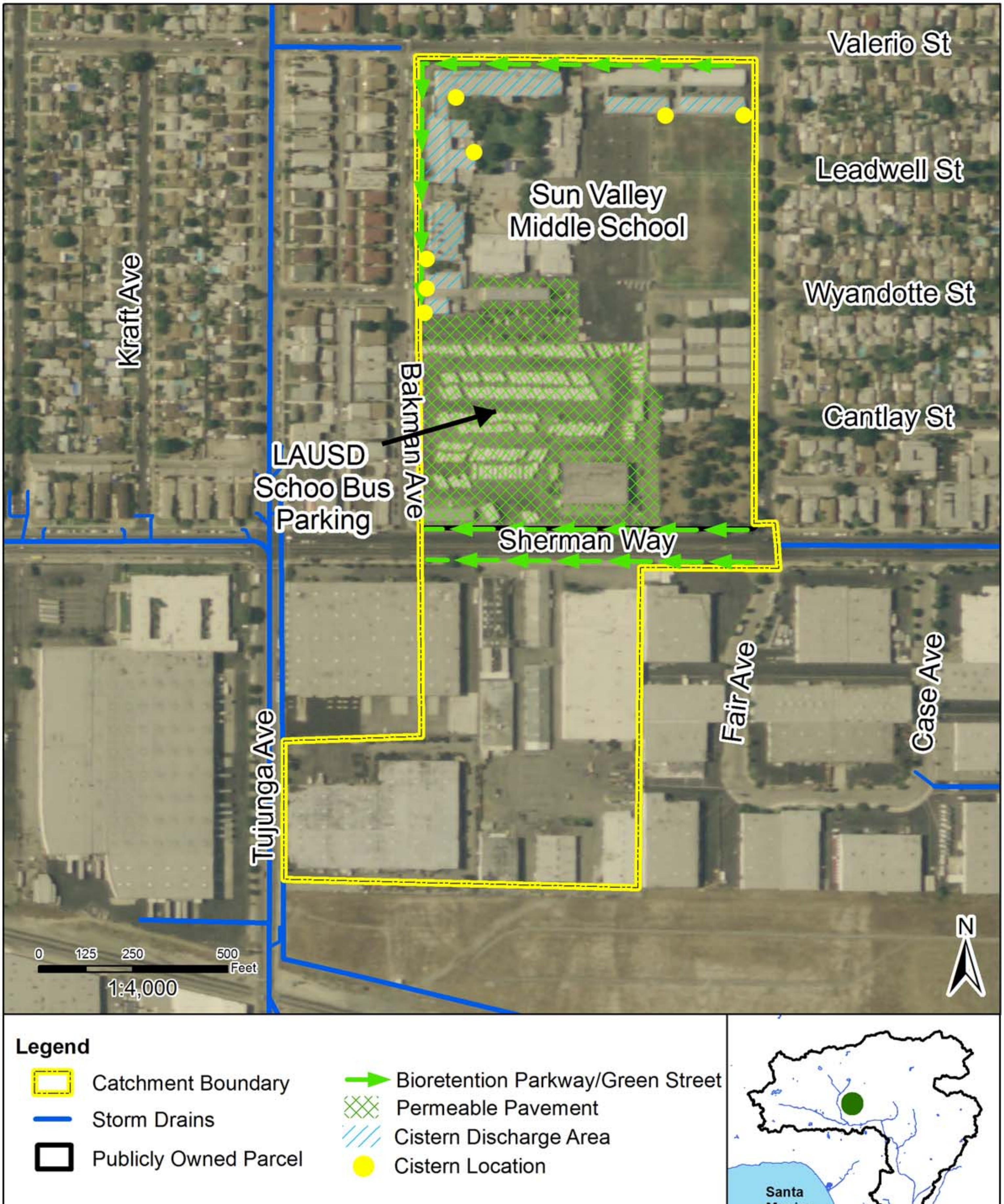
Catchment ID: 611694
Waterbody: LA River Reach 4

Site Name: Dixie Canyon Ave Site
Neighborhood: Sherman Oaks



Catchment ID: 614854
Waterbody: LA River Reach 4

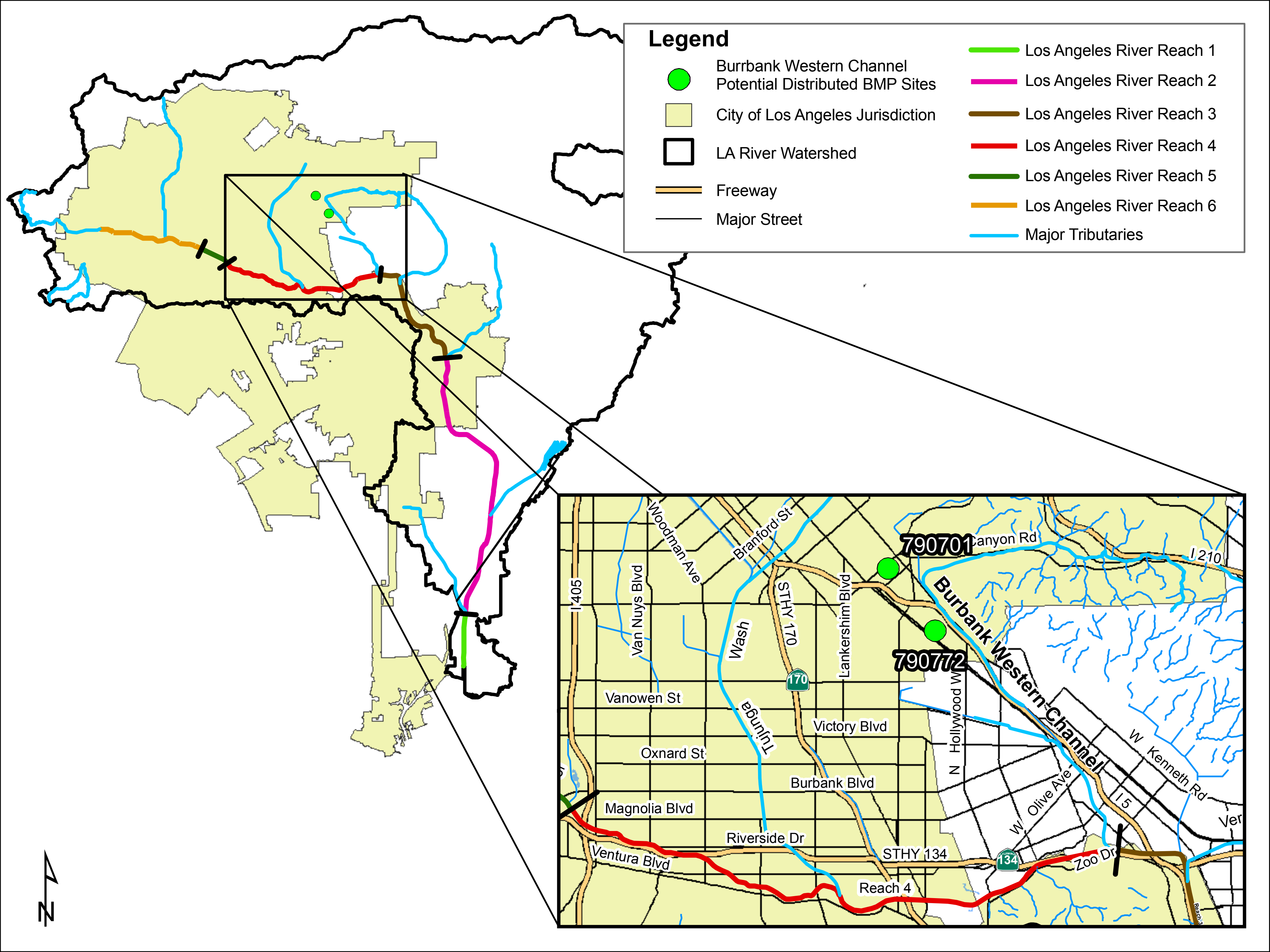
Site Name: Cahuenga Blvd Site
Neighborhood: Toluca Lake



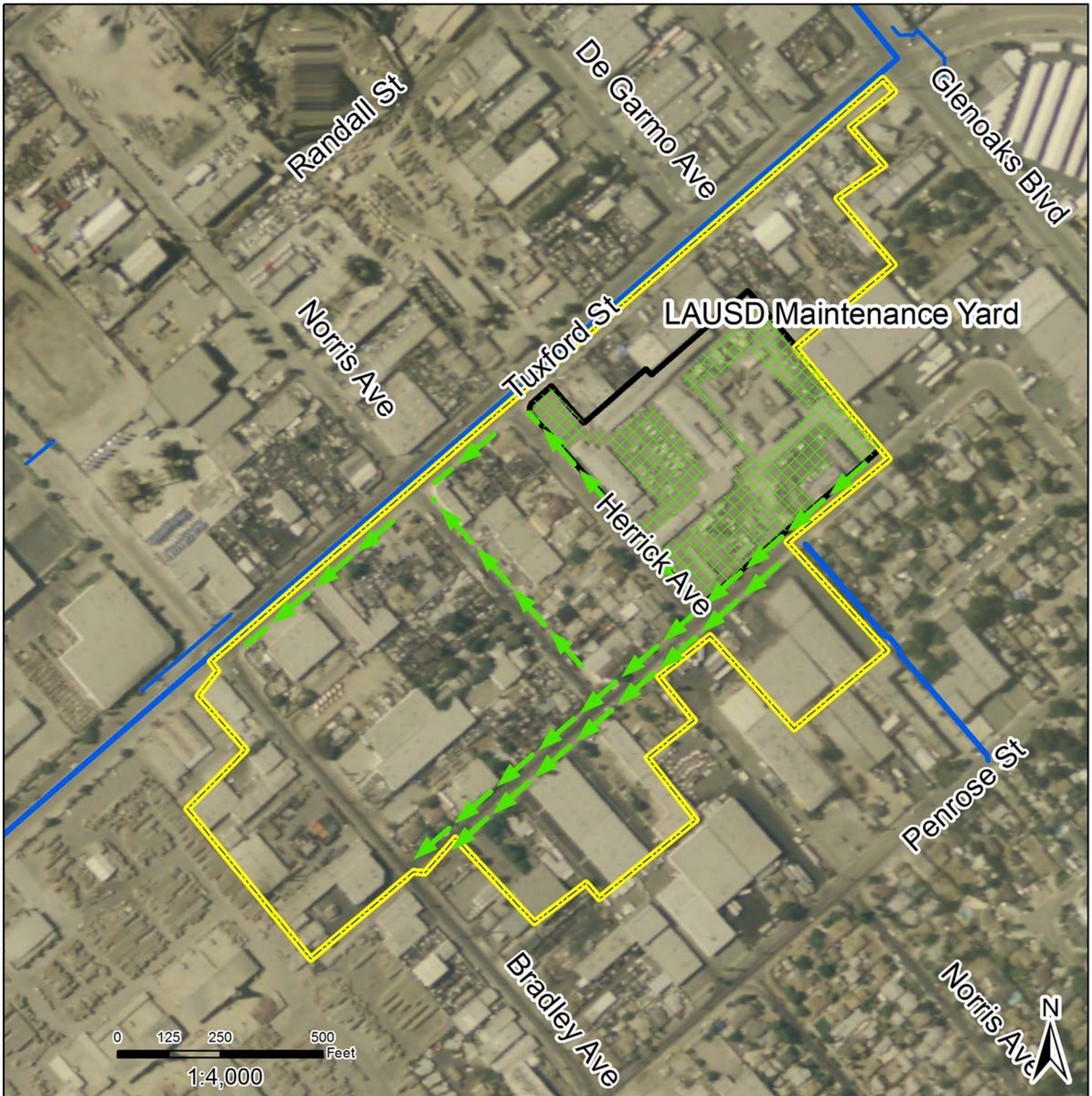
Catchment ID: 614782
Waterbody: LA River Reach 4

Site Name: Sun Valley Middle School Site
Neighborhood: Sun Valley/North Hollywood

Priority 1 Distributed BMP Project Sites
Burbank Channel



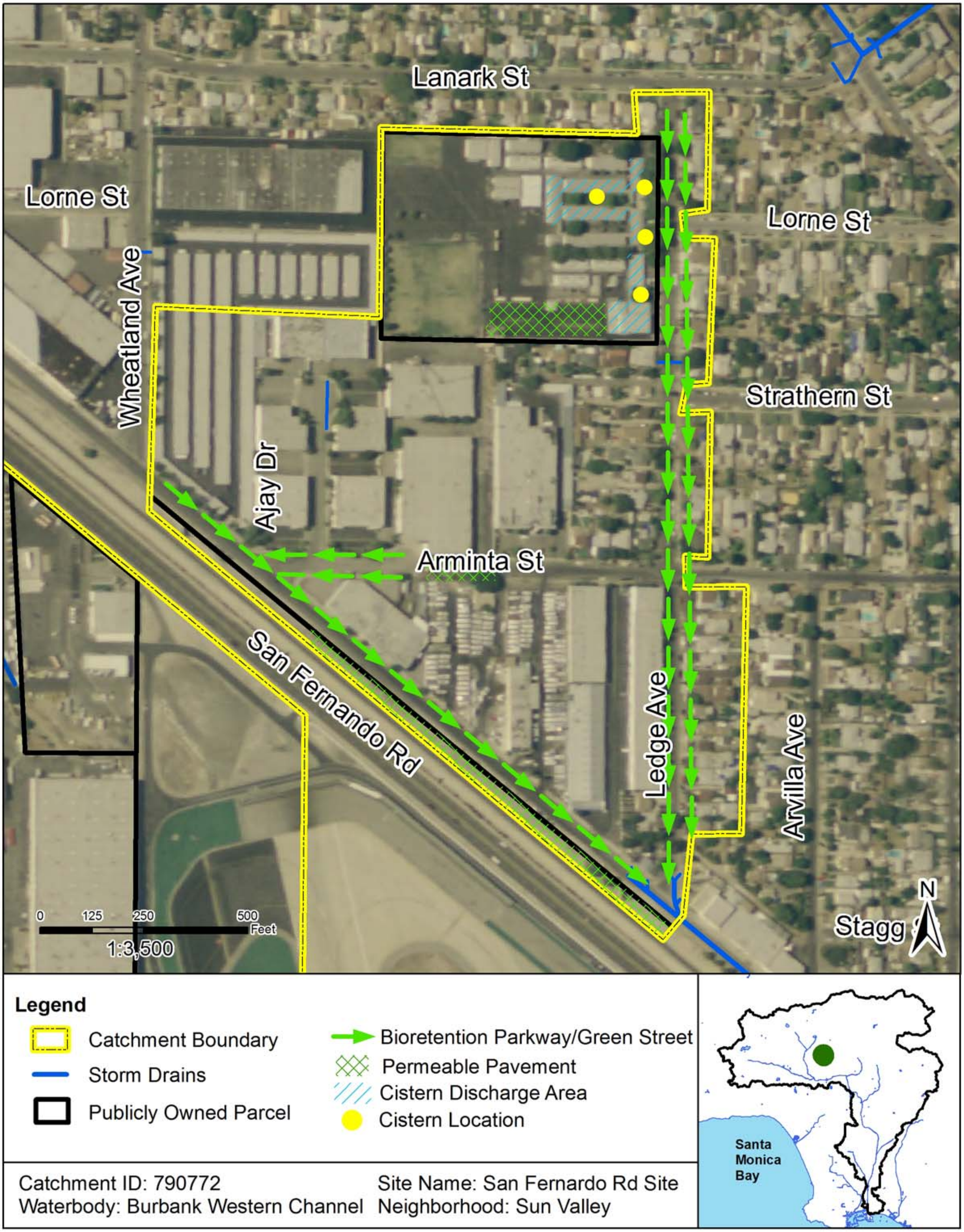
Legend
Burrbank Western Channel Potential Distributed BMP Sites
City of Los Angeles Jurisdiction
LA River Watershed
Freeway
Major Street
Los Angeles River Reach 1
Los Angeles River Reach 2
Los Angeles River Reach 3
Los Angeles River Reach 4
Los Angeles River Reach 5
Los Angeles River Reach 6
Major Tributaries
790701
790772
Burbank Western Channel
Canyon Rd
I 210
Woodman Ave
Branford St
Van Nuys Blvd
I 405
STHY 170
Lankershim Blvd
Wash
Tujunga
N Hollywood Way
Vanowen St
Victory Blvd
Oxnard St
Burbank Blvd
Magnolia Blvd
Riverside Dr
Ventura Blvd
STHY 134
Reach 4
Zoo Dr
W Olive Ave
W Kenneth Rd
I 5
170
134
N



Legend

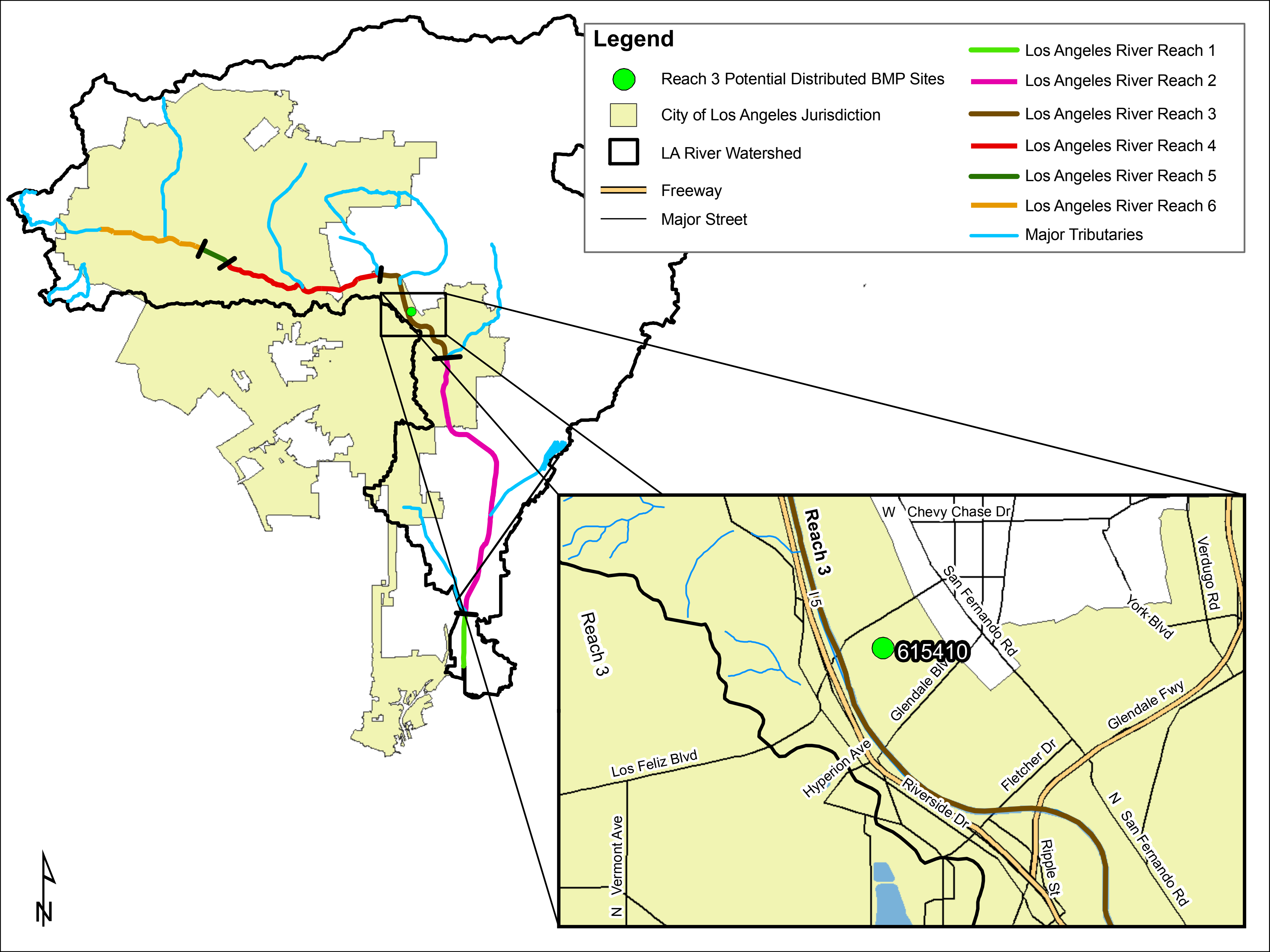
- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement

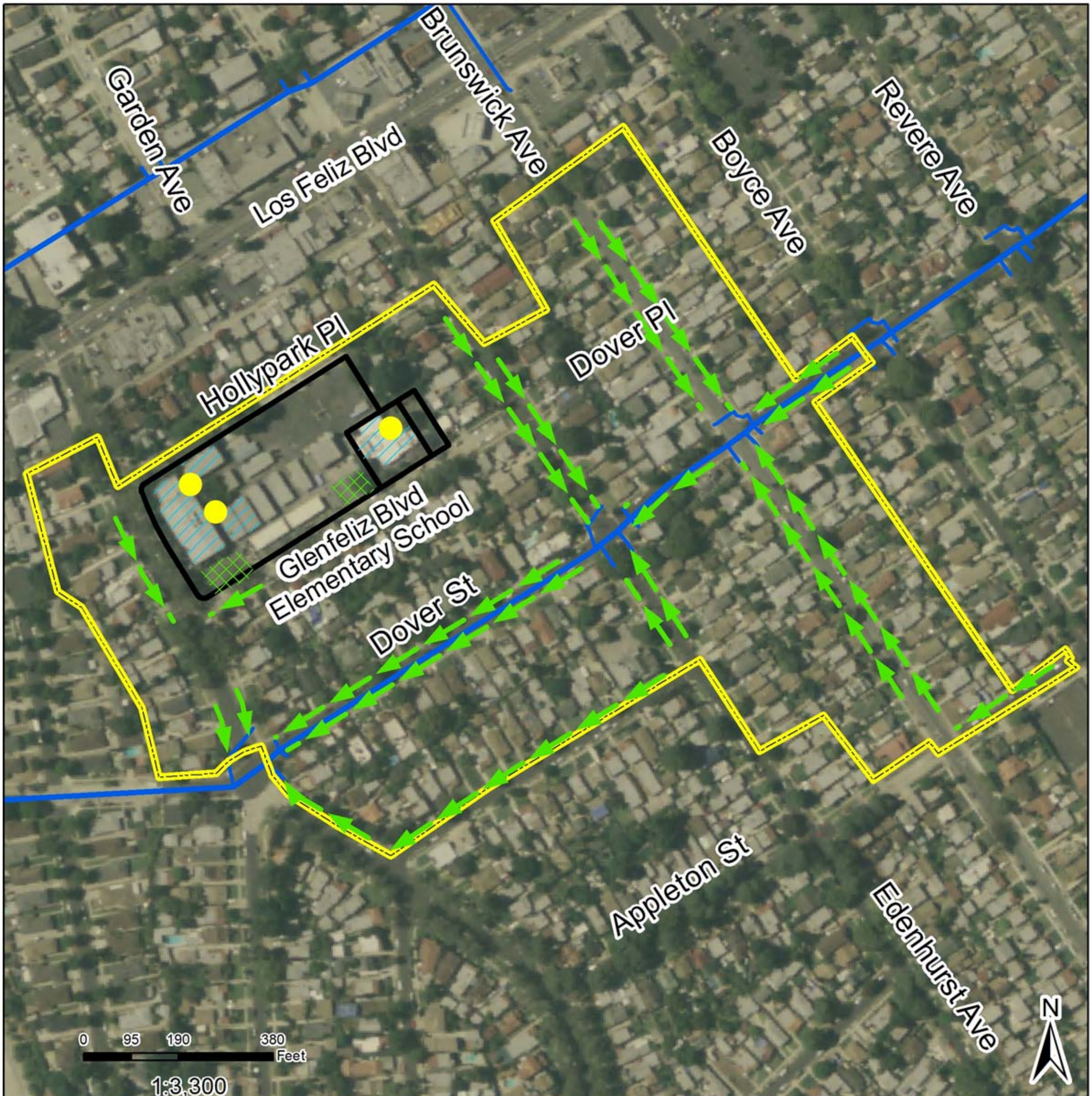
Catchment ID: 790701
Waterbody: Burbank Western Channel
Site Name: Tuxford St Site.
Neighborhood: Sun Valley



Lanark St
Lorne St
Lorne St
Wheatland Ave
Strathern St
Ajay Dr
Arminta St
San Fernando Rd
Ledge Ave
Arvilla Ave
Stagg St
0
125
250
500
Feet
1:3,500
N
Legend
Catchment Boundary
Storm Drains
Publicly Owned Parcel
Bioretention Parkway/Green Street
Permeable Pavement
Cistern Discharge Area
Cistern Location
Santa Monica Bay
Catchment ID: 790772
Waterbody: Burbank Western Channel
Site Name: San Fernando Rd Site
Neighborhood: Sun Valley

Priority 1 Distributed BMP Project Sites
Los Angeles River Reach 3


Legend
Reach 3 Potential Distributed BMP Sites
City of Los Angeles Jurisdiction
LA River Watershed
Freeway
Major Street
Los Angeles River Reach 1
Los Angeles River Reach 2
Los Angeles River Reach 3
Los Angeles River Reach 4
Los Angeles River Reach 5
Los Angeles River Reach 6
Major Tributaries
W Chevy Chase Dr
Reach 3
I5
San Fernando Rd
Verdugo Rd
York Blvd
615410
Glendale Blvd
Glendale Fwy
Reach 3
Los Feliz Blvd
Hyperion Ave
Riverside Dr
Fletcher Dr
N Vermont Ave
Ripple St
N San Fernando Rd
N



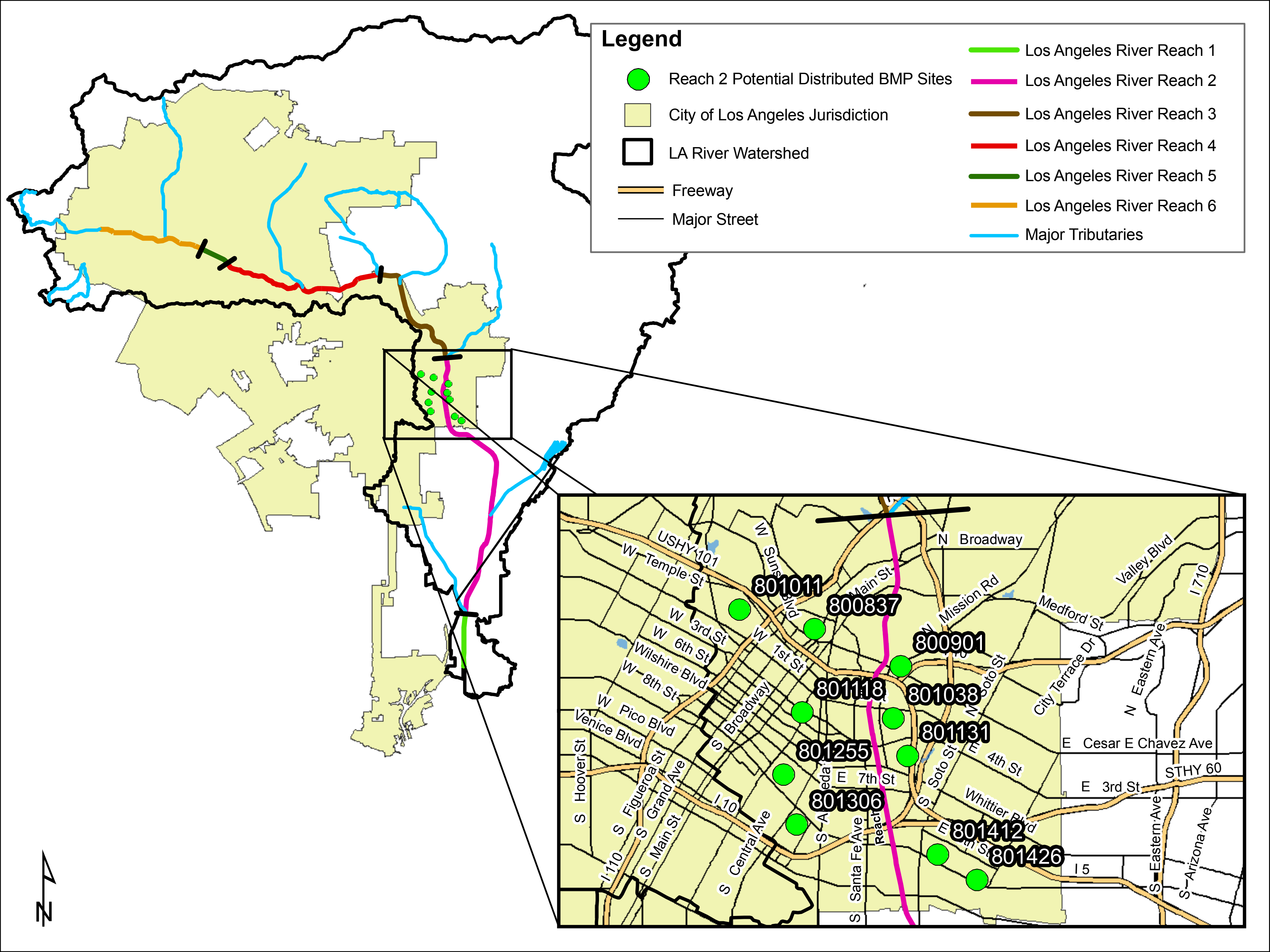
Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

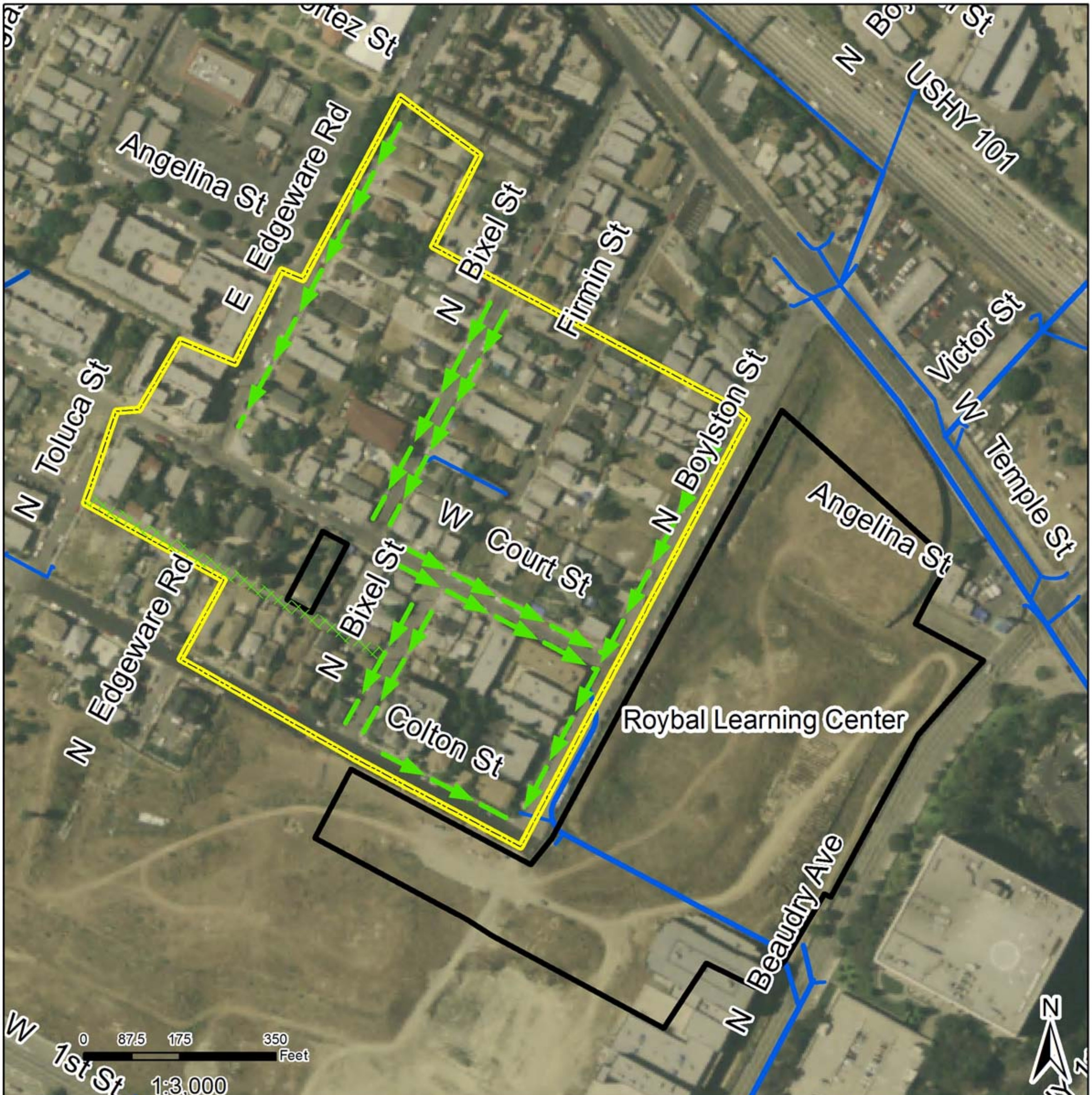
Catchment ID: 615410
Waterbody: LA River Reach 3

Site Name: Dover Street
Neighborhood: Atwater Village

Priority 1 Distributed BMP Project Sites
Los Angeles River Reach 2



Legend
Reach 2 Potential Distributed BMP Sites
City of Los Angeles Jurisdiction
LA River Watershed
Freeway
Major Street
Los Angeles River Reach 1
Los Angeles River Reach 2
Los Angeles River Reach 3
Los Angeles River Reach 4
Los Angeles River Reach 5
Los Angeles River Reach 6
Major Tributaries
N
801011
800837
800901
801118
801038
801131
801255
801306
801412
801426
USHY 101
W Temple St
W 3rd St
W 6th St
Wilshire Blvd
W 8th St
W Pico Blvd
Venice Blvd
S Hoover St
S Figueroa St
S Grand Ave
S Main St
I 110
I 10
S Broadway
W 1st St
S Central Ave
S Santa Fe Ave
E 7th St
N Broadway
N Main St
N Mission Rd
Medford St
Valley Blvd
I 710
City Terrace Dr
N Eastern Ave
E Cesar E Chavez Ave
STHY 60
E 3rd St
4th St
Whittier Blvd
S Soto St
N Soto St
I 5
S Eastern Ave
S Arizona Ave



Legend

Catchment Boundary

Storm Drains

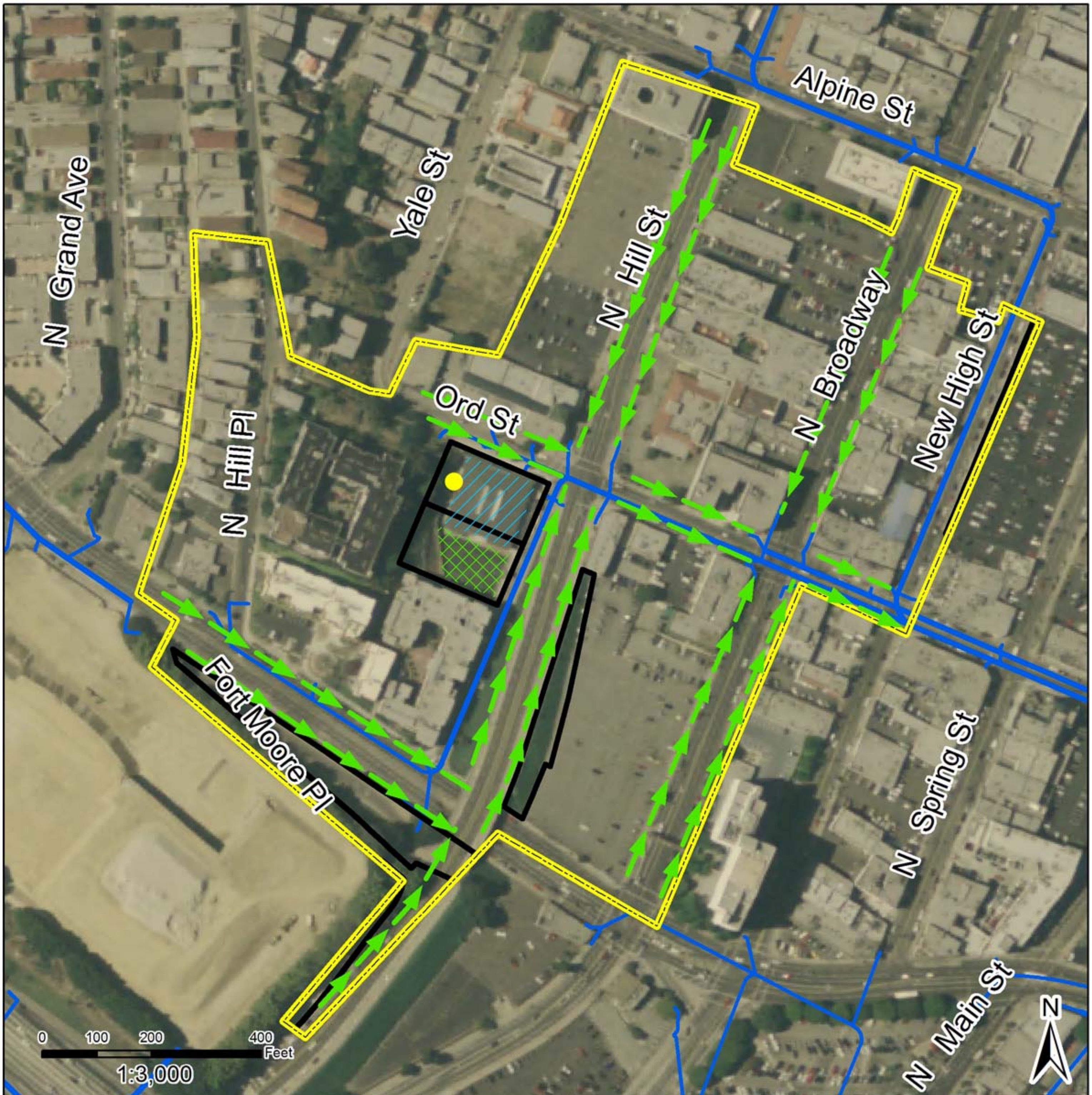
Publicly Owned Parcel

Bioretention Parkway/Green Street

Permeable Pavement

Catchment ID: 801011
Waterbody: LA River Reach 2

Site Name: Beaudry Avenue
Neighborhood: Downtown

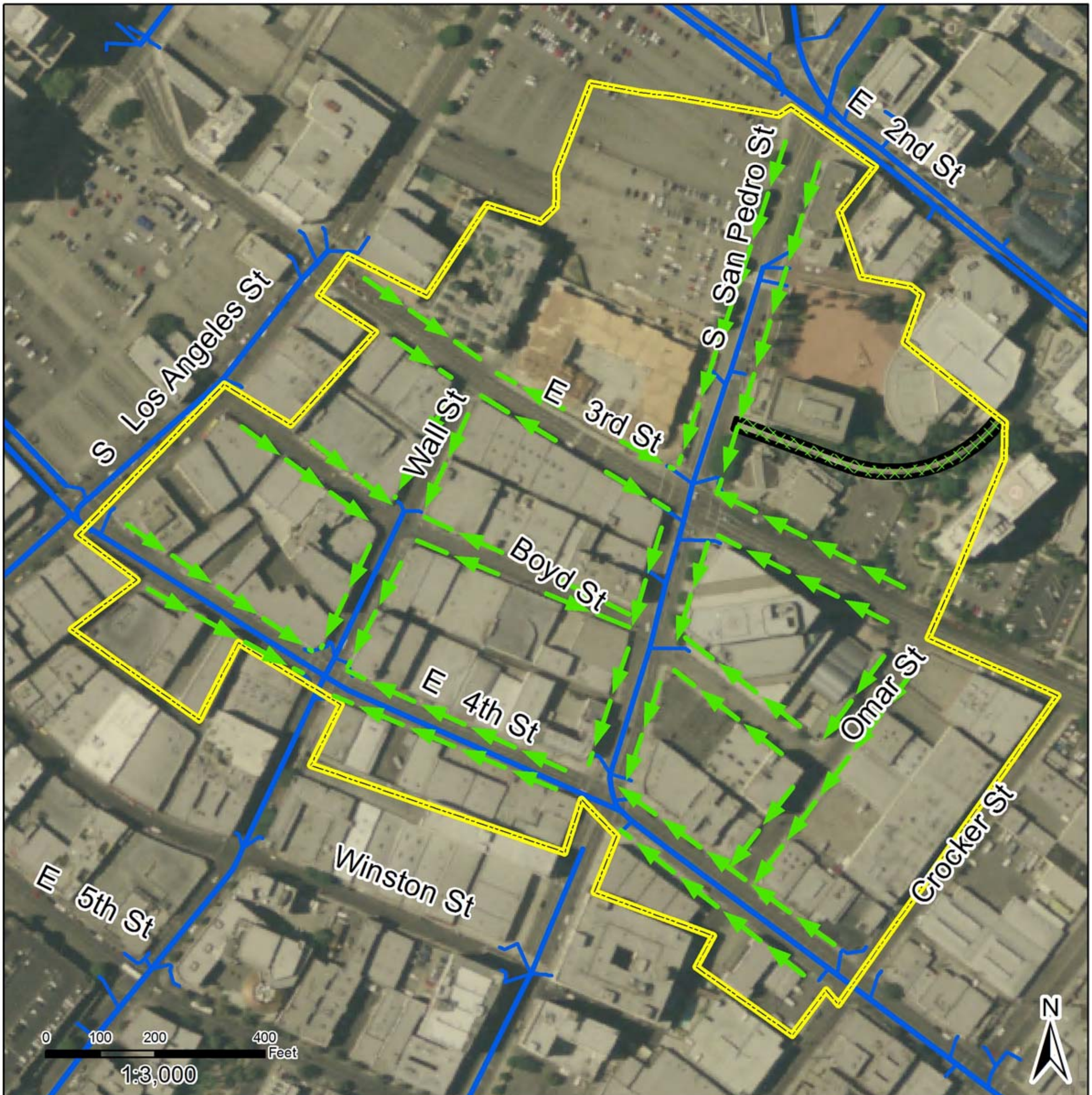


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 800837
Waterbody: LA River Reach 2

Site Name: Hill St Site
Neighborhood: Chinatown

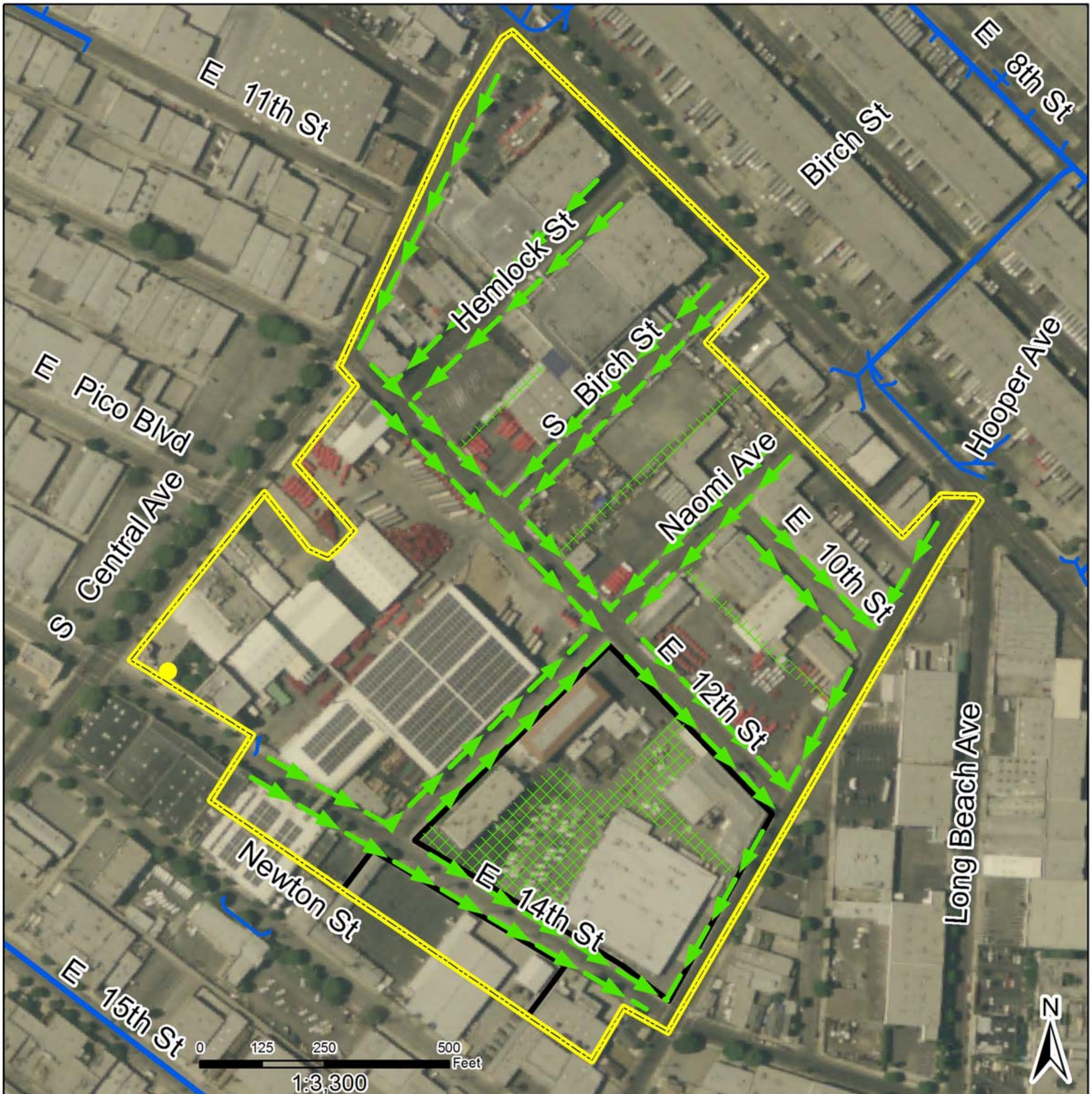


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement

Catchment ID: 801118
Waterbody: LA River Reach 2

Site Name: Wall St Site
Neighborhood: Downtown

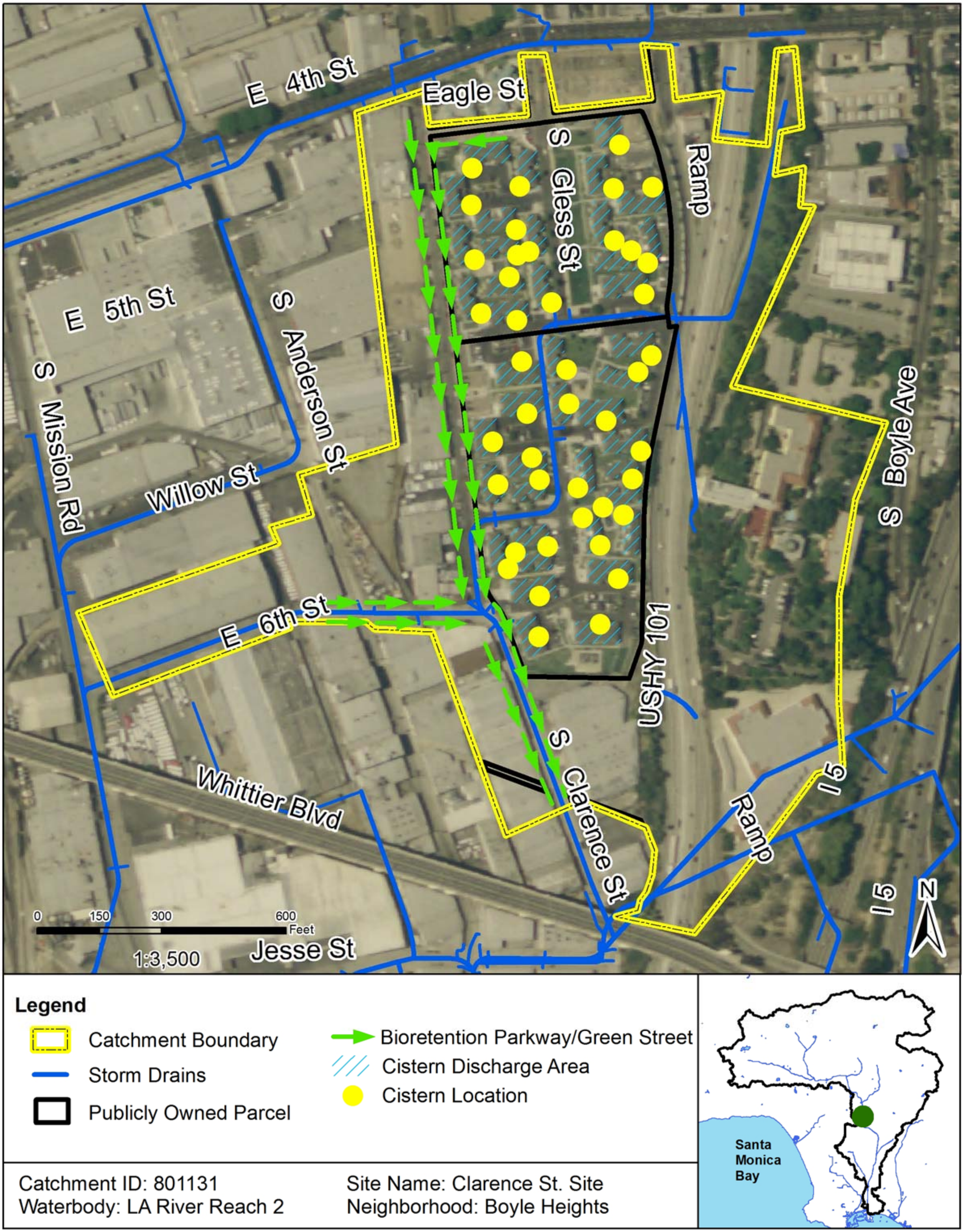


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement

Santa Monica Bay

Catchment ID: 801306
Waterbody: LA River Reach 2
Site Name: 12th St Site
Neighborhood: Downtown

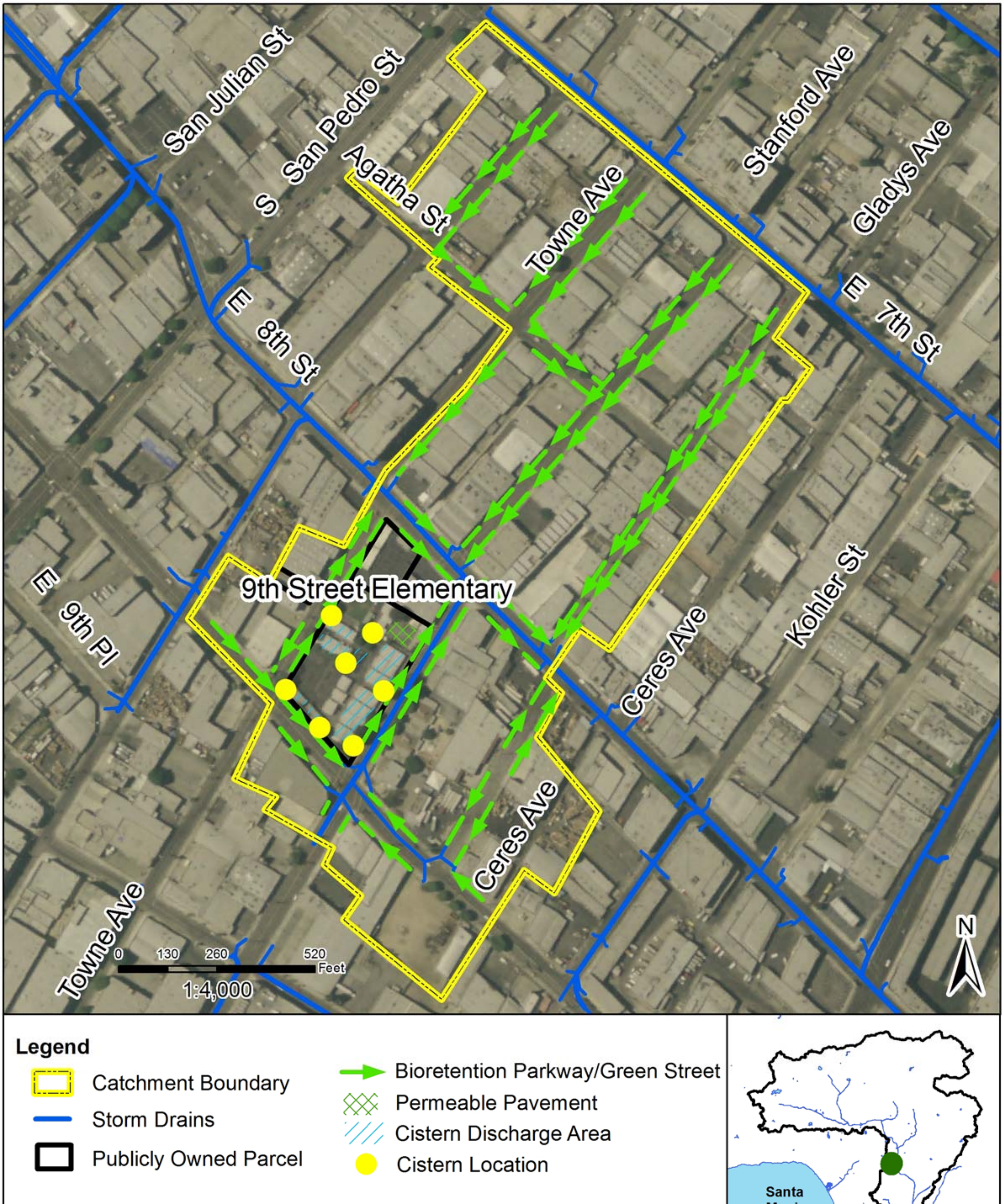


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Cistern Discharge Area
- Cistern Location

Catchment ID: 801131
Waterbody: LA River Reach 2

Site Name: Clarence St. Site
Neighborhood: Boyle Heights



Catchment ID: 801255
Waterbody: LA River Reach 2
Site Name: Stanford Ave
Neighborhood: Downtown

Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street

Catchment ID: 800901
Waterbody: LA River Reach 2

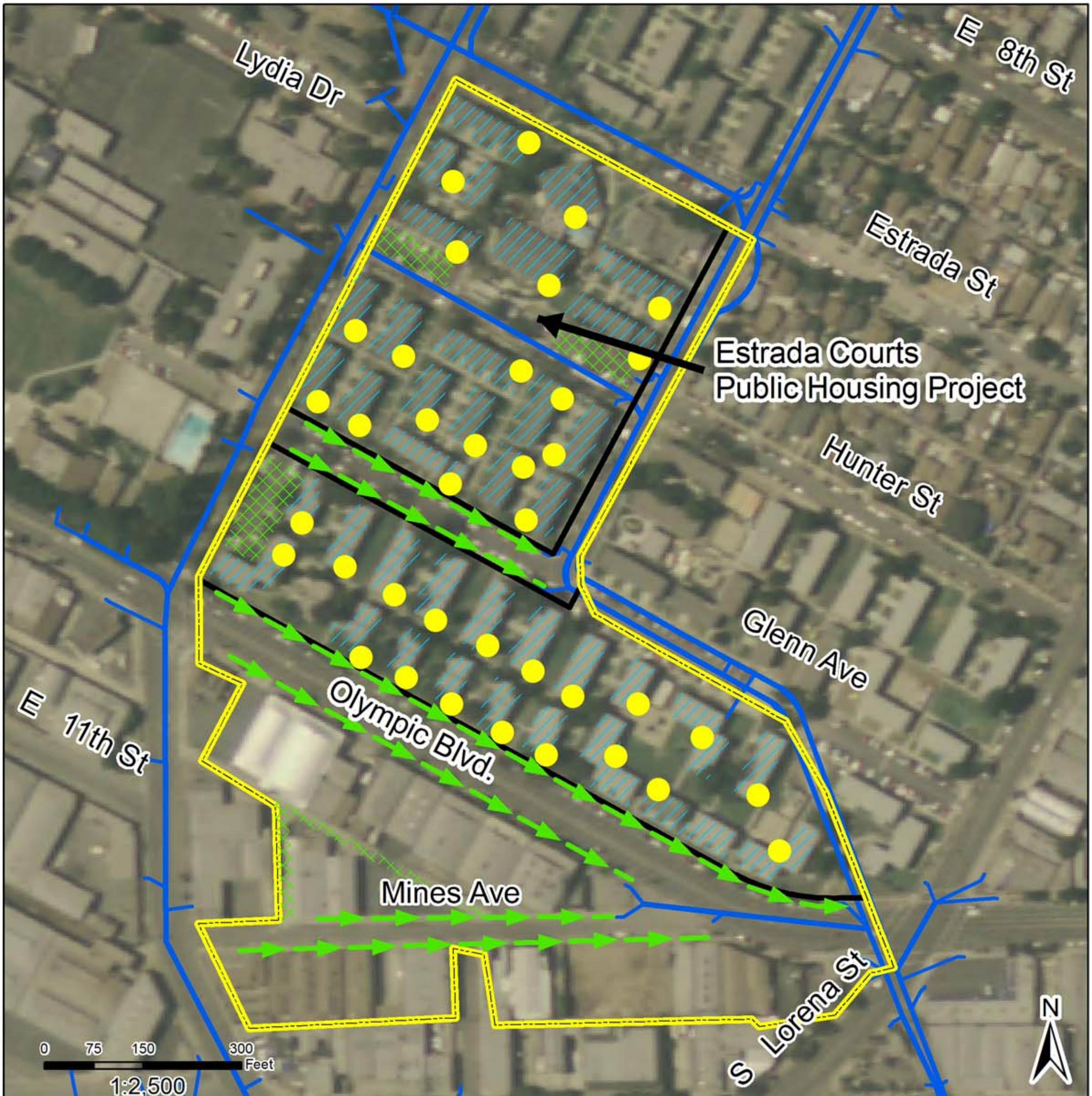
Site Name: Cesar Chavez Ave Site
Neighborhood: Boyle Heights

Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 801038
Waterbody: LA River Reach 2

Site Name: Utah St Site
Neighborhood: Boyle Heights

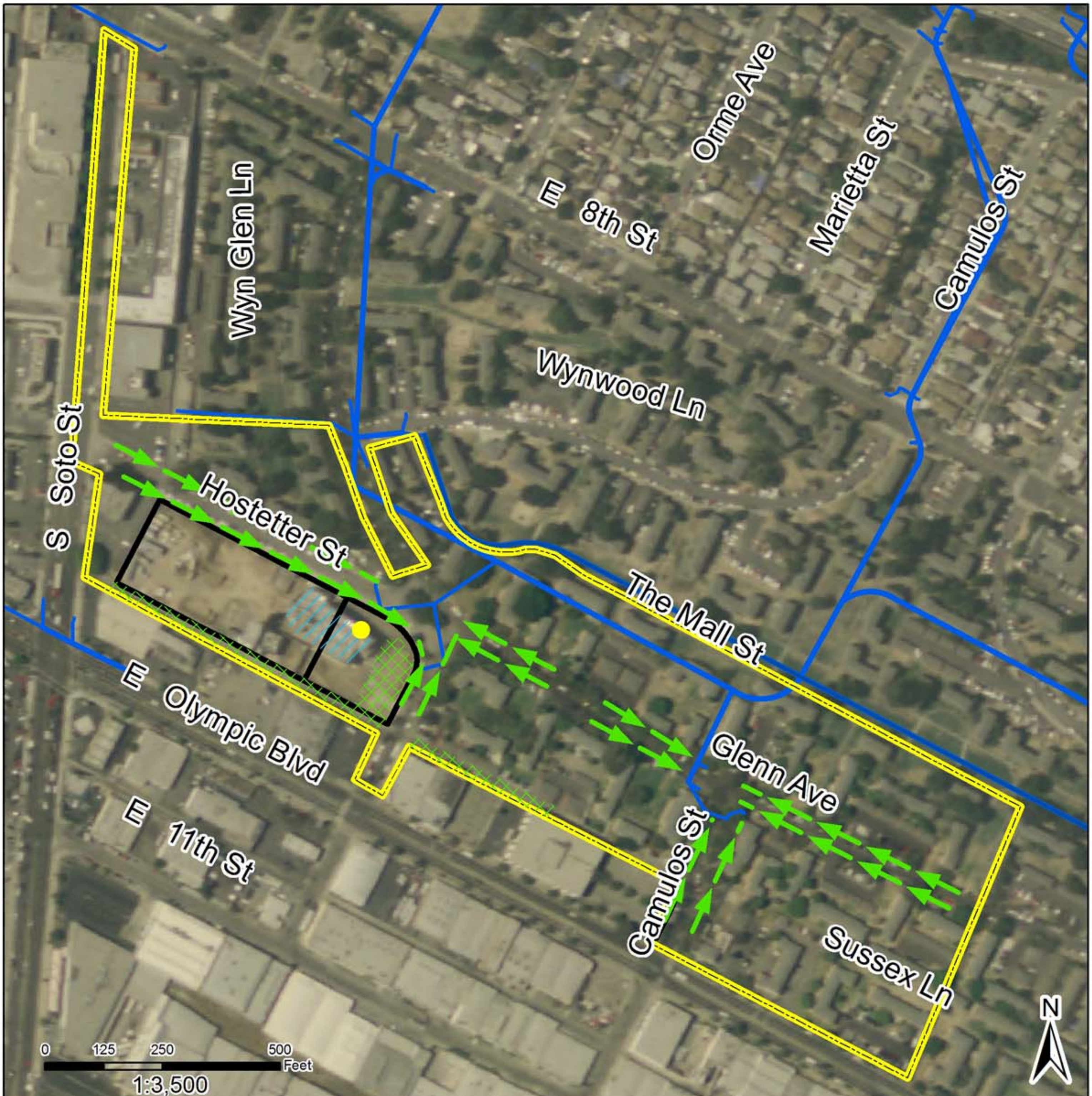


Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 801426
Waterbody: LA River Reach 2

Site Name: Olympic Blvd Site
Neighborhood: Boyle Heights



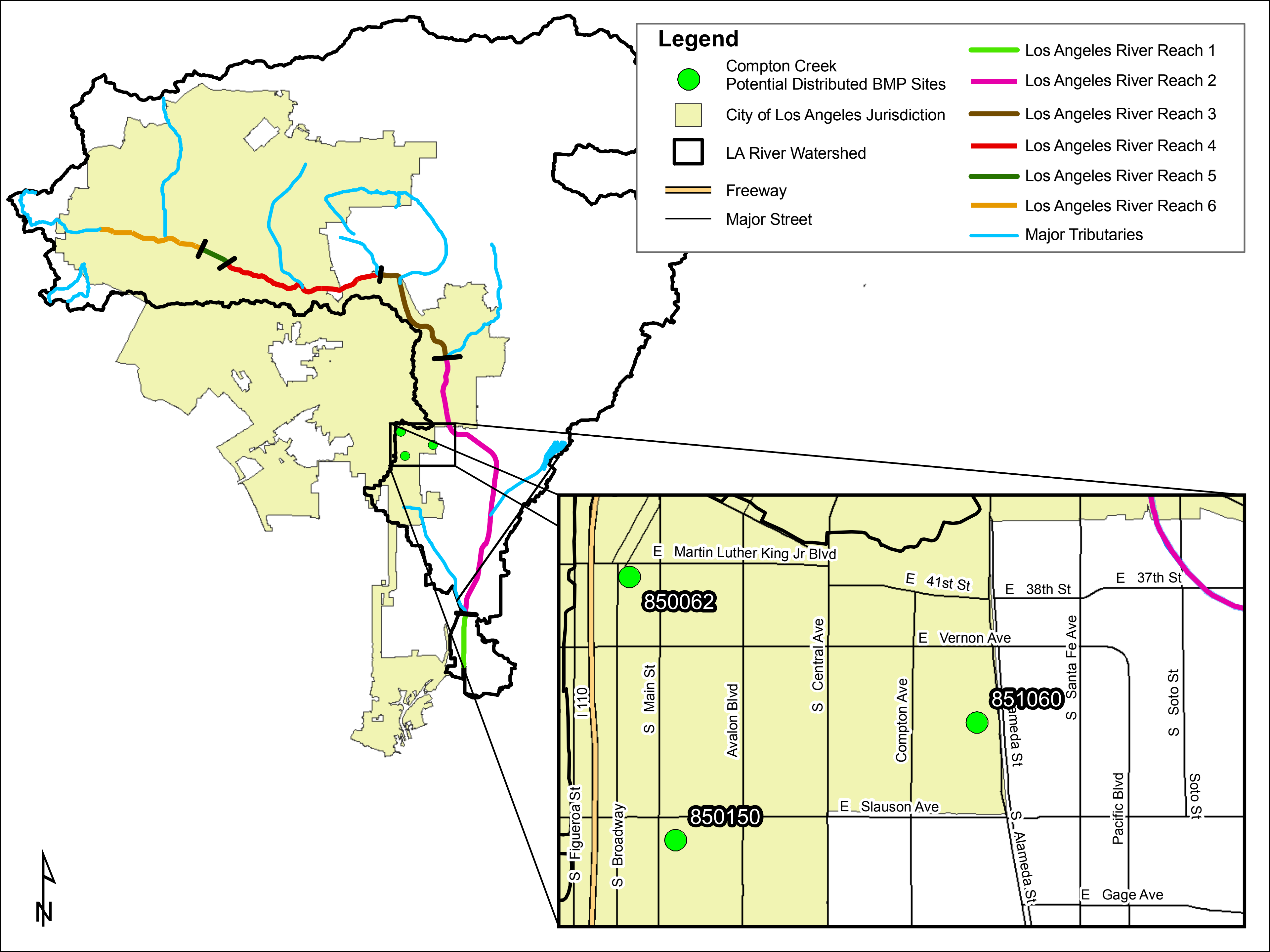
Legend

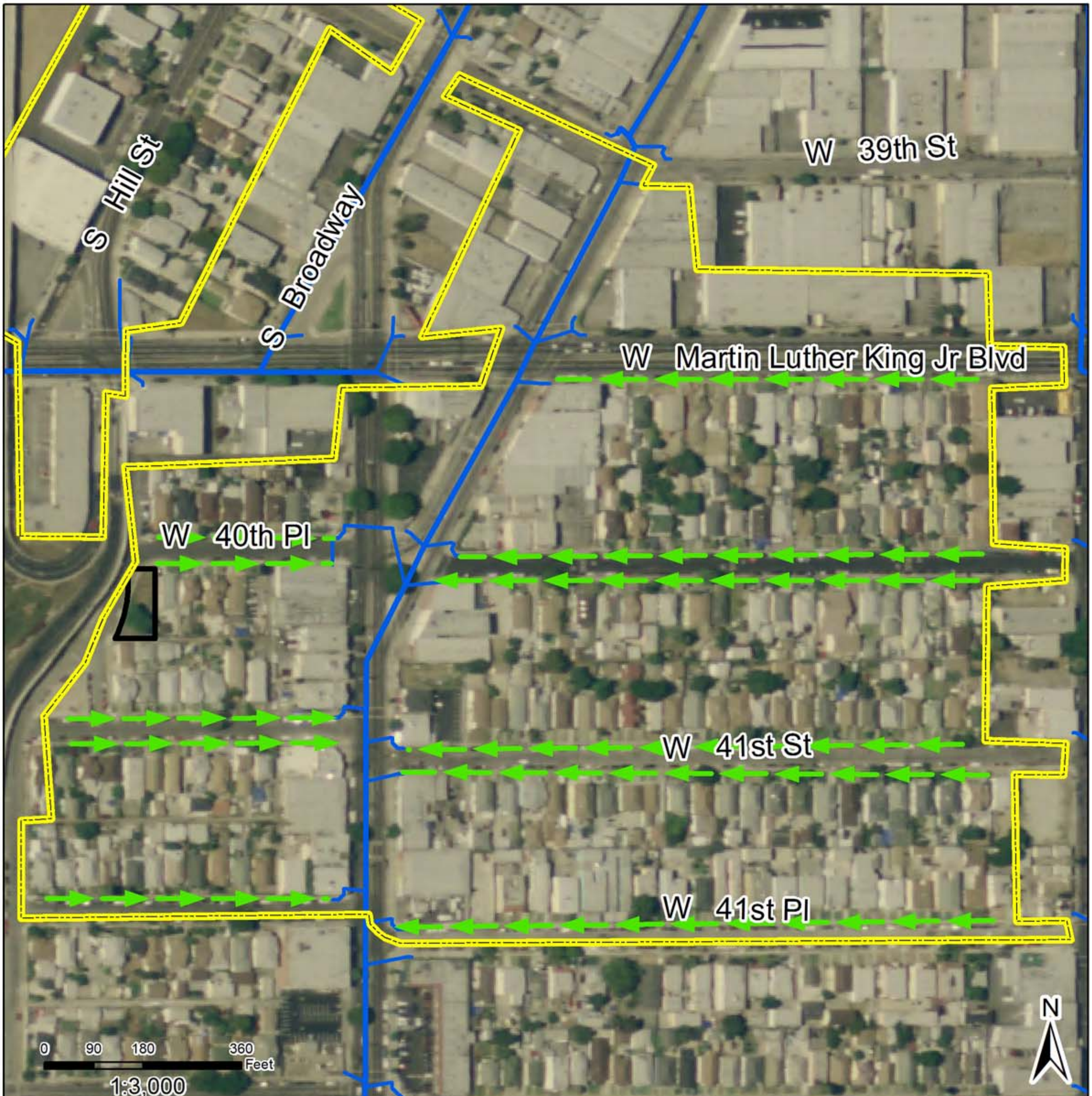
- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement
- Cistern Discharge Area
- Cistern Location

Catchment ID: 801412
Waterbody: LA River Reach 2

Site Name: Soto St Site
Neighborhood: Boyle Heights

Priority 1 Distributed BMP Project Sites
Compton Creek


Legend
Compton Creek Potential Distributed BMP Sites
City of Los Angeles Jurisdiction
LA River Watershed
Freeway
Major Street
Los Angeles River Reach 1
Los Angeles River Reach 2
Los Angeles River Reach 3
Los Angeles River Reach 4
Los Angeles River Reach 5
Los Angeles River Reach 6
Major Tributaries
E Martin Luther King Jr Blvd
E 41st St
E 38th St
E 37th St
E Vernon Ave
E Slauson Ave
E Gage Ave
I 110
S Figueroa St
S Broadway
S Main St
Avalon Blvd
S Central Ave
Compton Ave
S Alameda St
S Santa Fe Ave
Pacific Blvd
S Soto St
Soto St
850062
850150
851060
N



Legend

Catchment Boundary

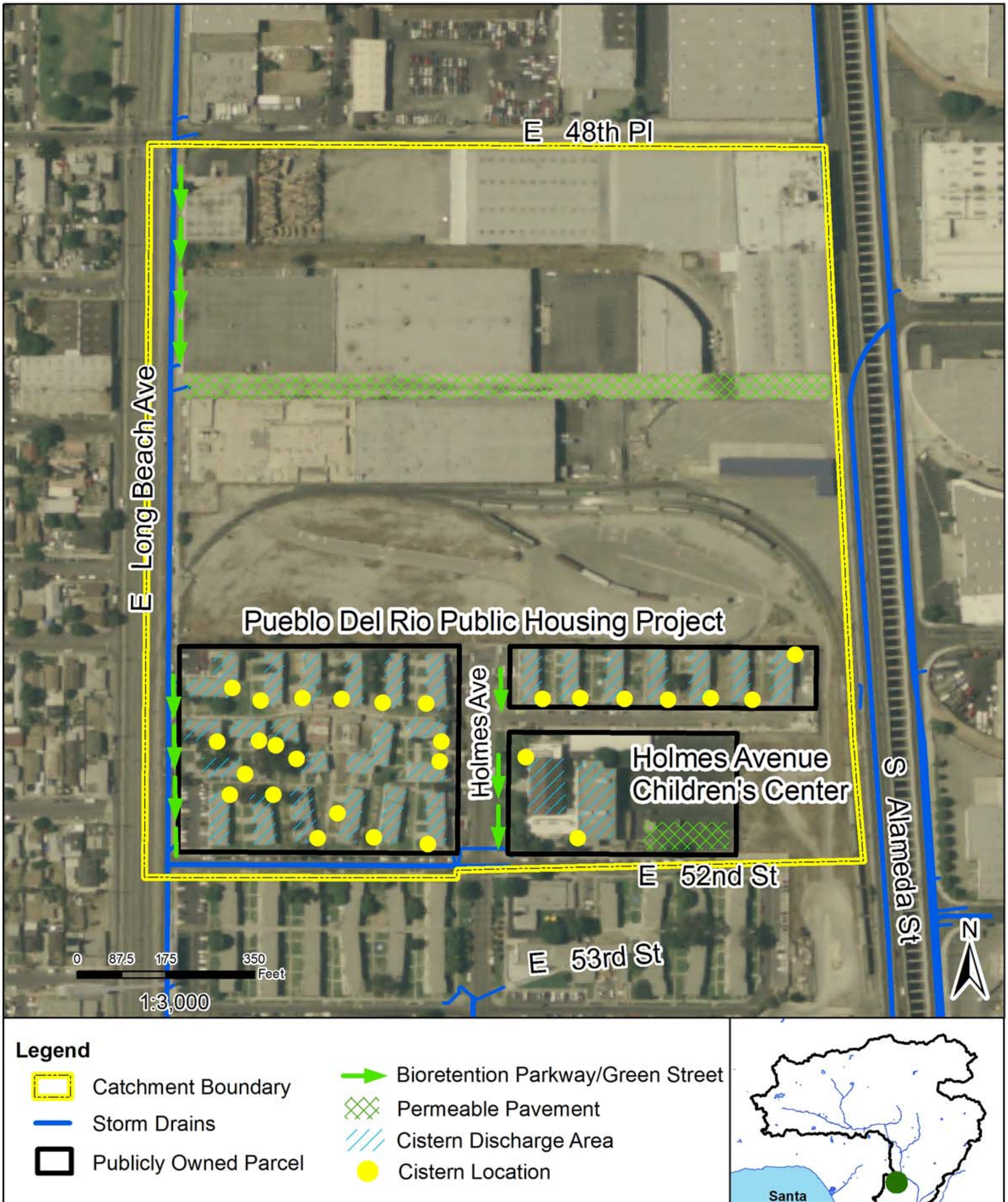
Storm Drains

Publicly Owned Parcel

Bioretention Parkway/Green Street

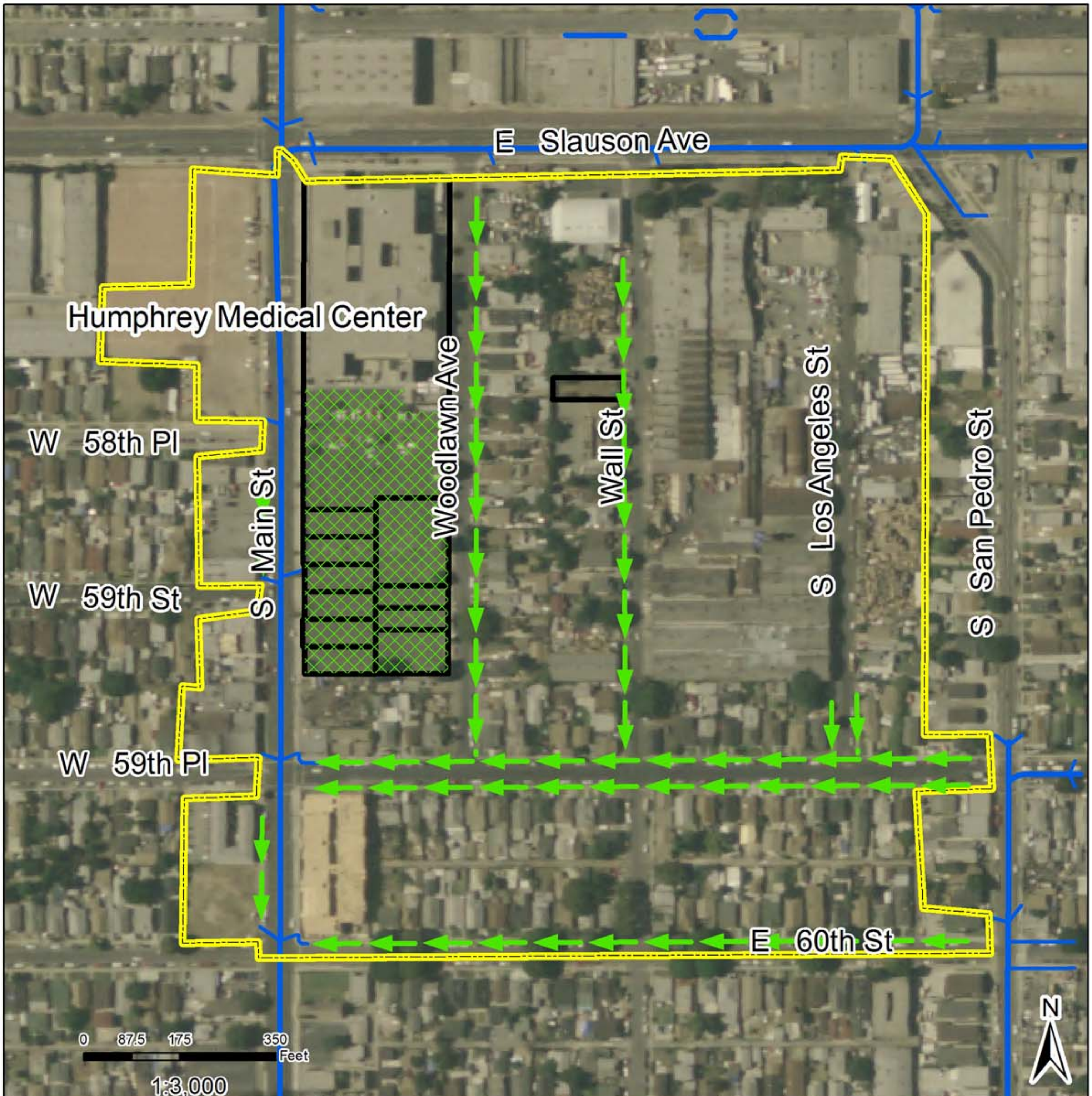
Catchment ID: 850062
Waterbody: Compton Creek

Site Name: Martin Luther King Jr Blvd Site
Neighborhood: Historic South Central



Catchment ID: 851060
Waterbody: Compton Creek

Site Name: Holmes Ave Site
Neighborhood: Central-Alameda



Legend

- Catchment Boundary
- Storm Drains
- Publicly Owned Parcel
- Bioretention Parkway/Green Street
- Permeable Pavement

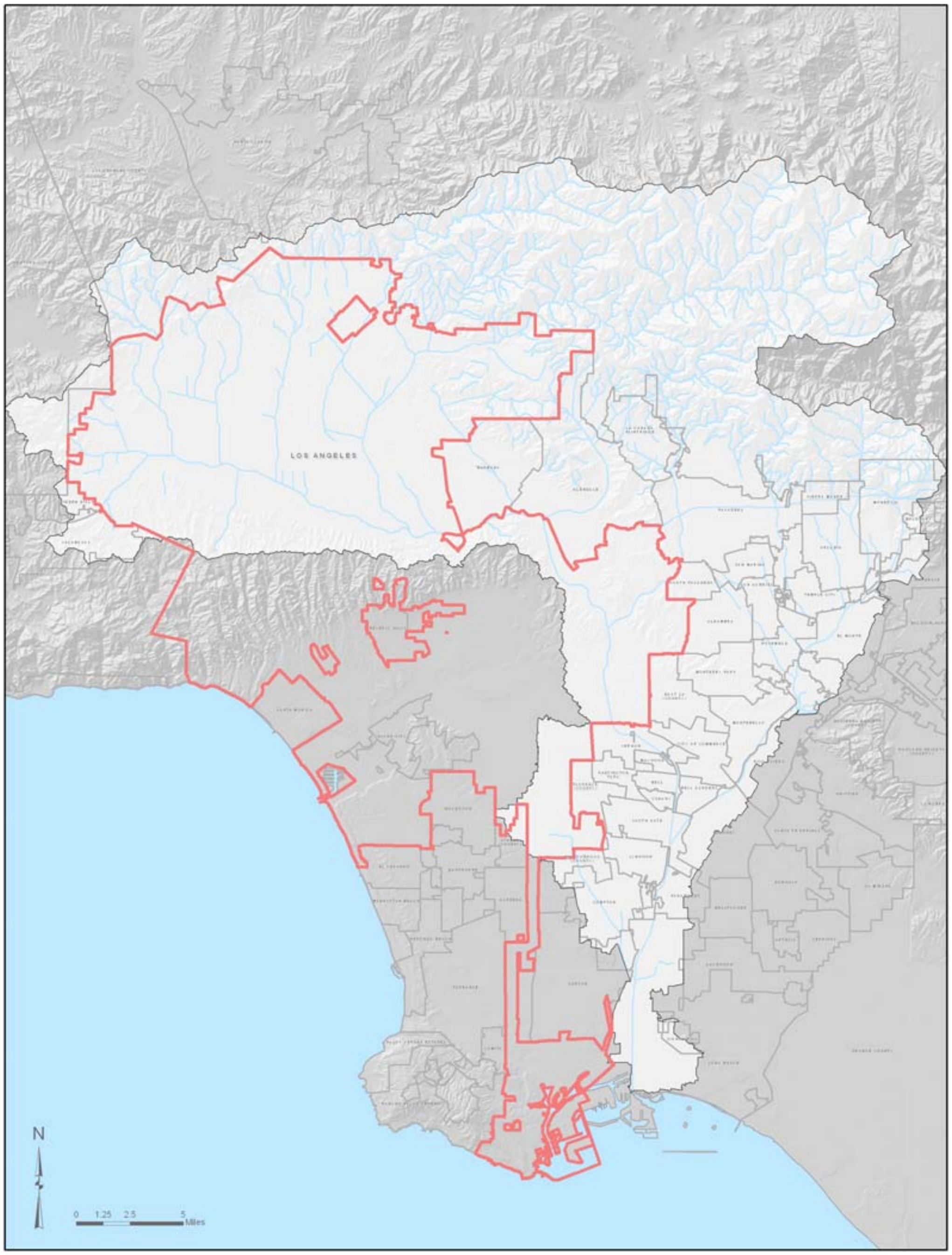
Catchment ID: 850150
Waterbody: Compton Creek

Site Name: Slauson Avenue
Neighborhood: South Los Angeles

Appendix F
Additional Monitoring Program

ADDITIONAL MONITORING PROGRAM

FOR THE CITY OF LOS ANGELES IN THE LOS ANGELES RIVER WATERSHED



CITY OF LOS ANGELES SANITATION DEPARTMENT OF PUBLIC WORKS

WATERSHED PROTECTION DIVISION

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TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS iv

INTRODUCTION 1

METHODOLOGY 2

- Step 1: Identifying Entry and Exit Points for Drainage into and out of the City of Los Angeles 2
- Step 2: Identifying Land Use Types for the Drainage Areas of Drainage Exit Points 3
- Step 3: Prioritizing Drainage Exit Points Based on Relevant Drainage Areas 6
- Step 4: Calculating Estimated Mass Loading Values for the Priority Drainage Exit Points 7
- Step 5: Ranking the Priority Drainage Exit Points for Monitoring 8

SUMMARY OF ANALYSIS 9

RECOMMENDED MONITORING SITES 14

ATTACHMENTS

1. LARWQCB APPROVAL LETTER OF A SEPARATE IMPLEMENTATION PLAN 16
2. LIST OF ALL DRAINAGE ENTRY AND EXIT POINTS IDENTIFIED 20

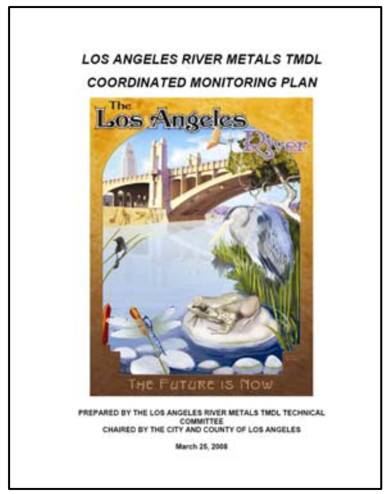
LIST OF ACRONYMS AND ABBREVIATIONS

AMP	Additional Monitoring Program
BMP	Best Management Practice
Caltrans	California Department of Transportation, District 7
City	City of Los Angeles
County	County of Los Angeles
CMP	Coordinated Monitoring Plan
EMC	Event Mean Concentration
GIS	Geographic Information Systems
IP	Implementation Plan
LARWQCB	Los Angeles Regional Water Quality Control Board
MS4	Municipal Separate Storm Sewer Systems
SBPAT	Structural BMP Prioritization Assessment Tool
SCAG	Southern California Association of Governments
TMDL	Total Maximum Daily Load
WLA	Waste Load Allocation

INTRODUCTION

To fulfill the requirements of the Los Angeles River Metals TMDL, the City of Los Angeles (City), along with the other responsible parties in the watershed, developed the Coordinated Monitoring Plan (CMP), which was approved by the Los Angeles Regional Water Quality Control Board (LARWQCB) on April 11, 2008. TMDL effectiveness monitoring, as specified by the CMP, began on October 11, 2008. The CMP includes sixteen monitoring locations, of which thirteen are considered Tier I sites and are monitored once a month and three are considered Tier II sites, which are monitored only if a Tier I site exceeds the numerical standards in two consecutive intervals.

From the beginning of the TMDL process, the responsible parties for meeting Los Angeles River Metals TMDL requirements, including the County of Los Angeles (County), planned on coordinating their compliance efforts on a watershed basis, with all parties working together by jurisdictional group ("reaches"). The City was leading Jurisdictional Groups 3, 4, 5, and 6 (upper Los Angeles River watershed), where the City has the most area, while the County was to lead Jurisdictional Groups 1 and 2. However, in early 2009, the County decided to develop its own implementation plan (IP) separate from the rest of the responsible parties in the watershed. As the County's decision came very near to the deadline for submittal of the draft IP, the City tried to get consensus from the agencies in the upper Los Angeles River watershed to develop a joint IP; however, the City was not able to accomplish this effort in the short amount of time necessary to move a joint IP forward. In light of this, the City sought approval from the LARWQCB to prepare a separate IP focusing only on the City's area within the Los Angeles River watershed. In a letter to the City dated April 10, 2009 (Attachment 1), the LARWQCB provided this approval with the condition that additional monitoring locations may need to be included as a part of the City's IP, where the City does not drain directly to receiving waters. It is expected that all responsible parties will be held to the same requirement as the City of Los Angeles to locate and monitor additional sites; therefore, it should be noted that as the City, as well as other municipalities, are now working on their own or in smaller jurisdictional groups due to the County's decision, much time and resources will need to be spent by all responsible parties to initiate and maintain the additional monitoring program (AMP).



The City's AMP is hereby proposed with a focus on locations of indirect discharge from the City of Los Angeles that are estimated to have the highest metals loading. This approach was utilized to maximize the use of available resources for this additional effort. The locations that were identified to include storm drain discharges into and out of the City of Los Angeles are shown in Attachment 2.

METHODOLOGY

The exercise of locating additional monitoring locations for the AMP was completed through a five-step method. The five steps are as follows:

- Step 1: Identifying Entry and Exit Points for Drainage into and out of the City of Los Angeles
- Step 2: Identifying Land Use Types for the Drainage Areas of Drainage Exit Points
- Step 3: Prioritizing Drainage Exit Points Based on Relevant Drainage Areas
- Step 4: Calculating Estimated Mass Loading Values for the Priority Drainage Exit Points
- Step 5: Ranking the Priority Drainage Exit Points for Monitoring

Available information from the City, County, Southern California Association of Governments (SCAG), and other State and Federal Geographic Information Systems (GIS) databases was used. The information included shape files with spatial data for City and County-owned storm drains, flow lines, SCAG-defined land uses, County-defined subwatersheds and city boundaries. The five-step method is detailed below.

Step 1:

Identifying Entry and Exit Points for Drainage into and out of the City of Los Angeles

City and County storm drain line information were overlaid with the City boundary lines to determine the points of intersection. An example of two drainage exit points that were identified at the border of the Cities of Los Angeles and Burbank is shown in Figure 1. After checking the accuracy of the drainage information for each point, the entry points for drainage from another area into the City and the exit points for drainage out of the City into another area were counted and presented in a new shape file. Staff also checked that the information for the storm drains, such as pipe size and type, were available and accurate. In some cases, this required checking the as-built plans for the drains. Many points were identified as natural drainage, meaning there are no man-made structures (i.e. – channels or pipes) carrying the drainage from one area to another, only natural stream beds. Drainage areas were also delineated using information from County's subwatershed shape file for each drainage exit point out of the City. These drainage areas were also double-checked utilizing the available storm drain network, flow line, and topographic information.

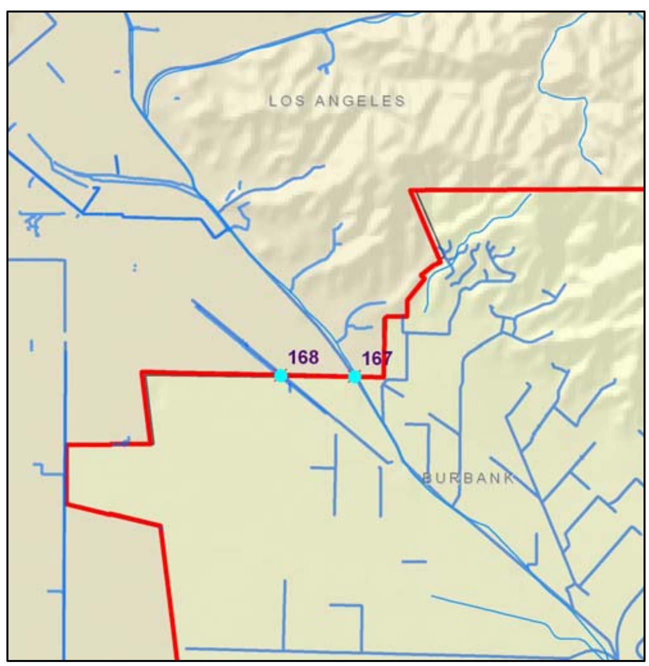


Figure 1: Example of drainage exit point determination

It is worthwhile to note that due to the complexity of drainage from Caltrans' areas (i.e. – freeways and state highways), these areas were not analyzed for this exercise. Discharge from General and Industrial permittees were also not considered. Essentially, this exercise is intended to constitute only MS4 permittee drainage, with the understanding that other types of permitted drainage may be included in the entry and exit points without being accounted for in the analysis.

A total of 85 entry points into the City and 37 exit points out of the City were identified. An example of the information identified for the two points in Figure 1 is shown in Table 1. Only the exit points were considered for the City's AMP, so the entry points were eliminated at this point.

Table 1: Example of drainage exit point information

ID	Flow Direction	Flows Through	Area (Acres)	Drain Type
167	OUT	BURBANK	8,804.51	Burbank Western Channel
168	OUT	BURBANK	247.72	45" Pipe

Step 2:
Identifying Land Use Types for the Drainage Areas of Exit Points

A shape file containing the 2005 SCAG land use categories for the County was overlaid on each drainage area determined for the exit points out of the City, showing the types of land use in each drainage area. Figure 2 shows an example of this overlay. The specific land use categories identified for each drainage area were then combined into more general land use categories based on the land use types used in the County MS4 monitoring reports in order to complete Steps 3 and 4. These assignments are shown in Table 2.

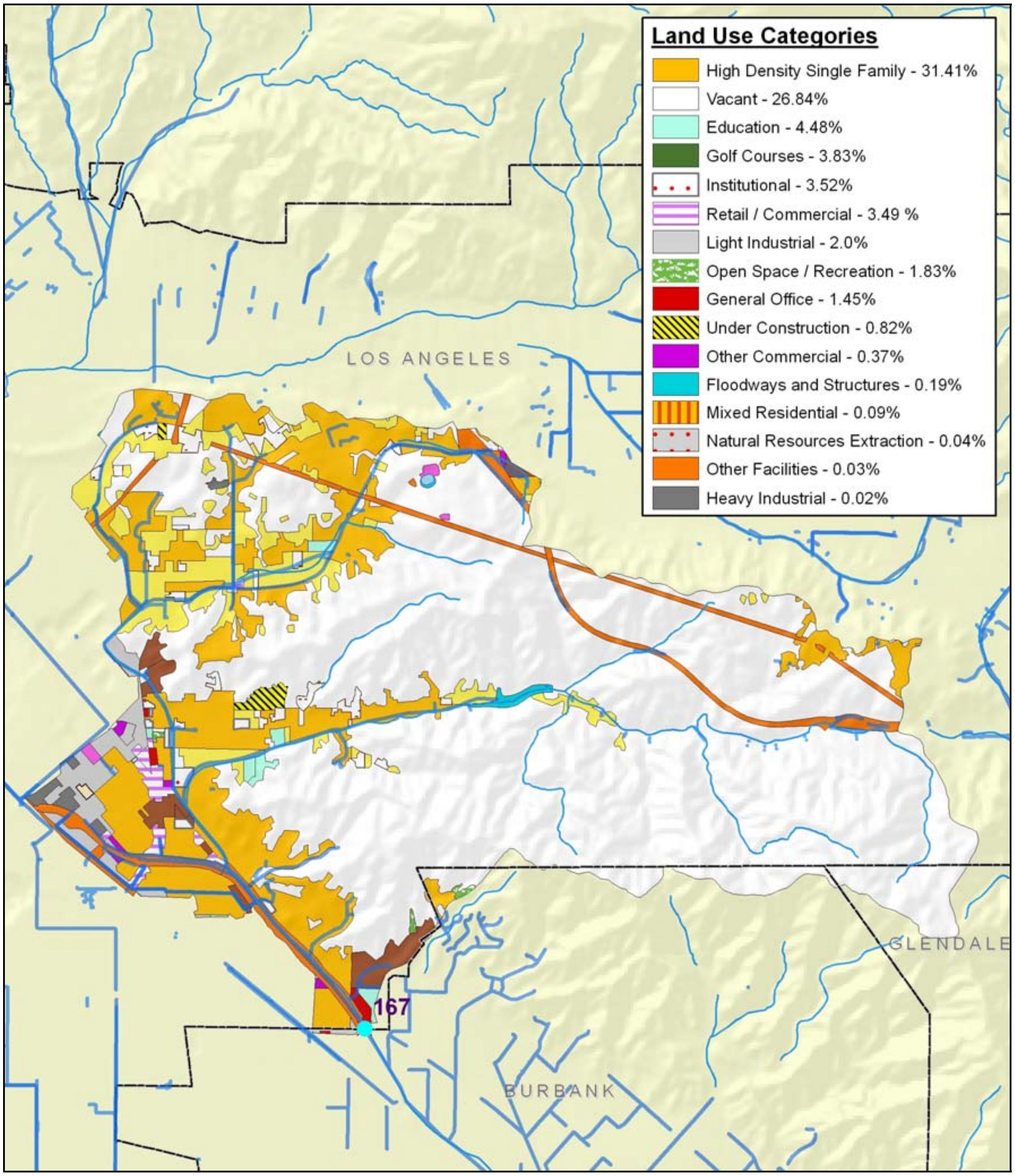


Figure 2: SCAG land use categorization for the drainage area of exit point ID 167

Table 2: Land Use Category Assignments

SCAG Code	Specific Land Use Category	Generalized Category
1111	High-Density Single Family Residential	SF Residential
1112	Low-Density Single Family Residential	SF Residential
1121	Mixed Multi-Family Residential	MF Residential
1122	Duplexes, Trjplexes and 2-or 3~Unit Condominiums and Townhouses	MF Residential
1123	Low-Rise Apartments, Condominiums, and Townhouses	MF Residential
1124	Medium-Rise Apartments and Condominiums	MF Residential
1125	High~Rise Apartments and Condominiums	MF Residential
1131	Trailer Parks and Mobile Home Courts, High-Density	SF Residential
1140	Mixed Residential	MF Residential
1151	Rural Residential, High~Density	SF Residential
1152	Rural Residential, Low-Density	SF Residential
1211	Low- and Medium-Rise Major Office Use	Commercial
1212	High-Rise Major Office Use	Commercial
1213	Skyscrapers	Commercial
1221	Regional Shopping Center	Commercial
1222	Retail Centers (Non-Strip With Contiguous Interconnected Off-Street…)	Commercial
1223	Modern Strip Development	Commercial
1224	Older Strip Development	Commercial
1231	Commercial Storage	Commercial
1232	Commercial Recreation	Commercial
1233	Hotels and Motels	Commercial
1241	GovernmentOffices	Commercial
1242	Police and Sheriff Stations	Commercial
1243	Fire Stations	Commercial
1244	Major Medical Health Care Facilities	Commercial
1245	Religious Facilities	Commercial
1246	Other Public Facilities	Commercial
1247	Non-Attended Public Parking Facilities	Commercial
1251	Correctional Facilities	Commercial
1252	Special Care Facilities	Commercial
1253	Other Special Use Facilities	Commercial
1261	Pre-SchoolslDay Care Centers	Education
1262	Elementary Schools	Education
1263	Junior or Intermediate High Sd"lods	Education
1264	Senior High Schools	Education
1265	Colleges and Universities	Education
1266	Trade Schools and Professional Training Facilities	Education
1271	Base (Built-up Area)	Commercial
1272	Vacant Area	Open
1311	Manufacturing, Assembly, and Industrial services	Industrial
1312	Motion Picture and Television Studio Lots	Industrial
1313	Packing Houses and Grain Elevators	Industrial
1314	Research and Development	Industrial
1321	Manufacturing	Industrial
1322	Petroleum Refining and Processing	Industrial
1323	Open Storage	Industrial
1324	Major Metal Processing	Industrial
1325	Chemical Processing	Industrial
1331	Mineral Extraction - Other Than Oil and Gas	Industrial
1332	Mineral Extraction - Oil and Gas	Industrial
1340	Wholesaling and Warehousing	Commercial
1411	Airports	Transportation

Table 2 (Continued): Land Use Category Assignments

SCAG Code	Specific Land Use Category	Generalized Category
1412	Railroads	Transportation
1413	Freeways and Major Roads	Transportation
1414	Park-and~Ride Lots	Transportation
1415	Bus Terminals and Yards	Transportation
1416	Truck Terminals	Transportation
1417	Harbor Facilities	Transportation
1420	Communication Facilities	Commercial
1431	Electrical Power Facilities	Commercial
1432	Solid Waste Disposal Facilities	Commercial
1433	Liquid Waste Disposal Facilities	Commercial
1434	Water Storage Facilities	Commercial
1435	Natural Gas and Petroleum Facilities	Commercial
1436	Water Transfer Facilities	Commercial
1437	Improved Flood Waterways and Structures	Open
1438	Mixed Wind Energy Generation and Percolation Basin	Open
1440	Maintenance Yards	Transportation
1450	Mixed Transportation	Transportation
1460	Mixed Transportation and Utility	Transportation
1500	Mixed Commercial and Industrial	Commercial
1600	Mixed Urban	Transportation
1700	Under Construction	Transportation
1810	Golf Courses	Open
1821	Developed Local Parks and Recreation	Open
1822	Undeveloped Local Parks and Recreation	Open
1831	Developed Regional Parks and Recreation	Open
1832	Undeveloped Regional Parks and Recreation	Open
1840	Cemeteries	Open
1850	Wildlife Preserves and Sanctuaries	Open
1860	Specimen Gardens and Arboreta	Open
1880	Other Open Space and Recreation	Open
2110	Irrigated Cropland and Improved Pasture Land	Agriculture
2120	Non-Irrigated Cropland and Improved Pasture Land	Agriculture
2200	Orchards and Vineyards	Agriculture
2300	Nurseries	Agriculture
2600	Other Agriculture	Agriculture
2700	Horse Ranches	Agriculture
3100	Vacant Undifferentiated	Open
3200	Abandoned Orchards and Vineyards	Open
3300	Vacant With Limited Improvements	Open
4100	Water, Undifferentiated	Open
4200	Harbor Water Facilities	Open

Step 3:

Prioritizing Exit Points Based on Relevant Drainage Areas

Once all of the exit points out of the City into another area were identified, and all land use and drain size information gathered, exit points were prioritized by the type of land use contained in the drainage areas and jurisdiction of the areas. Exit points with industrial, transportation, and commercial land uses were determined to be the highest priority since these areas are expected to generate higher metals pollutant loads based on previous studies, such as the County Land Use Monitoring performed for the MS4 Permit program. In addition, areas containing mixed drainage from other cities or unincorporated areas were also eliminated because they do not accurately represent drainage that is characteristic of only the City, except in cases where the mixed drainage from another area is primarily open space or otherwise represents an insignificant amount of flow. After this exercise was completed, 24 exit points were removed from consideration as a monitoring site.

Step 4

Calculating Estimated Mass Loading Values for the Priority Exit Points

A pollutant loading calculation for each of the high priority exit points was then performed and an estimate of mass loading was determined for each point. Mass loading was used as it correlates with the TMDL-assigned WLAs, which are also expressed in units of mass. The mass loading calculation was based on the rational method using the total drainage area for each exit point, the land uses constituting the drainage area, the event mean concentrations (EMCs) from the County's 1994-2000 Land Use Monitoring, and an average annual rainfall of 15 inches.

The annual runoff volume to each exit point was estimated as follows:

$$Q = C \times I \times A$$

With

$C = 0.9 \times (\%\ imperviousness) + 0.05$

$I = 15$ inches per year = 1.25 feet per year (assumed average annual value)

$A =$ Area in square feet

$Q =$ Annual runoff volume in cubic feet

Pollutant loading is estimated as:

$$Load = \sum \left[(EMC)_i \times (Runoff\ Volume)_i \right]$$

Table 3 shows the EMC values that were used in this calculation.

Table 3: EMC Values Used for the Mass Loading Calculation[1]

Land Use	Copper (ug/l)	Lead (ug/l)	Zinc (ug/l)
Industrial	31.04	14.87	565.6
Transportation	51.86	9.08	279.45
Commercial	34.77	11.53	238.53
Agricultural[2]	29.8	7.84	105
Educational	21.49	4.53	123.69
Multi-family Residential	14.78	6.915	159.865
Single Family Residential	15.3	9.59	80.35
Open	9.12	0	38.81

[1]Values from LA County 1994-2000 Integrated Receiving Water Impacts Report.
[2]Agricultural values from an LA County special study via email communication with Dr. Youn Sim on August 25, 2009, ysim@dpw.lacounty.gov

Step 5:
Ranking the Priority Exit Points for Monitoring

The final step in the methodology for determining the AMP locations was to rank the exit points by estimated mass loading, with the highest mass loading estimates to be ranked first for consideration as a monitoring location. Since copper has typically been shown by existing CMP sampling data to be the limiting metal impairment for the Los Angeles River, the mass loadings were ranked in order by their estimated copper loading over lead or zinc loading (though it is worth noting that the highest estimated lead and zinc mass loadings strongly correlated with the highest estimated copper mass loadings, leaving the preference for copper loading almost irrelevant). In addition, the exit points were grouped by river reach, and the exit point with the highest estimated mass loading was chosen as the proposed monitoring location for that reach. This ranking step provides a way to focus resources on the highest priority areas distributed throughout the watershed with the ultimate goal of achieving TMDL compliance.

Table 4 shows the results of calculating the estimated mass loading for exit points 167 and 168. In this case, ID 167 is ranked as a higher priority for monitoring than ID 168, and as such is shown in yellow.

Table 4: Estimated Mass Loading Calculation Results for IDs 167 & 168

ID	Drain Type	Estimated Pollutant Loading (kg/yr)		
		Cu	Pb	Zn
167	Burbank Western Channel	66.09	23.85	458.48
168	45" Pipe	6.65	2.47	64.37

SUMMARY OF ANALYSIS

Based on the methodology described in Step 3 of the previous section, 11 exit points were prioritized as proposed monitoring location considerations for the City's AMP, as shown in Table 6. There are no priority exit points in Reaches 5 and 6 because the majority of the drainage in that area of the watershed drains into the City of Los Angeles, or otherwise represents insignificant flow.

Table 6: Priority Exit Points for Monitoring Consideration

ID	Flow Direction	Flows Through	Area (Acres)	Drain Type
30	OUT	COUNTY UNINCORPORATED	116.39	75" Pipe
32	OUT	COUNTY UNINCORPORATED	288.24	57" Pipe
51	OUT	SAN FERNANDO	3,296.06	Pacoima Wash
52	OUT	SAN FERNANDO	1,475.83	84" Pipe
53	OUT	SAN FERNANDO	2,945.09	Wilson Canyon Channel
54	OUT	SAN FERNANDO	3,673.93	East Canyon Channel
126	OUT	COUNTY UNINCORPORATED	860.93	69" Pipe
153	OUT	VERNON	465.66	110"x132" Box
154	OUT	VERNON	39.35	27" Pipe
167	OUT	BURBANK	8,804.51	Burbank Western Channel
168	OUT	BURBANK	247.72	45" Pipe

Using the methodology described in Step 4, estimated mass loading values were calculated for each of the 11 prioritized exit points, as shown in Table 7.

Table 7: Estimated Mass Loading for the Prioritized Exit Points

		Estimated Pollutant Loading (kg/yr)		
ID	Reach	Cu	Pb	Zn
30	1	2.19	0.91	15.89
32	1	3.54	1.88	21.96
126	1	21.80	8.56	244.45
153	2	14.76	5.00	145.16
154	2	1.48	0.62	22.93
167	3	66.09	23.85	458.48
168	3	6.65	2.47	64.37
51	4	13.59	5.08	95.35
52	4	13.07	5.68	77.84
53	4	21.03	6.96	135.34
54	4	44.85	18.41	333.58

Finally, the exit points were ranked to prioritize the potential monitoring locations from highest to lowest loading, with copper as the emphasized metal impairment based on existing Metals TMDL monitoring data. This ranking was performed for each of the four Los Angeles River reaches that the 11 exit points fall into, and the exit point with the highest estimated mass load in each reach was chosen as the proposed monitoring location for that reach. The results of this exercise are shown in Figures 3 through 6.

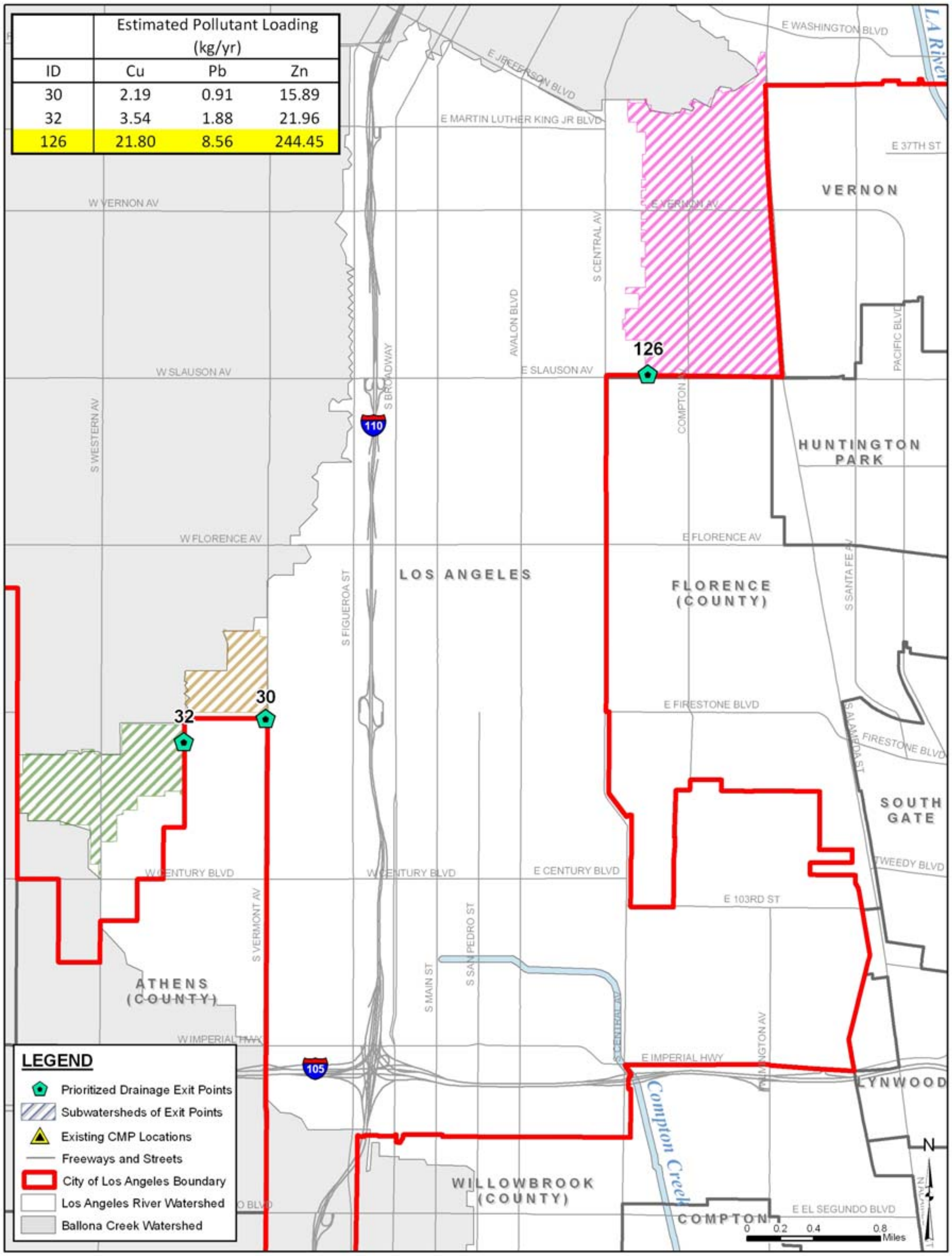
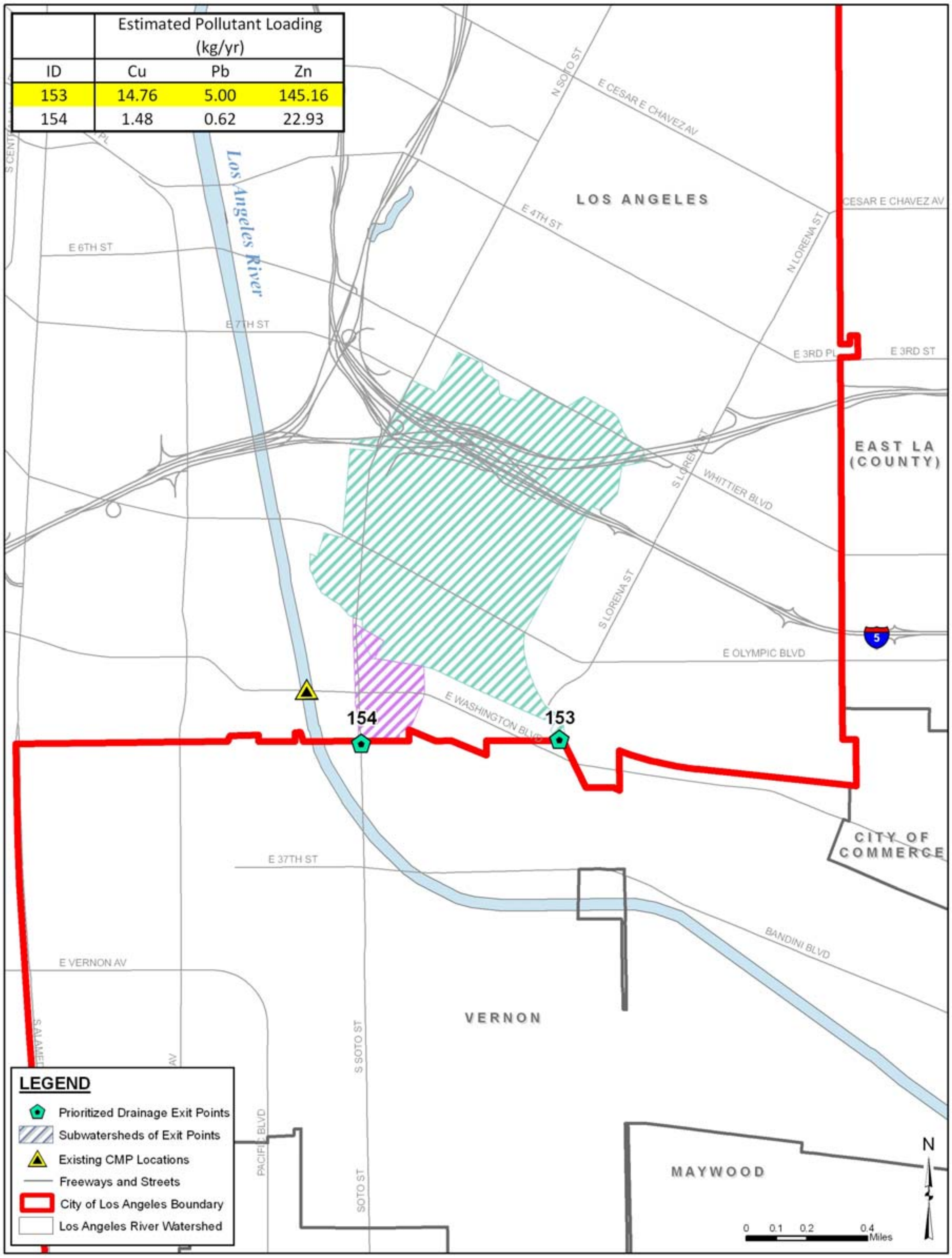
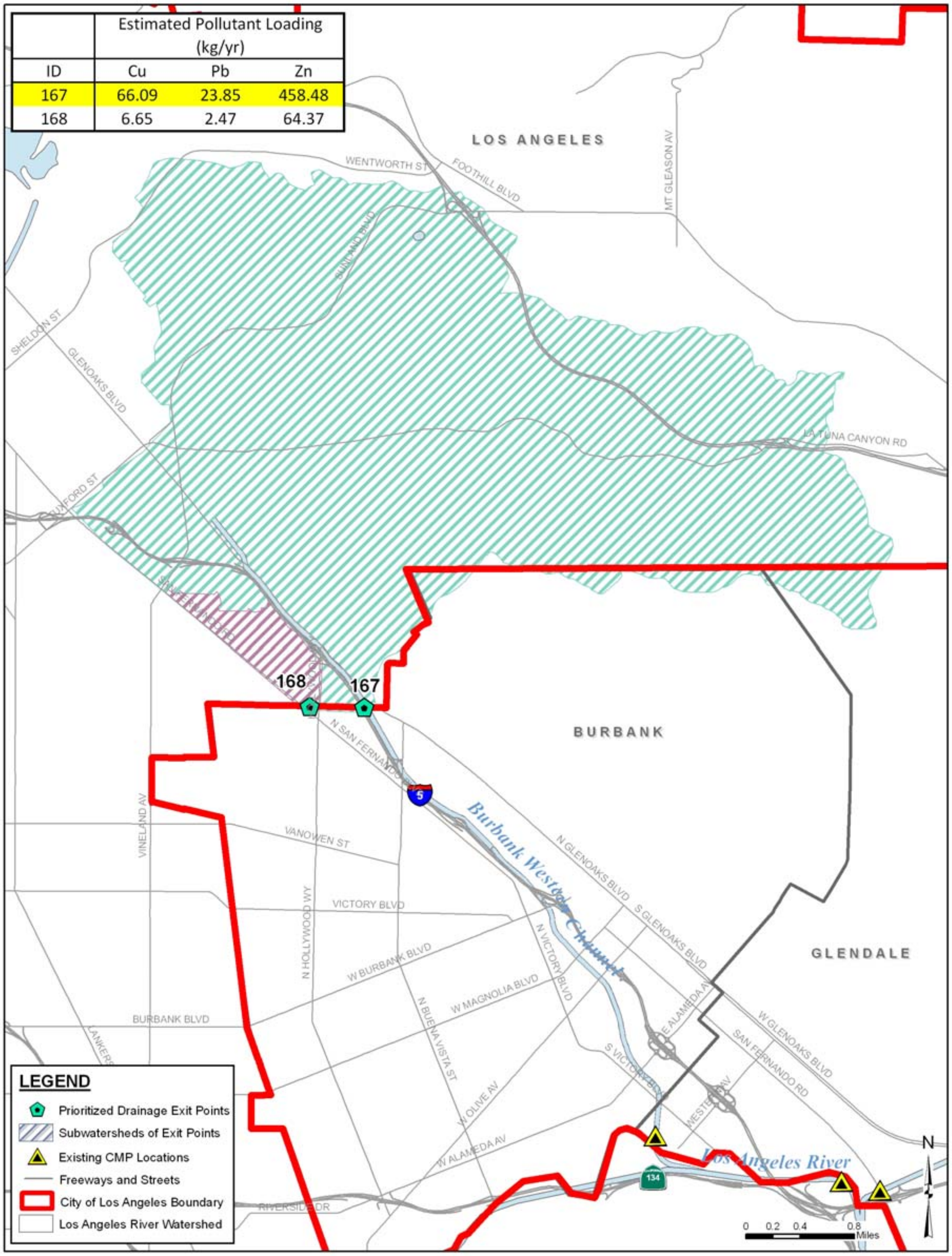


Figure 3: Drainage Areas for Prioritized Exit Points in Los Angeles River Reach 1



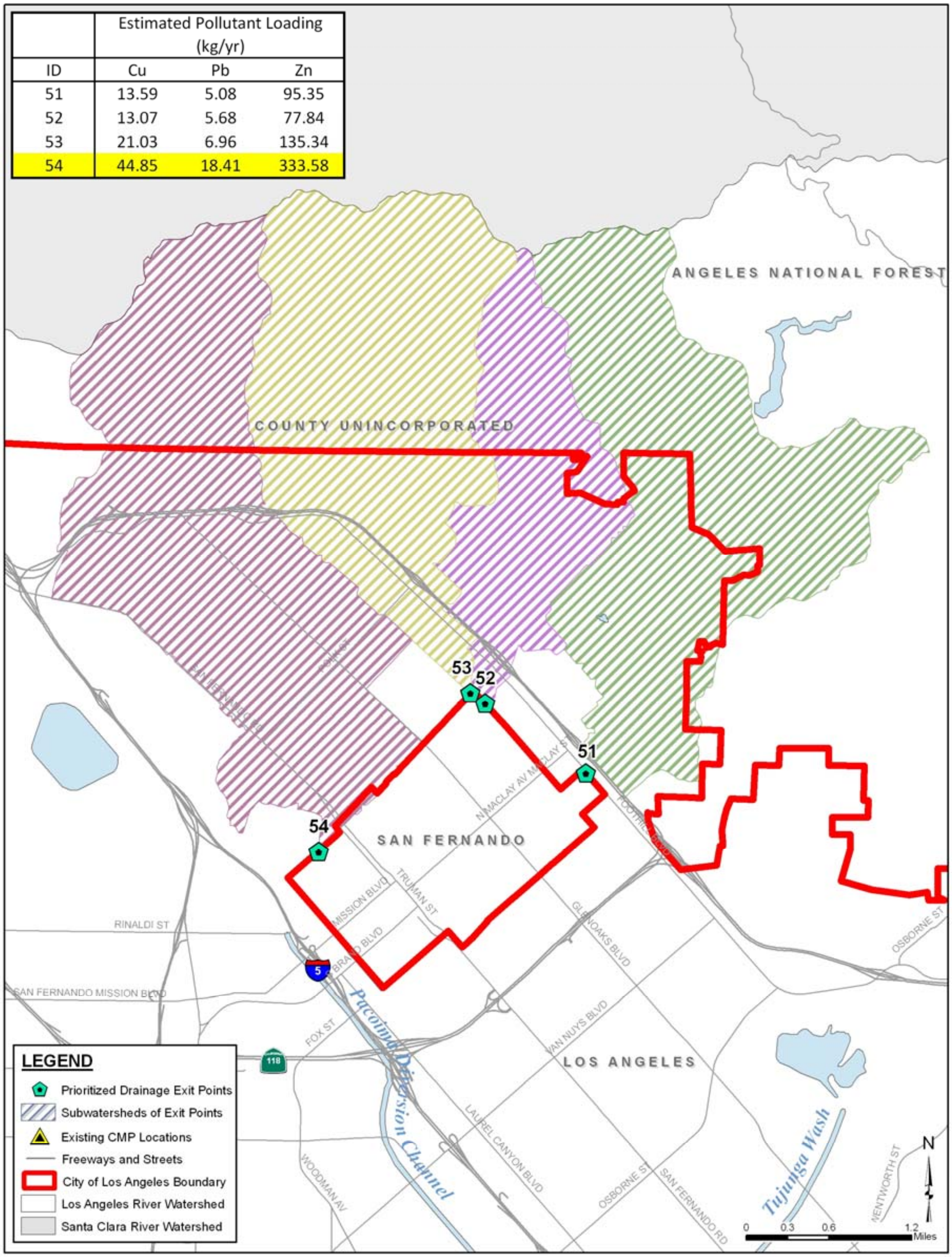
	Estimated Pollutant Loading (kg/yr)		
ID	Cu	Pb	Zn
153	14.76	5.00	145.16
154	1.48	0.62	22.93

Figure 4: Drainage Areas for Prioritized Exit Points in Los Angeles River Reach 2



	Estimated Pollutant Loading (kg/yr)		
ID	Cu	Pb	Zn
167	66.09	23.85	458.48
168	6.65	2.47	64.37

Figure 5: Drainage Areas for Prioritized Exit Points in Los Angeles River Reach 3



	Estimated Pollutant Loading (kg/yr)		
ID	Cu	Pb	Zn
51	13.59	5.08	95.35
52	13.07	5.68	77.84
53	21.03	6.96	135.34
54	44.85	18.41	333.58

Figure 6: Drainage Areas for Prioritized Exit Points in Los Angeles River Reach 4

RECOMMENDED MONITORING SITES

Based on the results as described in the previous section, the following are the proposed monitoring locations for the City of Los Angeles AMP:

Site ID: LAR – R1	**Subwatershed ID:** 126	**Status:** New
Location: 69" Pipe	**Coordinates:** 33.989630° N, 118.251932° W	**Sampling Details:** Grab
Comments: This is a new sampling site located in the neighborhood of South Los Angeles in Reach 1. The drainage from this site flows toward Compton Creek. The sample is to be collected through the manhole on Hooper Street just north of the intersection of Slauson Avenue, across from the alley.		No Photo Available

Site ID: LAR – R2	**Subwatershed ID:** 153	**Status:** New
Location: 110" x 132" Box	**Coordinates:** 34.015075° N, 118.208483° W	**Sampling Details:** Grab
Comments: This is a new sampling site located in the neighborhood of Downtown Los Angeles in Reach 2. The drainage from this site flows toward the Los Angeles River main channel. The sample is to be collected through the manhole across from Emery Street on the west side of Grande Vista Avenue.		

Site ID: LAR – R3	**Subwatershed ID:** 167	**Status:** New
Location: Burbank Western Channel	**Coordinates:** 34.206549° N, 118.342703° W	**Sampling Details:** Grab
Comments: This is a new sampling site located in the neighborhood of Sun Valley in Reach 3. The drainage from this site flows into Burbank Western Channel. The sample is to be collected in the channel on the north side of the intersection at Cohasset Street.		

Site ID: LAR – R4	**Subwatershed ID:** 54	**Status:** New
Location: East Canyon Channel	**Coordinates:** 34.287695° N, 118.452037° W	**Sampling Details:** Grab
Comments: This is a new sampling site located in the neighborhood of Mission Hills in Reach 4. The drainage from this site flows into East Canyon Channel. The sample is to be collected in the channel on the north/west side of the intersection at Hubbard Street.		

Samples from all of these locations will be taken from County drains that represent City of Los Angeles drainage (with the exception of private drains and state agency drainage that are not accounted for in the site determination analysis). AMP monitoring locations will be sampled, observed, and reported in the same manner as Tier I and II monitoring locations that are grab-sampled as specified in the CMP. The monitoring of these sites will be triggered by an exceedance of the Tier I monitoring location that is the most directly downstream of any one AMP site.

ATTACHMENT 1

LARWQCB APPROVAL LETTER OF A SEPARATE IMPLEMENTATION PLAN

JN

California Regional Water Quality Control Board
Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Linda S. Adams
Cal/EPA Secretary

Arnold Schwarzenegger
Governor

April 10, 2009

Shahram Kharaghani, Ph.D, P.E., Stormwater Program Manager
City of Los Angeles, Department of Public Works
Bureau of Sanitation, Watershed Protection Division
1149 South Broadway, 10th Floor
Los Angeles, CA 90015

LOS ANGELES RIVER TOTAL MAXIMUM DAILY LOAD IMPLEMENTATION PLAN FOR THE CITY OF LOS ANGELES

Dear Mr. Kharaghani:

The Los Angeles Regional Water Quality Control Board (Regional Board) received your letter dated March 17, 2009, notifying the Regional Board of the City of Los Angeles' (City) intent to prepare its own implementation plan for the Los Angeles River Metals Total Maximum Daily Load (TMDL), independent of any jurisdictional groups. The Regional Board approves the City's request to be removed from the jurisdictional groups identified in the TMDL and to prepare its own implementation plan.

Please note that the City's implementation plan must include monitoring to demonstrate attainment of waste load allocations assigned to City-owned areas of the watershed according to the TMDL implementation schedule. This may require revisions to the TMDL effectiveness monitoring previously set forth in the Los Angeles River Metals TMDL Coordinated Monitoring Plan, approved by the Regional Board on April 11, 2008. In areas where the City does not drain directly to receiving waters (e.g., jurisdiction 3), the revised TMDL effectiveness monitoring may need to include storm drain outlet monitoring rather than receiving water monitoring in order to accurately demonstrate attainment of waste load allocations assigned to the City.

The Regional Board agrees that cooperative watershed-based planning is the most cost-effective approach to TMDL compliance and encourages the City to pursue such approaches for other TMDLs. I look forward to receiving the City's implementation plan for the Los Angeles River Metals TMDL by January 11, 2010. If you have any questions, please contact Jenny Newman of my staff at (213) 576-6691 or jnewman@waterboards.ca.gov.

Sincerely,

Tracy J. Egoscue
Executive Officer

California Environmental Protection Agency

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Shahram Kharaghani - 2 - Aril 10, 2009

cc:	Romel Pascual	City of Los Angeles, Mayor's Office
	Mike Mullin	City of Los Angeles, Mayor's Office
	Cynthia Ruiz	City of Los Angeles, Board of Public Works
	Enrique Zaldivar	City of Los Angeles, Bureau of Sanitation
	Traci Minamide	City of Los Angeles, Bureau of Sanitation
	Adel Hagekhalil	City of Los Angeles, Bureau of Sanitation
	Paul Thakur	Caltrans
	Bob Wu	Caltrans
	Mark Pestrella	Los Angeles County, Department of Public Works
	Youn Sim	Los Angeles County, Department of Public Works
	Dennis Ahlen	City of Alhambra
	James Cowan	City of Alhambra
	Tom Tait	City of Arcadia
	Marie Rodriguez	City of Arcadia
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	Daniel Rynn	City of Burbank
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	Gerald Greene	City of Downey
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	Carmen Barsu	City of El Monte
	Stephen M. Zurn	City of Glendale
	Maurice Oillataguerre	City of Glendale
	Dirk Lovett	City of Hidden Hills
	Kevin Powers	City of Hidden Hills
	Pat Fu	City of Huntington Park
	Kwok Tam	City of Irwindale
	Edward Hitti	City of La Canada Flintridge
	Golnaz Manouchehrpour	City of La Canada Flintridge
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ATTACHMENT 2

LIST OF ALL DRAINAGE ENTRY AND EXIT POINTS IDENTIFIED

The following table lists all identified drainage entry points into the City of Los Angeles ("IN") and exit points out of the City of Los Angeles ("OUT"). The "Flows Through" column lists the area adjacent to the City of Los Angeles at that point, but does not list all of the jurisdictional areas that drain to that point or that collect drainage from that point. Note that the ID numbers are not necessarily in numerical order as some locations originally spotted by intersecting spatial data in GIS were later removed because they did not accurately depict "in" and "out" drainage.

ID	Flow Direction	Flows Through	Latitude	Longitude
0	IN	HIDDEN HILLS	34.16098383000	-118.64123061600
1	IN	HIDDEN HILLS	34.16039137200	-118.64077791400
2	OUT	HIDDEN HILLS	34.16197688990	-118.64256684900
3	IN	HIDDEN HILLS	34.16298592070	-118.64554770000
4	IN	HIDDEN HILLS	34.17309185170	-118.65864574800
5	IN	CALABASAS	34.14790422230	-118.61140501400
6	IN	CALABASAS	34.14827614900	-118.61219284200
7	IN	CALABASAS	34.15045399680	-118.63032546800
8	IN	CALABASAS	34.15086021940	-118.63165226600
9	IN	CALABASAS	34.15760053440	-118.63871998600
10	IN	COUNTY UNINCORPORATED	34.14418322720	-118.60156502600
22	IN	CITY OF COMMERCE	34.01363939920	-118.19144944900
25	IN	COUNTY UNINCORPORATED	33.94314479730	-118.29166460500
26	IN	COUNTY UNINCORPORATED	33.94551635950	-118.29161295800
27	IN	COUNTY UNINCORPORATED	33.94781281800	-118.29165090500
28	IN	COUNTY UNINCORPORATED	33.95420338440	-118.29158329000
29	IN	COUNTY UNINCORPORATED	33.95792284120	-118.29156628200
30	OUT	COUNTY UNINCORPORATED	33.95954488470	-118.29178162800
31	OUT	COUNTY UNINCORPORATED	33.95960992160	-118.29582605600
32	OUT	COUNTY UNINCORPORATED	33.95750198410	-118.30031205700
33	OUT	COUNTY UNINCORPORATED	33.95215997680	-118.30032285900
44	IN	COUNTY UNINCORPORATED	34.18935067750	-118.65879318000
45	IN	COUNTY UNINCORPORATED	34.19406971570	-118.65687966000
46	IN	COUNTY UNINCORPORATED	34.19654555760	-118.65662006400
47	OUT	COUNTY UNINCORPORATED	34.19591589500	-118.65848753700
48	IN	COUNTY UNINCORPORATED	34.19536131170	-118.66824887500
49	IN	COUNTY UNINCORPORATED	34.20615722020	-118.66801389300
50	IN	COUNTY UNINCORPORATED	34.22091808770	-118.65417289100
51	OUT	SAN FERNANDO	34.29613065020	-118.41814685900
52	OUT	SAN FERNANDO	34.30341882470	-118.43095972800
53	OUT	SAN FERNANDO	34.30453296190	-118.43287914600
54	OUT	SAN FERNANDO	34.28769494380	-118.45203709500
55	IN	SAN FERNANDO	34.28151876700	-118.42932735800
56	IN	SAN FERNANDO	34.27781309340	-118.43375331700
57	IN	SAN FERNANDO	34.27650309480	-118.44719391200
58	IN	SAN FERNANDO	34.28243571290	-118.45361372400
59	IN	COUNTY UNINCORPORATED	34.32509111880	-118.41752020400
60	IN	COUNTY UNINCORPORATED	34.28737220210	-118.40768532200
61	IN	COUNTY UNINCORPORATED	34.27734351400	-118.59272193500
62	IN	COUNTY UNINCORPORATED	34.29283297280	-118.59205070800

ID	Flow Direction	Flows Through	Latitude	Longitude
63	OUT	COUNTY UNINCORPORATED	34.29715109080	-118.59042680000
64	IN	COUNTY UNINCORPORATED	34.30358481290	-118.58514058800
65	IN	COUNTY UNINCORPORATED	34.29925453700	-118.57339016600
66	IN	COUNTY UNINCORPORATED	34.29691566660	-118.55135942400
67	IN	COUNTY UNINCORPORATED	34.29872687810	-118.54081355200
68	IN	COUNTY UNINCORPORATED	34.32067838540	-118.52572585600
69	IN	COUNTY UNINCORPORATED	34.33133948360	-118.49397596200
70	IN	COUNTY UNINCORPORATED	34.33022324580	-118.47746331600
71	IN	COUNTY UNINCORPORATED	34.33014168310	-118.46904892200
72	IN	COUNTY UNINCORPORATED	34.33004567290	-118.46426670400
73	IN	COUNTY UNINCORPORATED	34.32998779040	-118.45943873100
74	IN	COUNTY UNINCORPORATED	34.33022527660	-118.44693409400
75	IN	COUNTY UNINCORPORATED	34.32994583480	-118.42927721400
76	IN	COUNTY UNINCORPORATED	34.32992397940	-118.42860940200
77	IN	COUNTY UNINCORPORATED	34.32851313350	-118.41349981800
78	IN	COUNTY UNINCORPORATED	34.32985515580	-118.41143748700
79	IN	COUNTY UNINCORPORATED	34.32160457140	-118.40358139000
80	OUT	COUNTY UNINCORPORATED	34.32751232910	-118.40489731300
81	IN	COUNTY UNINCORPORATED	34.31959173120	-118.40095125800
82	IN	COUNTY UNINCORPORATED	34.31674091190	-118.39794948900
83	IN	COUNTY UNINCORPORATED	34.29289455100	-118.40008763500
84	IN	COUNTY UNINCORPORATED	34.28415467490	-118.37794270200
85	IN	COUNTY UNINCORPORATED	34.28248882200	-118.37393739300
86	IN	COUNTY UNINCORPORATED	34.28196556260	-118.37044277200
87	IN	COUNTY UNINCORPORATED	34.28594967630	-118.32455326400
88	IN	COUNTY UNINCORPORATED	34.28596505560	-118.31876323000
89	IN	COUNTY UNINCORPORATED	34.28597060130	-118.31664940800
90	IN	COUNTY UNINCORPORATED	34.28591214380	-118.30975622500
91	IN	COUNTY UNINCORPORATED	34.29330890160	-118.29567484700
92	IN	COUNTY UNINCORPORATED	34.29256836060	-118.28638896600
93	OUT	COUNTY UNINCORPORATED	34.27993448960	-118.27361752400
94	OUT	COUNTY UNINCORPORATED	34.28135666970	-118.26875143300
95	OUT	COUNTY UNINCORPORATED	34.28141308410	-118.26038861700
96	OUT	COUNTY UNINCORPORATED	34.28140901240	-118.24403021900
97	OUT	GLENDALE	34.23049065270	-118.26681750000
98	IN	GLENDALE	34.24061067230	-118.26648867700
99	IN	GLENDALE	34.15784419130	-118.30367978800
100	IN	GLENDALE	34.14824924980	-118.27285902900
101	IN	GLENDALE	34.14572960230	-118.27172726400
102	IN	GLENDALE	34.14199769610	-118.26963667800
103	IN	GLENDALE	34.14111088920	-118.26935294800
104	IN	GLENDALE	34.13691162390	-118.26737343100
105	IN	GLENDALE	34.12506288820	-118.26053980800
106	IN	GLENDALE	34.12433285620	-118.25239396800
107	OUT	GLENDALE	34.14026052320	-118.22868080600
108	IN	GLENDALE	34.13563535560	-118.22928602200

ID	Flow Direction	Flows Through	Latitude	Longitude
109	IN	PASADENA	34.13650527500	-118.18590317800
126	OUT	COUNTY UNINCORPORATED	33.98963034320	-118.25193184500
127	OUT	COUNTY UNINCORPORATED	33.98705226450	-118.25629758100
128	OUT	COUNTY UNINCORPORATED	33.98163405070	-118.25639313100
129	OUT	COUNTY UNINCORPORATED	33.97397439580	-118.25625755700
130	OUT	COUNTY UNINCORPORATED	33.96757570500	-118.25618192100
131	OUT	COUNTY UNINCORPORATED	33.96112983430	-118.25633036400
132	IN	COUNTY UNINCORPORATED	33.95318769160	-118.23433534200
133	IN	COUNTY UNINCORPORATED	33.95442349590	-118.24700577700
134	IN	COUNTY UNINCORPORATED	33.95329838900	-118.24902018100
135	IN	COUNTY UNINCORPORATED	33.94736630640	-118.24917067800
136	IN	COUNTY UNINCORPORATED	33.93428005000	-118.22985568800
137	OUT	COUNTY UNINCORPORATED	33.92949822990	-118.23897576800
138	OUT	COUNTY UNINCORPORATED	33.92938417580	-118.24917323500
139	OUT	COUNTY UNINCORPORATED	33.92367640350	-118.25375055900
141	IN	COUNTY UNINCORPORATED	33.92331640080	-118.27386869900
152	OUT	VERNON	34.01452136430	-118.20455564000
153	OUT	VERNON	34.01507512890	-118.20848323300
154	OUT	VERNON	34.01486809890	-118.21986878700
155	OUT	COUNTY UNINCORPORATED	34.06229345250	-118.18110172300
156	IN	COUNTY UNINCORPORATED	34.05643737370	-118.19253688300
157	IN	COUNTY UNINCORPORATED	34.04046387230	-118.19233181100
158	IN	COUNTY UNINCORPORATED	34.03747463030	-118.19232494100
159	IN	ALHAMBRA	34.09198131060	-118.16073080500
160	IN	ALHAMBRA	34.08030492580	-118.16042770200
161	IN	ALHAMBRA	34.07848335200	-118.16042420800
162	IN	SOUTH PASADENA	34.10218599340	-118.17798771400
163	IN	SOUTH PASADENA	34.09860189920	-118.16938988000
164	IN	SOUTH PASADENA	34.09861667800	-118.15849775400
167	OUT	BURBANK	34.20654918490	-118.34270347500
168	OUT	BURBANK	34.20662248920	-118.34973102600
268	OUT	COUNTY UNINCORPORATED	33.92897460710	-118.23028738600
270	OUT	VERNON	34.01281541020	-118.19212063300
271	OUT	COUNTY UNINCORPORATED	33.92897095120	-118.25388615800
272	OUT	VERNON	34.01493415210	-118.22238429600
273	IN	SOUTH PASADENA	34.11622073090	-118.17017419900

Appendix G
BMP Project Cost Estimate Forms

Pierce College Regional BMP Site
Los Angeles River Reach 6

Extended Detention Basin

Site Name: Pierce College Site

Site Location: Priority Catchment BI112

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	1761.00	1761.00
Drainage Area Impervious Cover (IC)*	pct	40%	90.0%	90%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	3,196,215		3,196,215
Flood Detention/Attenuation Volume	ft^3		10,193,040	10,193,040
Channel Protection/Erosion Control Volume**	ft^3			0
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		10,193,040	13,389,255

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.

** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	M		M
Main Pool Volume	yd^3	118,378		118,378
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	29,595		29,595

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Extended Detention Basin

CAPITAL COSTS

Site Name: Pierce College Site
Site Location: Priority Catchment BI112

Choose Capital Costing Option

B	**Total Facility Cost**	**$ 39,093,194**

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	1761.00		1761.00
Base Facility Cost per acre DA*	$ 18,000		$ 18,000
Default Cost Adjustment for Smaller Projects**	1.00		1.00
Resulting Base Cost per acre DA	$ 18,000		$ 18,000
Base Facility Cost (rounded up to nearest $100)	$ 31,698,000		**$ 31,698,000**
Engineering & Planning (default = 25% of Base Cost)	$ 7,924,500		$ 7,924,500
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 7,924,500**
Total Facility Cost	**$ 39,622,500**		**$ 39,622,500**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre
** Smaller projects generally incur higher unit costs for many components; factor added to adjust.
Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	$ 1,104,073	1	$ 1,104,073
Clearing & Grubbing	AC	$ 1,800	39	$ 70,200
Excavation/Embankment	CY	$ 15	415272	$ 6,229,080
Dewatering	LS	$ 10,000	1	$ 10,000
Haul/Dispose of Excavated Material	CY	$ 35	411272	$ 14,394,520
Sediment Pretreatment Struct. (e.g., inlet sump)	LF	$ 24,000	1	$ 24,000
Trash Rack	LF	$ 85	40	$ 3,400
Inflow Structure(s)	EA	$ 15,000	2	$ 30,000
Energy Dissipation Apron	EA	$ 5,000	2	$ 10,000
Outflow Structure	EA	$ 15,000	2	$ 30,000
Overflow Structure (concrete or rock riprap)	CY	$ 750	24	$ 18,000
Embankment	CY	$ 25	4000	$ 100,000
Maintenance Access Ramp/Pad	LS	$ 8,000	1	$ 8,000
Erosion Controls	SY	$ 5	2500	$ 12,500
Traffic Control	LS	$ 30,000	1	$ 30,000
Signage, Public Education Materials, etc.	LS	$ 2,500	1	$ 2,500
Imported Aggegate Fill	CY	$ 25	15730	$ 393,250
36" RCP for inflow & return flow	LF	$ 290	400	$ 116,000
Connection to Existing Storm Drain System (4)	EA	$ 145,000	4	$ 580,000
Misc. Flow Control Device	LS	$ 20,000	1	$ 20,000
Other				$ -
Total Facility Base Cost				**$ 23,185,523**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Project Management		$ 3,477,828	1	$ 3,477,828
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				$ -
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 5,000	1	$ 5,000
Legal Services (2%)		$ 463,710	1	$ 463,710
Permitting & Construction Inspection (3%)		$ 695,566	1	$ 695,566
Sales Tax (9.75%)		$ 1,130,294	1	$ 1,130,294
Contingency (e.g., 35%)		$ 10,135,272	1	$ 10,135,272
Total Associated Capital Costs				**$ 15,907,671**
Total Facility Cost				**$ 39,093,194**

Extended Detention Basin

M | **User entered MEDIUM maintenance level in Sheet 1.**

** Change on Sheet 1 if desired/applicable **

Site Name: Pierce College Site

Site Location: Priority Catchment BI112

Maintenance Costs

User may enter lump sum here

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**
Inspection, Reporting & Information Management	36		**36**	2		**2**	1.0		**1.0**	40		**40**	30		**30**	0		**0**	**140**		**140**
Vegetation Management with Trash & Minor Debris Removal	12		**12**	4		**4**	2.0		**2.0**	30		**30**	60		**60**	0		**0**	**480**		**480**
Vector Control	36	1.5	**2**	0	4	**4**	1.0	3	**3.0**	40		**40**	200		**200**	200		**200**	**200**	1,480	**1,480**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		**12**			**0**			**0.0**			**0**			**0**			**0**	**1,000**		**1,000**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

Cost Item	**Frequency (months betw. maint. events)**			**Sediment Quantity (yds3) [from Sheet 1]**			**Cost per yd3 to Remove, Dispose of Sediment**												**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**										**Model**	**User**	**Input**
Sediment Removal	120		**120**	29,595		**29,595**	25.0		**25.0**										**739,865**		**739,865**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V.
Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Extended Detention Basin

Site Name: Pierce College Site
Site Location: Priority Catchment BI112

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		$23,185,523
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		$15,907,671
Capital Costs	Y		Y		**$39,093,194**

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	3	$140	$47
Vegetation Management with Trash & Minor Debris Removal	Y		Y	1	$480	$480
Vector Control	Y		Y	0.125	$1,480	$11,840
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Regular Maintenance Activities						**$12,367**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	10	$739,865	$73,986
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$74,986**

Extended Detention Basin

Site Name: Pierce College Site
Site Location: Priority Catchment BI112

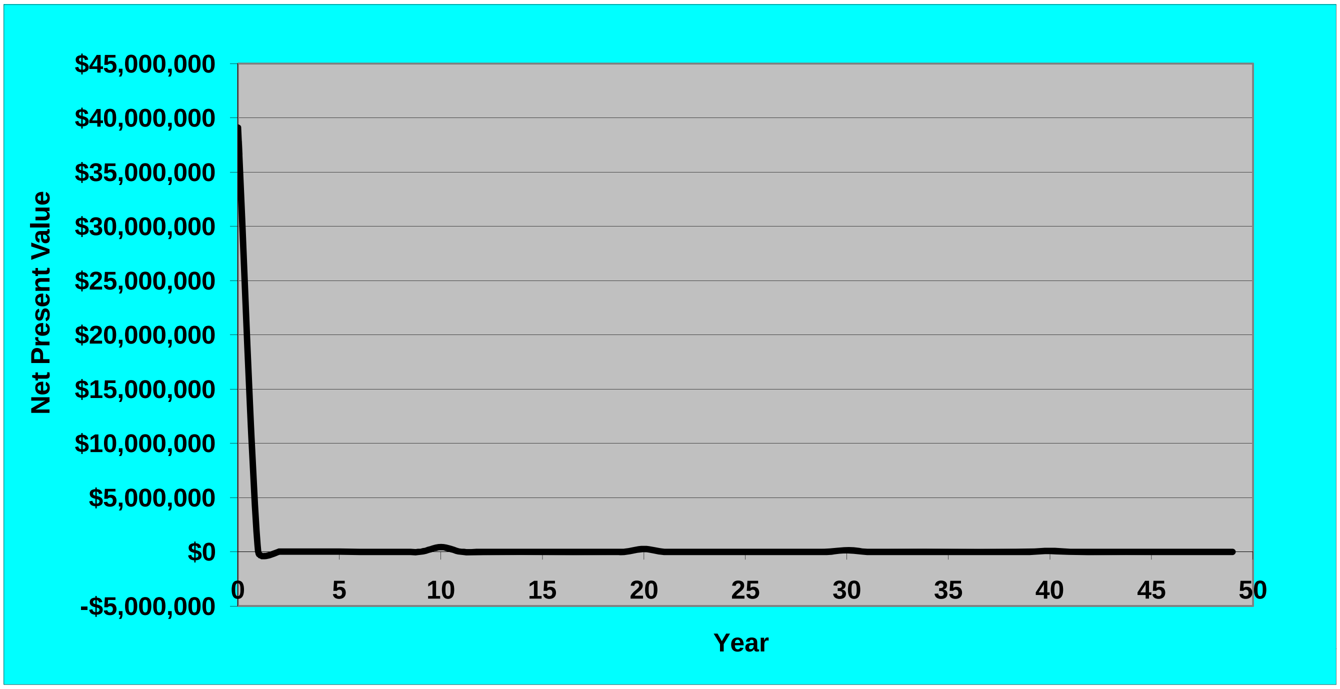
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility Maint.	Sediment Removal	Other [User Entered]	Total Irregular Maint.			Cash	Present Value
Cash Sum ($)								#########	#########		
0	1.000	#########						#########	#########	#########	#########
1	0.948	$ -	**$ 12,367**	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 12,670	#########	#########
2	0.898	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 12,009	#########	#########
3	0.852	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 11,383	#########	#########
4	0.807	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 10,790	#########	#########
5	0.765	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 10,227	#########	#########
6	0.725	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 9,694	#########	#########
7	0.687	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 9,189	#########	#########
8	0.652	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 8,710	#########	#########
9	0.618	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 8,256	#########	#########
10	0.585	$ -	$ 12,367	$ 1,000	$ 739,865	$ -	$ 740,865	$ 753,231	$ 440,965	#########	#########
11	0.555	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 7,417	#########	#########
12	0.526	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 7,031	#########	#########
13	0.499	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 6,664	#########	#########
14	0.473	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 6,317	#########	#########
15	0.448	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 5,987	#########	#########
16	0.425	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 5,675	#########	#########
17	0.402	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 5,379	#########	#########
18	0.381	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 5,099	#########	#########
19	0.362	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 4,833	#########	#########
20	0.343	$ -	$ 12,367	$ 1,000	$ 739,865	$ -	$ 740,865	$ 753,231	$ 258,154	#########	#########
21	0.325	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 4,342	#########	#########
22	0.308	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 4,116	#########	#########
23	0.292	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 3,901	#########	#########
24	0.277	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 3,698	#########	#########
25	0.262	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 3,505	#########	#########
26	0.249	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 3,322	#########	#########
27	0.236	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 3,149	#########	#########
28	0.223	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 2,985	#########	#########
29	0.212	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 2,829	#########	#########
30	0.201	$ -	$ 12,367	$ 1,000	$ 739,865	$ -	$ 740,865	$ 753,231	$ 151,131	#########	#########
31	0.190	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 2,542	#########	#########
32	0.180	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 2,410	#########	#########
33	0.171	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 2,284	#########	#########
34	0.162	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 2,165	#########	#########
35	0.154	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 2,052	#########	#########
36	0.146	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,945	#########	#########
37	0.138	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,844	#########	#########
38	0.131	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,748	#########	#########
39	0.124	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,656	#########	#########
40	0.117	$ -	$ 12,367	$ 1,000	$ 739,865	$ -	$ 740,865	$ 753,231	$ 88,477	#########	#########
41	0.111	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,488	#########	#########
42	0.106	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,411	#########	#########
43	0.100	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,337	#########	#########
44	0.095	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,267	#########	#########
45	0.090	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,201	#########	#########
46	0.085	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,139	#########	#########
47	0.081	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,079	#########	#########
48	0.077	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 1,023	#########	#########
49	0.073	$ -	$ 12,367	$ 1,000	$ -	$ -	$ 1,000	$ 13,367	$ 970	#########	#########
50	0.069	$ 1	$ 12,367	$ 1,000	$ 739,865	$ -	$ 740,865	$ 753,232	$ 51,797	#########	#########

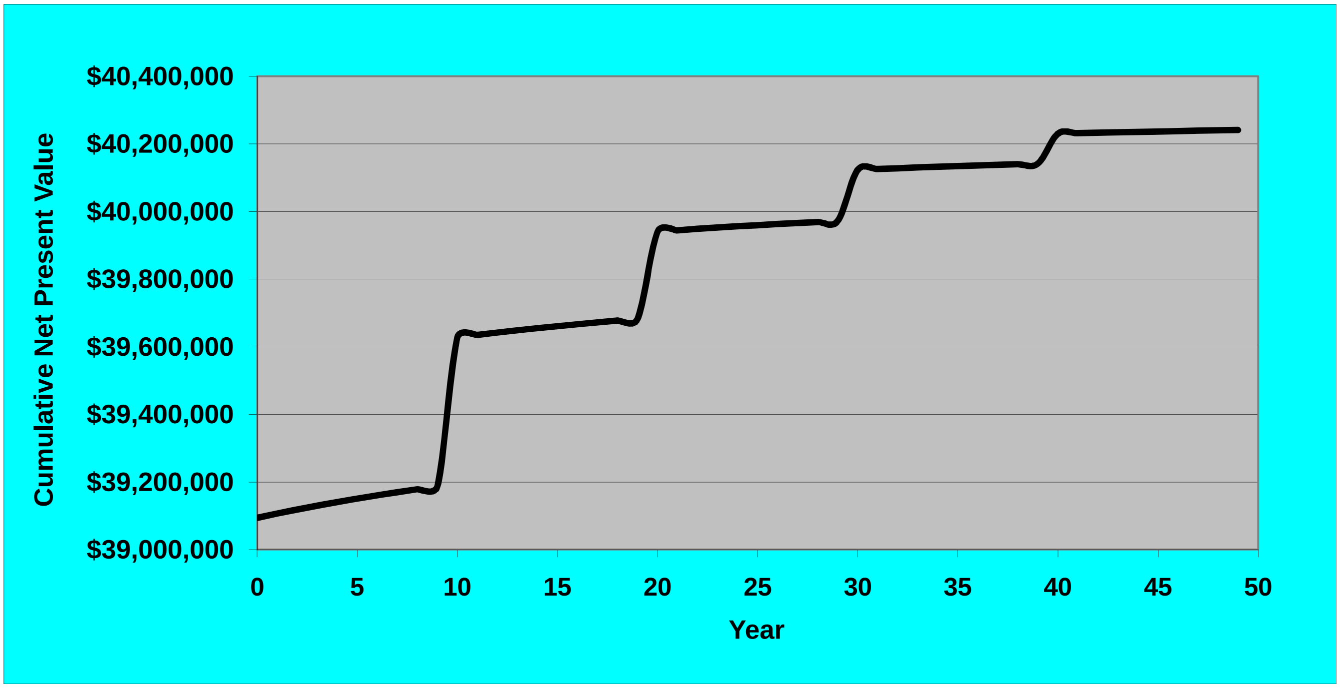
Extended Detention Basin

Site Name: Pierce College Site
Site Location: Priority Catchment BI112

Net Present Value over time



NPV - Cumulative



Van Nuys Sherman Oaks Regional BMP Site
Los Angeles River Reach 4

Extended Detention Basin

Site Name: Van Nuys Sherman Oaks Park

Site Location: Priority Catchment BI9203-1

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	1107.00	1107.00
Drainage Area Impervious Cover (IC)*	pct	60%	90.0%	90%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	2,009,205		2,009,205
Flood Detention/Attenuation Volume	ft^3		7,056,720	7,056,720
Channel Protection/Erosion Control Volume**	ft^3			0
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		7,056,720	9,065,925

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.

** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	H		H
Main Pool Volume	yd^3	74,415		74,415
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	18,604		18,604

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Extended Detention Basin

CAPITAL COSTS

Site Name: Van Nuys Sherman Oaks Park
Site Location: Priority Catchment BI9203-1

Choose Capital Costing Option

B	Total Facility Cost	$ 33,147,776

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	1107.00		1107.00
Base Facility Cost per acre DA*	$ 24,000		$ 24,000
Default Cost Adjustment for Smaller Projects**	1.00		1.00
Resulting Base Cost per acre DA	$ 24,000		$ 24,000
Base Facility Cost (rounded up to nearest $100)	$ 26,568,000		**$ 26,568,000**
Engineering & Planning (default = 25% of Base Cost)	$ 6,642,000		$ 6,642,000
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 6,642,000**
Total Facility Cost	**$ 33,210,000**		**$ 33,210,000**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre
** Smaller projects generally incur higher unit costs for many components; factor added to adjust.
Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	$ 921,564	1	$ 921,564
Clearing & Grubbing	AC	$ 1,800	27	$ 48,600
Demolish	LS	$ 50,000	1	$ 50,000
Excavation/Regrading	CY	$ 15	287496	$ 4,312,440
Dewatering	LS	$ 10,000	1	$ 10,000
Haul/Dispose of Excavated Material	CY	$ 35	279552	$ 9,784,304
Sediment Pretreatment Struct. (e.g., inlet sump)	EA	$ 24,000	2	$ 48,000
Trash Rack	LF	$ 85	160	$ 13,600
Inflow Structure(s)	EA	$ 15,000	4	$ 60,000
Energy Dissipation Apron	EA	$ 5,000	4	$ 20,000
Outflow Structure	EA	$ 15,000	2	$ 30,000
Overflow Structure (concrete or rock riprap)	CY	$ 750	24	$ 18,000
Embankment	CY	$ 25	7944	$ 198,611
Basic Landscape (shrubs, grass ground cover, etc)	SF	$ 10	235224	$ 2,352,240
Basic Irrigation	SF	$ 2	235224	$ 352,836
Maintenance Access Ramp/Pad	LS	$ 20,000	1	$ 20,000
Erosion Controls	SY	$ 5	5778	$ 28,889
Traffic Control	LS	$ 30,000	1	$ 30,000
Amenity Items (e.g. recreational facilities, seating)	LS	$ 100,000	1	$ 100,000
Signage, Public Education Materials, etc.	LS	$ 2,500	1	$ 2,500
24" PVC	LF	$ 165	1200	$ 198,000
48" RCP	LF	$ 385	450	$ 173,250
Connection to Existing Storm Drain System (2)	EA	$ 120,000	2	$ 240,000
Connection to Existing Storm Drain System (4)	EA	$ 40,000	4	$ 160,000
Flow Control Device	EA	$ 20,000	6	$ 120,000
Restroe Existing Baseball Field	LS	$ 60,000	1	$ 60,000
Others				
Total Facility Base Cost				**$ 19,352,834**

Associated Capital Costs	Unit	Unit Cost	Quantity	Cost
Project Management		$ 2,902,925	1	$ 2,902,925
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				$ -
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 387,057	1	$ 387,057
Legal Services (2%)		$ 387,057	1	$ 387,057
Permitting & Construction Inspection (3%)		$ 580,585	1	$ 580,585
Sales Tax (9.75%)		$ 943,451	1	$ 943,451
Contingency (e.g., 35%)		$ 8,593,868	1	$ 8,593,868
Total Associated Capital Costs				**$ 13,794,942**
Total Facility Cost				**$ 33,147,776**

Extended Detention Basin

H | **User entered HIGH maintenance level in Sheet 1.**

** Change on Sheet 1 if desired/applicable **

Site Name: Van Nuys Sherman Oaks Park

Site Location: Priority Catchment BI9203-1

Maintenance Costs

User may enter lump sum here

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**
Inspection, Reporting & Information Management	12		**12**	2		**2**	2.0		**2.0**	50		**50**	30		**30**	0		**0**	**260**		**260**
Vegetation Management with Trash & Minor Debris Removal	1		**1**	5		**5**	3.5		**3.5**	30		**30**	60		**60**	0		**0**	**825**		**825**
Vector Control	1	1.5	**2**	4		**4**	5.0	3	**3.0**	40		**40**	375		**375**	375		**375**	**2,675**	2,355	**2,355**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		**12**			**0**			**0.0**			**0**			**0**			**0**	**1,000**		**1,000**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

Cost Item	**Frequency (months betw. maint. events)**			**Sediment Quantity (yds3) [from Sheet 1]**			**Cost per yd3 to Remove, Dispose of Sediment**												**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**										**Model**	**User**	**Input**
Sediment Removal	72		**72**	18,604		**18,604**	33.0		**33.0**										**613,924**		**613,924**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V. Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Extended Detention Basin

Site Name: Van Nuys Sherman Oaks Park
Site Location: Priority Catchment BI9203-1

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		#########
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		#########
Capital Costs	Y		Y		**#########**

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	1	$260	$260
Vegetation Management with Trash & Minor Debris Removal	Y		Y	0.0833333	$825	$9,900
Vector Control	Y		Y	0.125	$2,355	$18,840
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Regular Maintenance Activities						**$29,000**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	6	$613,924	$102,321
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$103,321**

Extended Detention Basin

Site Name: Van Nuys Sherman Oaks Park
Site Location: Priority Catchment BI9203-1

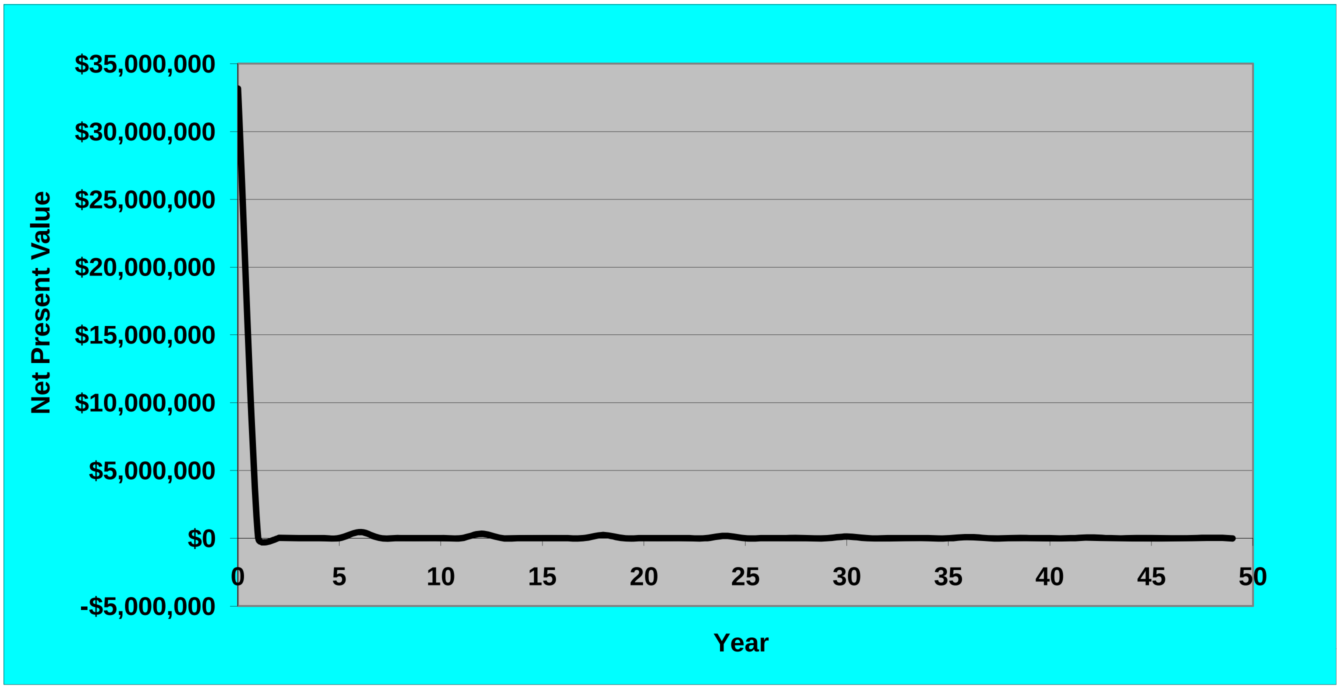
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility Maint.	Sediment Removal	Other [User Entered]	Total Irregular Maint.			Cash	Present Value
Cash Sum ($)								#########	#########		
0	1.000	#########						#########	#########	#########	#########
1	0.948	$ -	**$ 29,000**	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 28,436	#########	#########
2	0.898	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 26,954	#########	#########
3	0.852	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 25,548	#########	#########
4	0.807	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 24,217	#########	#########
5	0.765	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 22,954	#########	#########
6	0.725	$ -	$ 29,000	$ 1,000	$ 613,924	$ -	$ 614,924	$ 643,924	$ 467,003	#########	#########
7	0.687	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 20,623	#########	#########
8	0.652	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 19,548	#########	#########
9	0.618	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 18,529	#########	#########
10	0.585	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 17,563	#########	#########
11	0.555	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 16,647	#########	#########
12	0.526	$ -	$ 29,000	$ 1,000	$ 613,924	$ -	$ 614,924	$ 643,924	$ 338,692	#########	#########
13	0.499	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 14,957	#########	#########
14	0.473	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 14,177	#########	#########
15	0.448	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 13,438	#########	#########
16	0.425	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 12,737	#########	#########
17	0.402	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 12,073	#########	#########
18	0.381	$ -	$ 29,000	$ 1,000	$ 613,924	$ -	$ 614,924	$ 643,924	$ 245,635	#########	#########
19	0.362	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 10,847	#########	#########
20	0.343	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 10,282	#########	#########
21	0.325	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 9,746	#########	#########
22	0.308	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 9,238	#########	#########
23	0.292	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 8,756	#########	#########
24	0.277	$ -	$ 29,000	$ 1,000	$ 613,924	$ -	$ 614,924	$ 643,924	$ 178,146	#########	#########
25	0.262	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,867	#########	#########
26	0.249	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,457	#########	#########
27	0.236	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,068	#########	#########
28	0.223	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 6,700	#########	#########
29	0.212	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 6,350	#########	#########
30	0.201	$ -	$ 29,000	$ 1,000	$ 613,924	$ -	$ 614,924	$ 643,924	$ 129,199	#########	#########
31	0.190	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,706	#########	#########
32	0.180	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,408	#########	#########
33	0.171	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,126	#########	#########
34	0.162	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,859	#########	#########
35	0.154	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,606	#########	#########
36	0.146	$ -	$ 29,000	$ 1,000	$ 613,924	$ -	$ 614,924	$ 643,924	$ 93,701	#########	#########
37	0.138	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,138	#########	#########
38	0.131	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,922	#########	#########
39	0.124	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,718	#########	#########
40	0.117	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,524	#########	#########
41	0.111	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,340	#########	#########
42	0.106	$ -	$ 29,000	$ 1,000	$ 613,924	$ -	$ 614,924	$ 643,924	$ 67,957	#########	#########
43	0.100	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,001	#########	#########
44	0.095	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,845	#########	#########
45	0.090	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,696	#########	#########
46	0.085	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,556	#########	#########
47	0.081	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,422	#########	#########
48	0.077	$ -	$ 29,000	$ 1,000	$ 613,924	$ -	$ 614,924	$ 643,924	$ 49,285	#########	#########
49	0.073	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,176	#########	#########
50	0.069	$ 1	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,001	$ 2,063	#########	#########

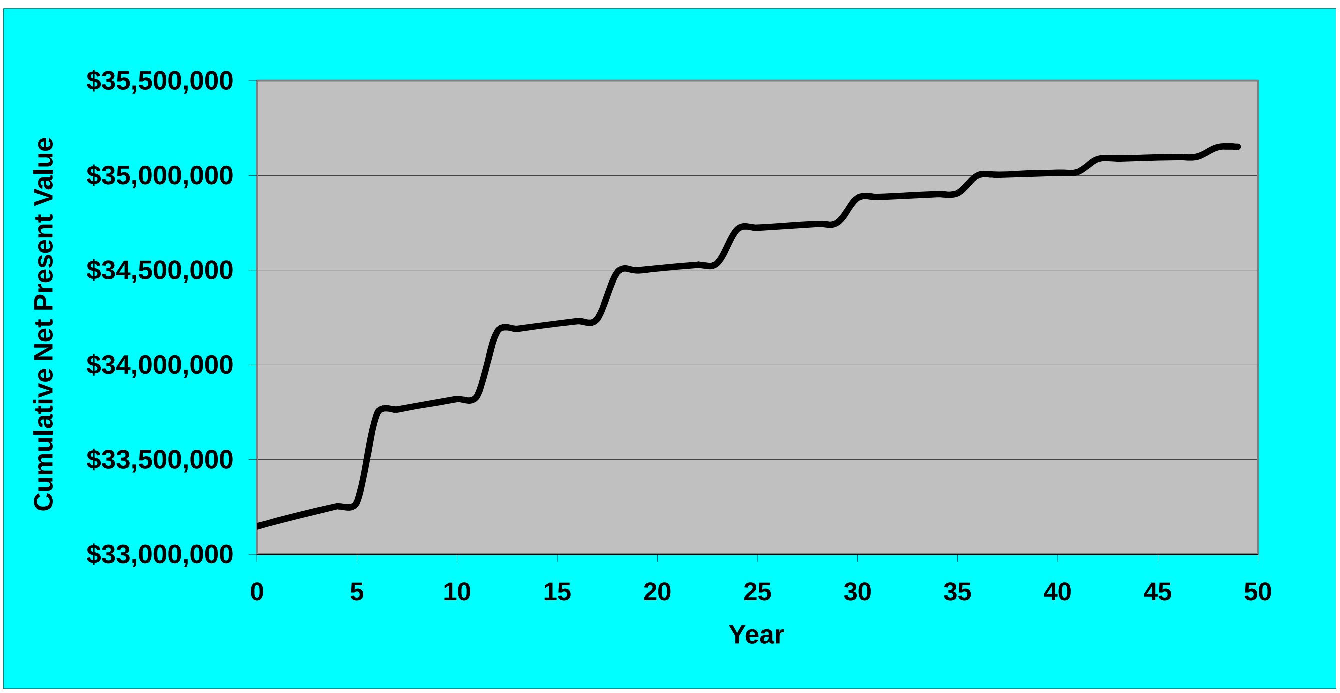
Extended Detention Basin

Site Name: Van Nuys Sherman Oaks Park
Site Location: Priority Catchment BI9203-1

Net Present Value over time



NPV - Cumulative



North Hollywood Park Regional BMP Site
Los Angeles River Reach 4

Extended Detention Basin

Site Name: North Hollywood Park

Site Location: Priority Catchment BI462

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	4363.00	4363.00
Drainage Area Impervious Cover (IC)*	pct	60%		90%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	7,918,845	2,439,360	2,439,360
Flood Detention/Attenuation Volume	ft^3			0
Channel Protection/Erosion Control Volume**	ft^3			0
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		2,439,360	2,439,360

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.

** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	H		H
Main Pool Volume	yd^3	90,347		90,347
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	22,587		22,587

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Extended Detention Basin

CAPITAL COSTS

Site Name: North Hollywood Park
Site Location: Priority Catchment BI462

Choose Capital Costing Option

B	Total Facility Cost	$ 13,551,948

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	4363.00		4363.00
Base Facility Cost per acre DA*	$ 2,500		$ 2,500
Default Cost Adjustment for Smaller Projects**	1.00		1.00
Resulting Base Cost per acre DA	$ 2,500		$ 2,500
Base Facility Cost (rounded up to nearest $100)	$ 10,907,500		**$ 10,907,500**
Engineering & Planning (default = 25% of Base Cost)	$ 2,726,875		$ 2,726,875
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 2,726,875**
Total Facility Cost	**$ 13,634,375**		**$ 13,634,375**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre
** Smaller projects generally incur higher unit costs for many components; factor added to adjust.
Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	$ 382,610	1	$ 382,610
Clearing & Grubbing	AC	$ 1,800	14	$ 25,200
Excavation	CY	$ 15	99382	$ 1,490,730
Dewatering	LS	$ 10,000	1	$ 10,000
Haul/Dispose of Excavated Material	CY	$ 35	96582	$ 3,380,370
Imported Aggegate Fill	CY	$ 25	37268	$ 931,706
Regrading/Recompaction	CY	$ 1	0	$ -
Sediment Pretreatment Struct. (e.g., inlet sump)	LS	$ 24,000	1	$ 24,000
Pumps	EA	$ 50,000	2	$ 100,000
I & C for Pumping System	LS	$ 10,000	1	$ 10,000
Inflow Structure(s)	EA	$ 15,000	1	$ 15,000
Energy Dissipation Apron	EA	$ 5,000	1	$ 5,000
Outflow Structure	EA	$ 15,000	1	$ 15,000
Overflow Structure (concrete or rock riprap)	CY	$ 750	24	$ 18,000
Embankment	CY	$ 25	2800	$ 70,000
Tree Protection/Removal	LS	$ 10,000	1	$ 10,000
Basic Landscape (shrubs, grass ground cover, etc)	SF	$ 10	121968	$ 1,219,680
Basic Irrigation	SF	$ 2	121968	$ 182,952
Maintenance Access Ramp/Pad	LS	$ 2,000	1	$ 2,000
Erosion Controls	SY	$ 5	1694	$ 8,470
Traffic Control	LS	$ 30,000	1	$ 30,000
Amenity Items (e.g. recreational facilities, seating)	LS	$ 32,600	1	$ 32,600
Signage, Public Education Materials, etc.	LS	$ 2,500	1	$ 2,500
Flow Control Device	EA	$ 20,000	2	$ 40,000
36" RCP Diversion Piping	LF	$ 290	100	$ 29,000
Other				$ -
Total Facility Base Cost				**$ 8,034,819**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Project Management		$ 1,205,223	1	$ 1,205,223
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				$ -
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 5,000	1	$ 5,000
Legal Services (2%)		$ 160,696	1	$ 160,696
Permitting & Construction Inspection (3%)		$ 241,045	1	$ 241,045
Sales Tax (9.75%)		$ 391,697	1	$ 391,697
Contingency (e.g., 35%)		$ 3,513,468	1	$ 3,513,468
Total Associated Capital Costs				**$ 5,517,129**
Total Facility Cost				**$ 13,551,948**

Extended Detention Basin

H — User entered HIGH maintenance level in Sheet 1.

** Change on Sheet 1 if desired/applicable **

Site Name: North Hollywood Park

Site Location: Priority Catchment BI462

Maintenance Costs

User may enter lump sum here

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**
Inspection, Reporting & Information Management	12		**12**	2		**2**	2.0		**2.0**	50		**50**	30		**30**	0		**0**	**260**		**260**
Vegetation Management with Trash & Minor Debris Removal	1		**1**	5		**5**	3.5		**3.5**	30		**30**	60		**60**	0		**0**	**825**		**825**
Vector Control	1	1.5	**2**	4		**4**	5.0	3	**3.0**	40		**40**	375		**375**	375		**375**	**2,675**	2,355	**2,355**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		**12**			**0**			**0.0**			**0**			**0**			**0**	**1,000**		**1,000**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

Cost Item	**Frequency (months betw. maint. events)**			**Sediment Quantity (yds3) [from Sheet 1]**			**Cost per yd3 to Remove, Dispose of Sediment**												**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**										**Model**	**User**	**Input**
Sediment Removal	72		**72**	22,587		**22,587**	33.0		**33.0**										**745,360**		**745,360**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V. Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Extended Detention Basin

Site Name: North Hollywood Park
Site Location: Priority Catchment BI462

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		$8,034,819
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		$5,517,129
Capital Costs	Y		Y		#########

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	1	$260	$260
Vegetation Management with Trash & Minor Debris Removal	Y		Y	0.0833333	$825	$9,900
Vector Control	Y		Y	0.125	$2,355	$18,840
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Regular Maintenance Activities						**$29,000**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	6	$745,360	$124,227
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$125,227**

Extended Detention Basin

Site Name: North Hollywood Park
Site Location: Priority Catchment BI462

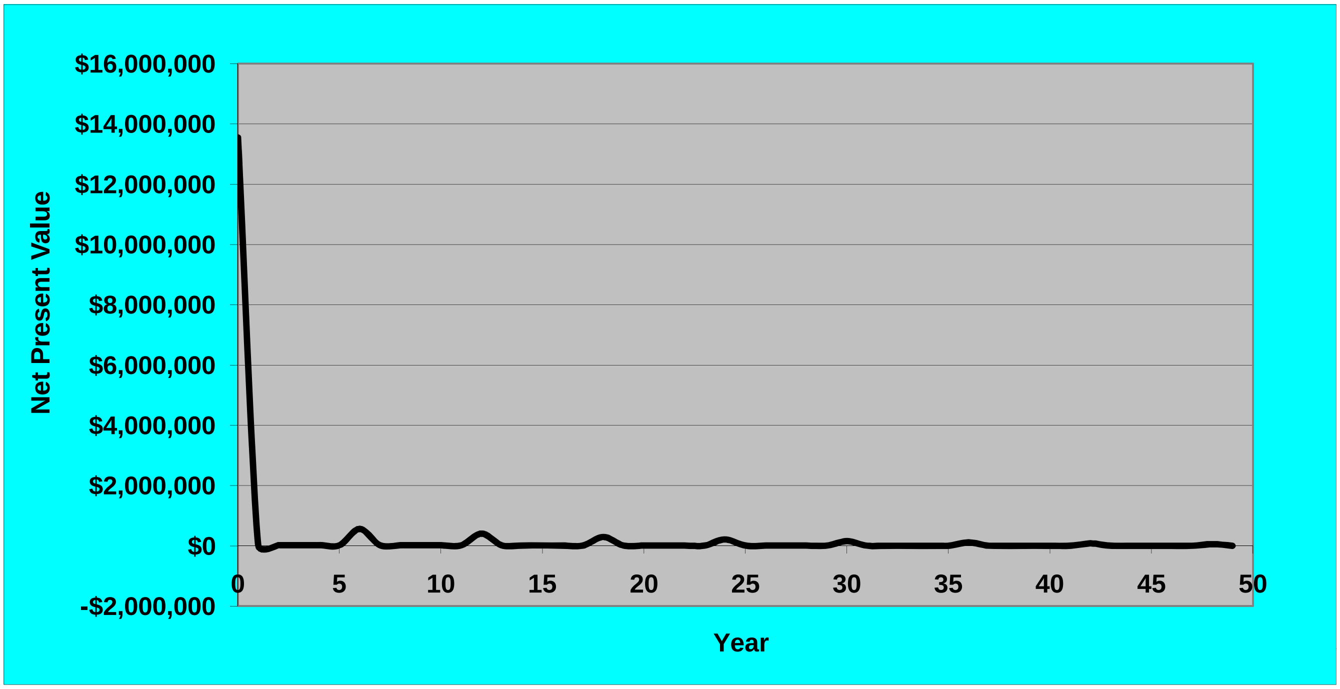
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility Maint.	Sediment Removal	Other [User Entered]	Total Irregular Maint.			Cash	Present Value
Cash Sum ($)								#########	#########		
0	1.000	#########						#########	#########	#########	#########
1	0.948	$ -	**$ 29,000**	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 28,436	#########	#########
2	0.898	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 26,954	#########	#########
3	0.852	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 25,548	#########	#########
4	0.807	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 24,217	#########	#########
5	0.765	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 22,954	#########	#########
6	0.725	$ -	$ 29,000	$ 1,000	$ 745,360	$ -	$ 746,360	$ 775,360	$ 562,327	#########	#########
7	0.687	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 20,623	#########	#########
8	0.652	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 19,548	#########	#########
9	0.618	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 18,529	#########	#########
10	0.585	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 17,563	#########	#########
11	0.555	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 16,647	#########	#########
12	0.526	$ -	$ 29,000	$ 1,000	$ 745,360	$ -	$ 746,360	$ 775,360	$ 407,825	#########	#########
13	0.499	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 14,957	#########	#########
14	0.473	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 14,177	#########	#########
15	0.448	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 13,438	#########	#########
16	0.425	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 12,737	#########	#########
17	0.402	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 12,073	#########	#########
18	0.381	$ -	$ 29,000	$ 1,000	$ 745,360	$ -	$ 746,360	$ 775,360	$ 295,773	#########	#########
19	0.362	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 10,847	#########	#########
20	0.343	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 10,282	#########	#########
21	0.325	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 9,746	#########	#########
22	0.308	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 9,238	#########	#########
23	0.292	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 8,756	#########	#########
24	0.277	$ -	$ 29,000	$ 1,000	$ 745,360	$ -	$ 746,360	$ 775,360	$ 214,508	#########	#########
25	0.262	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,867	#########	#########
26	0.249	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,457	#########	#########
27	0.236	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,068	#########	#########
28	0.223	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 6,700	#########	#########
29	0.212	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 6,350	#########	#########
30	0.201	$ -	$ 29,000	$ 1,000	$ 745,360	$ -	$ 746,360	$ 775,360	$ 155,571	#########	#########
31	0.190	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,706	#########	#########
32	0.180	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,408	#########	#########
33	0.171	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,126	#########	#########
34	0.162	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,859	#########	#########
35	0.154	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,606	#########	#########
36	0.146	$ -	$ 29,000	$ 1,000	$ 745,360	$ -	$ 746,360	$ 775,360	$ 112,827	#########	#########
37	0.138	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,138	#########	#########
38	0.131	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,922	#########	#########
39	0.124	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,718	#########	#########
40	0.117	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,524	#########	#########
41	0.111	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,340	#########	#########
42	0.106	$ -	$ 29,000	$ 1,000	$ 745,360	$ -	$ 746,360	$ 775,360	$ 81,828	#########	#########
43	0.100	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,001	#########	#########
44	0.095	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,845	#########	#########
45	0.090	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,696	#########	#########
46	0.085	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,556	#########	#########
47	0.081	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,422	#########	#########
48	0.077	$ -	$ 29,000	$ 1,000	$ 745,360	$ -	$ 746,360	$ 775,360	$ 59,345	#########	#########
49	0.073	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,176	#########	#########
50	0.069	$ 1	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,001	$ 2,063	#########	#########

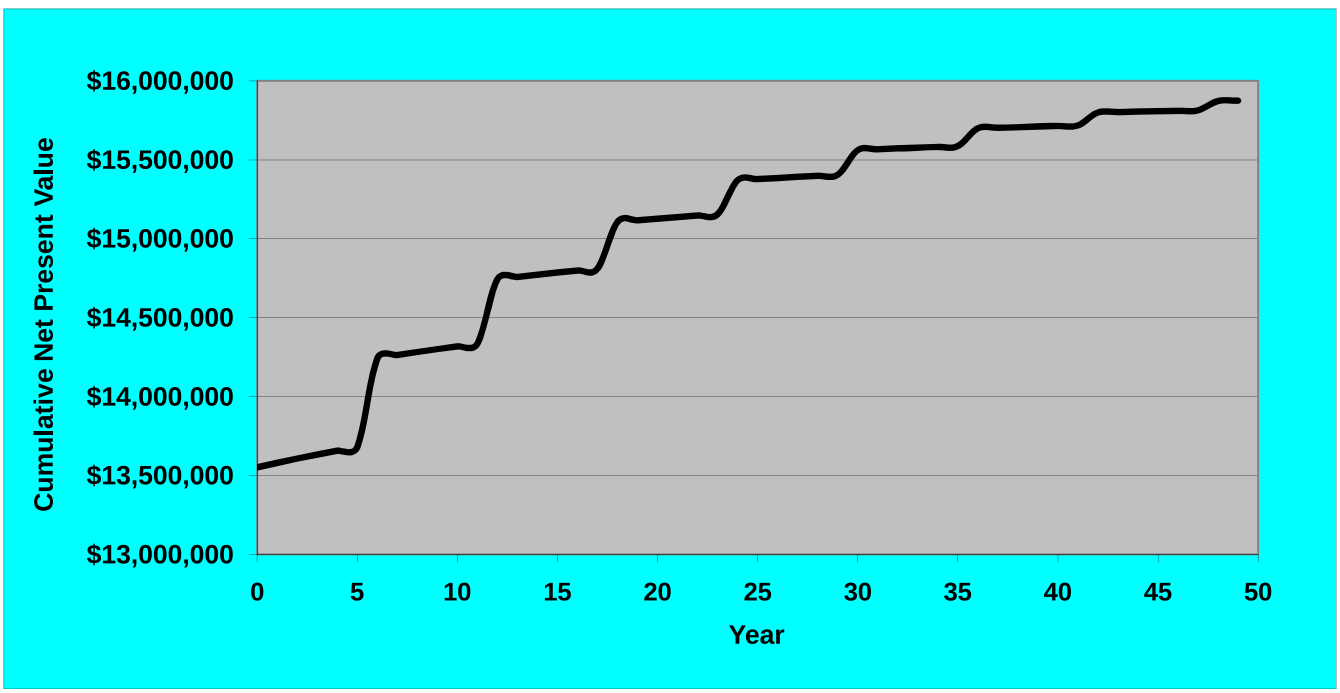
Extended Detention Basin

Site Name: North Hollywood Park
Site Location: Priority Catchment BI462

Net Present Value over time



NPV - Cumulative



Compton Creek Regional BMP Site
Compton Creek

Equalization Basin + Wetland Area

Site Name: Compton Creek

Site Location: Priority Catchment CMPTN-1

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	7100.00	7100.00
Drainage Area Impervious Cover (IC)*	pct	80%	90.0%	90%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	12,886,500		12,886,500
Flood Detention/Attenuation Volume	ft^3		1,030,000	1,030,000
Channel Protection/Erosion Control Volume**	ft^3		1,206,612	1,206,612
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		2,236,612	15,123,112

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.

** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	H		H
Main Pool Volume	yd^3	477,278		477,278
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	119,319		119,319

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Equalization Basin + Wetland Area

CAPITAL COSTS

Site Name: Compton Creek
Site Location: Priority Catchment CMPTN-1

Choose Capital Costing Option

B	**Total Facility Cost**	**$ 14,295,277**

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	7100.00		7100.00
Base Facility Cost per acre DA*	$ 1,610		$ 1,610
Default Cost Adjustment for Smaller Projects**	1.00		1.00
Resulting Base Cost per acre DA	$ 1,610		$ 1,610
Base Facility Cost (rounded up to nearest $100)	$ 11,431,000		**$ 11,431,000**
Engineering & Planning (default = 25% of Base Cost)	$ 2,857,750		$ 2,857,750
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 2,857,750**
Total Facility Cost	**$ 14,288,750**		**$ 14,288,750**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre
** Smaller projects generally incur higher unit costs for many components; factor added to adjust.
Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	$ 400,988	1	$ 400,988
Clearing & Grubbing	AC	$ 1,800	9	$ 15,300
Excavation/Regrading	CY	$ 15	82,274	$ 1,234,103
Dewatering	LS	$ 10,000	1	$ 10,000
Haul/Dispose of Excavated Material	CY	$ 35	76,718	$ 2,685,130
Inflow Structure	EA	$ 15,000	1	$ 15,000
Sediment Pretreatment Struct. (e.g., inlet sump)	LS	$ 24,000	1	$ 24,000
Trash Rack	LF	$ 85	40	$ 3,400
Equalization Basin Slope Stabilization	SF	$ 4	87,800	$ 351,200
Chain-link fence	LF	$ 40	3,000	$ 120,000
Discharge Pump and Vault (7cfs)	EA	$ 30,000	2	$ 60,000
Outflow Diversion Structure, Meter, Valves & Piping	LS	$ 30,000	1	$ 30,000
I & C for Pumping System	LS	$ 6,000	1	$ 6,000
Embankment	CY	$ 25	5,556	$ 138,889
Wetland Vegetation	SF	$ 10	301,435	$ 3,014,352
Access Road	LS	$ 8,000	1	$ 8,000
Erosion Controls	SY	$ 5	2,478	$ 12,389
Traffic Control	LS	$ 30,000	1	$ 30,000
Signage, Public Education Materials, etc.	LS	$ 5,000	1	$ 5,000
Connection to Existing Storm Drain System	EA	$ 120,000	1	$ 120,000
Pipe to Connection	LF	$ 385	200	$ 77,000
18" Diameter Pipe to Channel	LF	$ 120	500	$ 60,000
Outlet Structure	EA	$ 15,000	1	$ 15,000
Flow Control Device	EA	$ 20,000	2	$ 40,000
Others				
Total Facility Base Cost				**$ 8,475,751**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Project Management		$ 1,271,363	1	$ 1,271,363
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				$ -
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 5,000	1	$ 5,000
Legal Services (2%)		$ 169,515	1	$ 169,515
Permitting & Construction Inspection (3%)		$ 254,273	1	$ 254,273
Sales Tax (9.75%)		$ 413,193	1	$ 413,193
Contingency (e.g., 35%)		$ 3,706,183	1	$ 3,706,183
Total Associated Capital Costs				**$ 5,819,526**
Total Facility Cost				**$ 14,295,277**

Basin + Wetland

Site Name: Compton Creek

Site Location: Priority Catchment CMPTN-1

H | **User entered HIGH maintenance level in Sheet 1.**

** Change on Sheet 1 if desired/applicable **

Maintenance Costs

User may enter lump sum here

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Incidentals Cost/Event ($)			Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Inspection, Reporting & Information Management	12		12	2		2	2.0		2.0	50		50	30		30	0		0	260		260
Vegetation Management with Trash & Minor Debris Removal	1		1	5		5	3.5		3.5	30		30	60		60	0		0	825		825
Vector Control	1	1.5	2	4		4	5.0	3	3.0	40		40	375		375	375		375	2,675	2,355	2,355
add additional activities if necessary			0			0			0.0			0			0			0	0		0
add additional activities if necessary			0			0			0.0			0			0			0	0		0

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Incidentals Cost/Event ($)			Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		12			0			0.0			0			0			0	1,000		1,000
add additional activities if necessary			0			0			0.0			0			0			0	0		0
add additional activities if necessary			0			0			0.0			0			0			0	0		0

Cost Item	Frequency (months betw. maint. events)			Sediment Quantity (yds3) [from Sheet 1]			Cost per yd3 to Remove, Dispose of Sediment												Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input										Model	User	Input
Sediment Removal	72		72	######		119,319	33.0		33.0										3,937,542		3,937,542
add additional activities if necessary			0			0			0.0										0		0
add additional activities if necessary			0			0			0.0										0		0

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V.
Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Equalization Basin + Wetland Area

Site Name: Compton Creek
Site Location: Priority Catchment CMPTN-1

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		$8,475,751
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		$5,819,526
Capital Costs	Y		Y		**$14,295,277**

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	1	$260	$260
Vegetation Management with Trash & Minor Debris Removal	Y		Y	0.0833333	$825	$9,900
Vector Control	Y		Y	0.125	$2,355	$18,840
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Regular Maintenance Activities						**$29,000**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	6	$3,937,542	$656,257
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$657,257**

Equalization Basin + Wetland Area

Site Name: Compton Creek
Site Location: Priority Catchment CMPTN-1

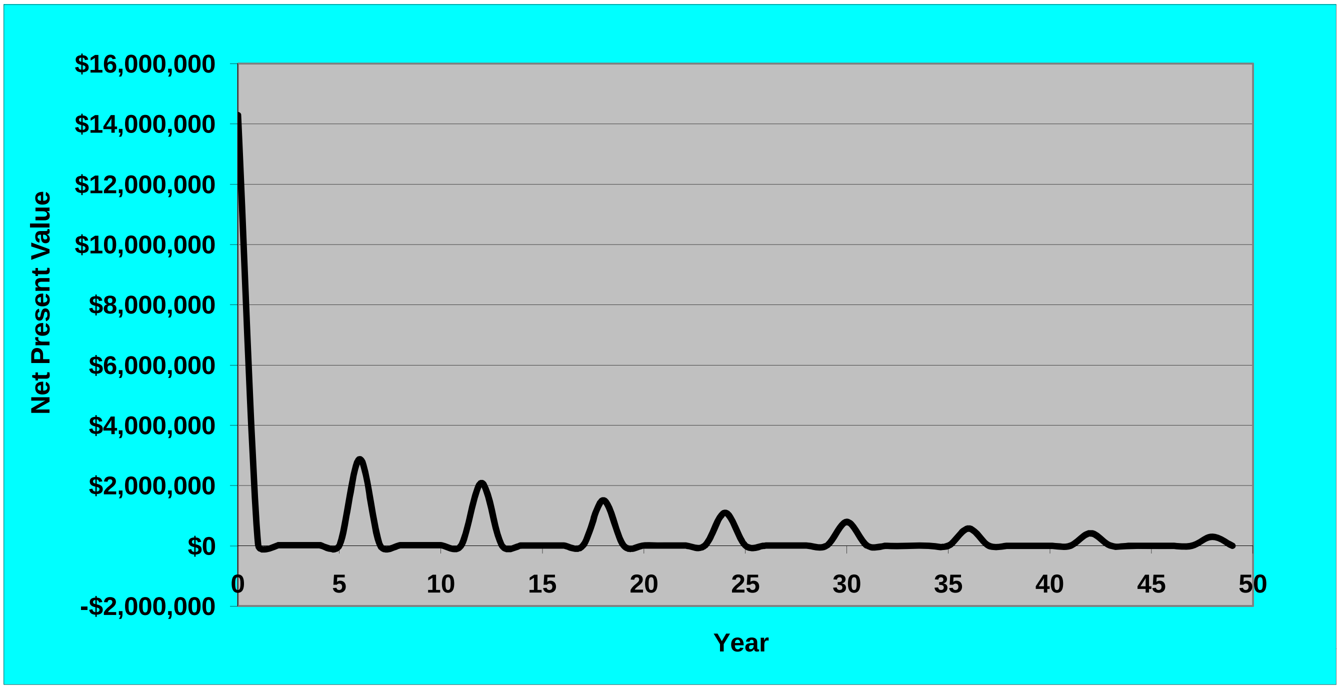
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility	Sediment Removal	Other [User	Total Irregular			Cash	Present Value
Cash Sum ($)								**$ 47,265,610**	**$ 24,399,248**		
0	1.000	**$ 14,295,277**						$ 14,295,277	$ 14,295,277	$ 14,295,277	$ 14,295,277
1	0.948	$ -	**$ 29,000**	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 28,436	$ 14,325,277	$ 14,323,713
2	0.898	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 26,954	$ 14,355,277	$ 14,350,666
3	0.852	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 25,548	$ 14,385,277	$ 14,376,215
4	0.807	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 24,217	$ 14,415,277	$ 14,400,431
5	0.765	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 22,954	$ 14,445,277	$ 14,423,385
6	0.725	$ -	$ 29,000	$ 1,000	$ 3,937,542	$ -	$ 3,938,542	$ 3,967,542	$ 2,877,443	$ 18,412,818	$ 17,300,828
7	0.687	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 20,623	$ 18,442,818	$ 17,321,451
8	0.652	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 19,548	$ 18,472,818	$ 17,340,999
9	0.618	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 18,529	$ 18,502,818	$ 17,359,528
10	0.585	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 17,563	$ 18,532,818	$ 17,377,091
11	0.555	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 16,647	$ 18,562,818	$ 17,393,738
12	0.526	$ -	$ 29,000	$ 1,000	$ 3,937,542	$ -	$ 3,938,542	$ 3,967,542	$ 2,086,854	$ 22,530,360	$ 19,480,592
13	0.499	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 14,957	$ 22,560,360	$ 19,495,549
14	0.473	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 14,177	$ 22,590,360	$ 19,509,726
15	0.448	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 13,438	$ 22,620,360	$ 19,523,164
16	0.425	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 12,737	$ 22,650,360	$ 19,535,901
17	0.402	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 12,073	$ 22,680,360	$ 19,547,975
18	0.381	$ -	$ 29,000	$ 1,000	$ 3,937,542	$ -	$ 3,938,542	$ 3,967,542	$ 1,513,482	$ 26,647,902	$ 21,061,457
19	0.362	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 10,847	$ 26,677,902	$ 21,072,304
20	0.343	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 10,282	$ 26,707,902	$ 21,082,586
21	0.325	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 9,746	$ 26,737,902	$ 21,092,332
22	0.308	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 9,238	$ 26,767,902	$ 21,101,569
23	0.292	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 8,756	$ 26,797,902	$ 21,110,326
24	0.277	$ -	$ 29,000	$ 1,000	$ 3,937,542	$ -	$ 3,938,542	$ 3,967,542	$ 1,097,646	$ 30,765,443	$ 22,207,972
25	0.262	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,867	$ 30,795,443	$ 22,215,839
26	0.249	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,457	$ 30,825,443	$ 22,223,296
27	0.236	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,068	$ 30,855,443	$ 22,230,364
28	0.223	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 6,700	$ 30,885,443	$ 22,237,064
29	0.212	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 6,350	$ 30,915,443	$ 22,243,414
30	0.201	$ -	$ 29,000	$ 1,000	$ 3,937,542	$ -	$ 3,938,542	$ 3,967,542	$ 796,063	$ 34,882,985	$ 23,039,478
31	0.190	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,706	$ 34,912,985	$ 23,045,183
32	0.180	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,408	$ 34,942,985	$ 23,050,591
33	0.171	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,126	$ 34,972,985	$ 23,055,717
34	0.162	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,859	$ 35,002,985	$ 23,060,576
35	0.154	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,606	$ 35,032,985	$ 23,065,182
36	0.146	$ -	$ 29,000	$ 1,000	$ 3,937,542	$ -	$ 3,938,542	$ 3,967,542	$ 577,342	$ 39,000,527	$ 23,642,524
37	0.138	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,138	$ 39,030,527	$ 23,646,661
38	0.131	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,922	$ 39,060,527	$ 23,650,584
39	0.124	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,718	$ 39,090,527	$ 23,654,301
40	0.117	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,524	$ 39,120,527	$ 23,657,825
41	0.111	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,340	$ 39,150,527	$ 23,661,165
42	0.106	$ -	$ 29,000	$ 1,000	$ 3,937,542	$ -	$ 3,938,542	$ 3,967,542	$ 418,715	$ 43,118,068	$ 24,079,880
43	0.100	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,001	$ 43,148,068	$ 24,082,881
44	0.095	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,845	$ 43,178,068	$ 24,085,726
45	0.090	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,696	$ 43,208,068	$ 24,088,422
46	0.085	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,556	$ 43,238,068	$ 24,090,978
47	0.081	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,422	$ 43,268,068	$ 24,093,400
48	0.077	$ -	$ 29,000	$ 1,000	$ 3,937,542	$ -	$ 3,938,542	$ 3,967,542	$ 303,671	$ 47,235,610	$ 24,397,071
49	0.073	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,176	$ 47,265,610	$ 24,399,248
50	0.069	$ 1	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,001	$ 2,063	$ 47,295,611	$ 24,401,311

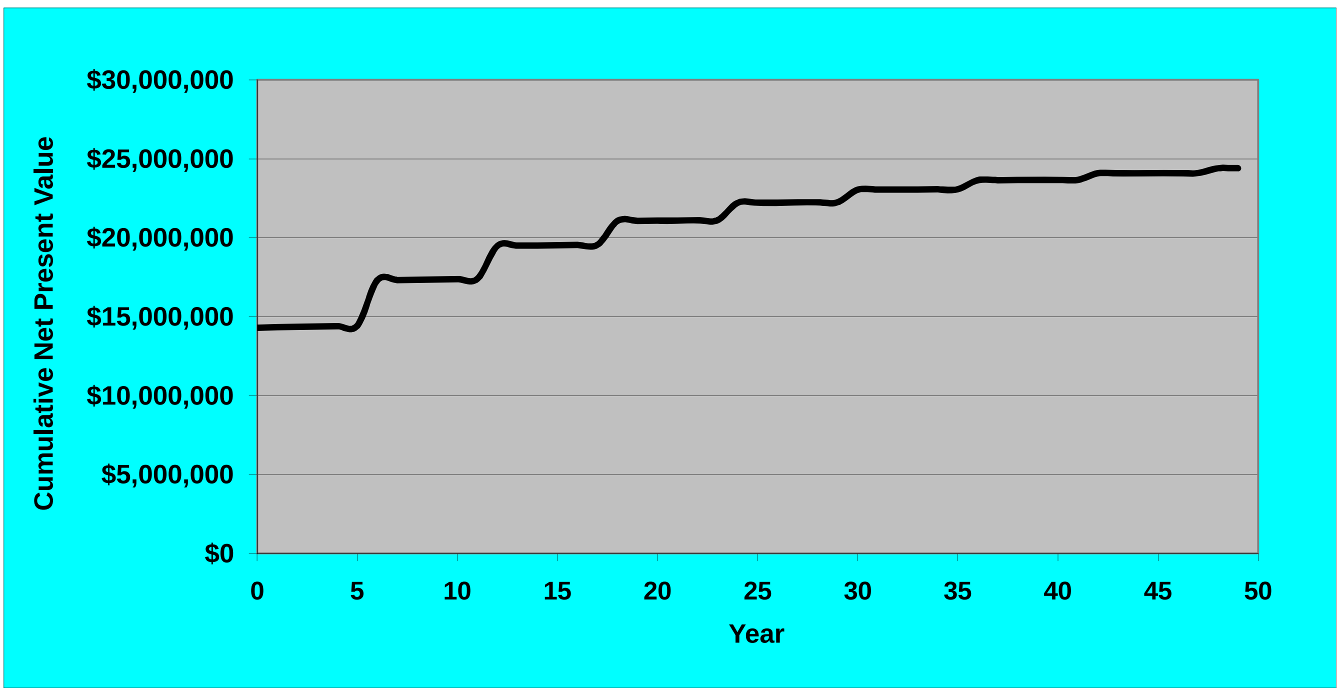
Equalization Basin + Wetland Area

Site Name: Compton Creek
Site Location: Priority Catchment CMPTN-1

Net Present Value over time



NPV - Cumulative



Sunnybrae Avenue Distributed BMP Site
Los Angeles River Reach 6

Combination BMPs

Site Name: Catchment 600954

Site Location: Sunnybrae Ave

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	29.20	29.20
Drainage Area Impervious Cover (IC)*	pct	80%		80%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	52,998		52,998
Flood Detention/Attenuation Volume	ft^3			0
Channel Protection/Erosion Control Volume**	ft^3			0
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		0	52,998

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.

** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	H		H
Main Pool Volume	yd^3	1,963		1,963
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	491		491

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Combination BMPs

CAPITAL COSTS

Site Name: Catchment 600954
Site Location: Sunnybrae Ave

Choose Capital Costing Option

B	Total Facility Cost	$ 1,135,583

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	29.20		29.20
Base Facility Cost per acre DA*	$ 21,000		$ 21,000
Default Cost Adjustment for Smaller Projects**	1.81		1.81
Resulting Base Cost per acre DA	$ 37,968		$ 37,968
Base Facility Cost (rounded up to nearest $100)	$ 1,108,700		**$ 1,108,700**
Engineering & Planning (default = 25% of Base Cost)	$ 277,175		$ 277,175
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 277,175**
Total Facility Cost	**$ 1,385,875**		**$ 1,385,875**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre
** Smaller projects generally incur higher unit costs for many components; factor added to adjust.
Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	31,571	1	$ 31,571
Cisterns	EA	40,000	2	$ 80,000
Permeable Pavement	AC	435,600	0.47	$ 204,732
Green Street/Bioretention Area	LF	72	3095	$ 222,872
Bioretention Area with Under Drains	LF	120	1032	$ 123,818
Total Facility Base Cost				**$ 662,993**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Project Management		$ 99,449	1	$ 99,449
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 13,260	1	$ 13,260
Legal Services (2%)		$ 13,260	1	$ 13,260
Permitting & Construction Inspection (3%)		$ 19,890	1	$ 19,890
Sales Tax (9.75%)		$ 32,321	1	$ 32,321
Contingency (e.g., 35%)		$ 294,410	1	$ 294,410
Total Associated Capital Costs				**$ 472,590**
Total Facility Cost				**$ 1,135,583**

Combination BMPs

Site Name: Catchment 600954

Site Location: Sunnybrae Ave

Maintenance Costs

H | **User entered HIGH maintenance level in Sheet 1.**

** Change on Sheet 1 if desired/applicable **

User may enter lump sum here

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Inciden-tals Cost/Event ($)			Total cost per visit ($)		
ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)																					
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Inspection, Reporting & Information Management	12		**12**	2		**2**	2.0		**2.0**	50		**50**	30		**30**	0		**0**	**260**		**260**
Vegetation Management with Trash & Minor Debris Removal	1		**1**	5		**5**	3.5		**3.5**	30		**30**	60		**60**	0		**0**	**825**		**825**
Vector Control	1	1.5	**2**	4		**4**	5.0	3	**3.0**	40		**40**	375		**375**	375		**375**	**2,675**	2,355	**2,355**
Cistern Pumping and water hauling		2	**2**		4	**4**		1	**1.0**		40	**40**		185	**185**			**0**	**0**	900	**900**
Permeable Pavement Sweeping	12		**12**	1		**1**	1.0		**1.0**	20		**20**	60		**60**	0		**0**	**80**		**80**
CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		**12**			**0**			**0.0**			**0**			**0**			**0**	**1,000**		**1,000**
Remove existing pavement & aggregate; wash and/or replace & reinstall*		420	**420**			**0**			**0.0**			**0**			**0**		204,732	**204,732**		**204,732**	**204,732**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
Cost Item	**Frequency (months betw. maint. events)**			**Sediment Quantity (yds3) [from Sheet 1]**			**Cost per yd3 to Remove, Dispose of Sediment**												**Total cost per visit ($)**		
	Model	User	Input	Model	User	Input	Model	User	Input										Model	User	Input
Sediment Removal	72		**72**	491		**491**	33.0		**33.0**										**16,194**		**16,194**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V. Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Combination BMPs

Site Name: Catchment 600954
Site Location: Sunnybrae Ave

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		$662,993
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		$472,590
Capital Costs	Y		Y		**$1,135,583**

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	1	$260	$260
Vegetation Management with Trash & Minor Debris Removal	Y		Y	0.0833333	$825	$9,900
Vector Control	Y		Y	0.125	$2,355	$18,840
Cistern Pumping and water hauling	Y		Y	0.1666667	$900	$5,400
Permeable Pavement Sweeping	Y		Y	1	$80	$80
Totals, Regular Maintenance Activities						**$34,480**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	6	$16,194	$2,699
*Remove existing pavement & aggregate; wash and/or replace & reinstall**	Y		Y	35	$204,732	$5,849
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$9,548**

Combination BMPs

Site Name: Catchment 600954
Site Location: Sunnybrae Ave

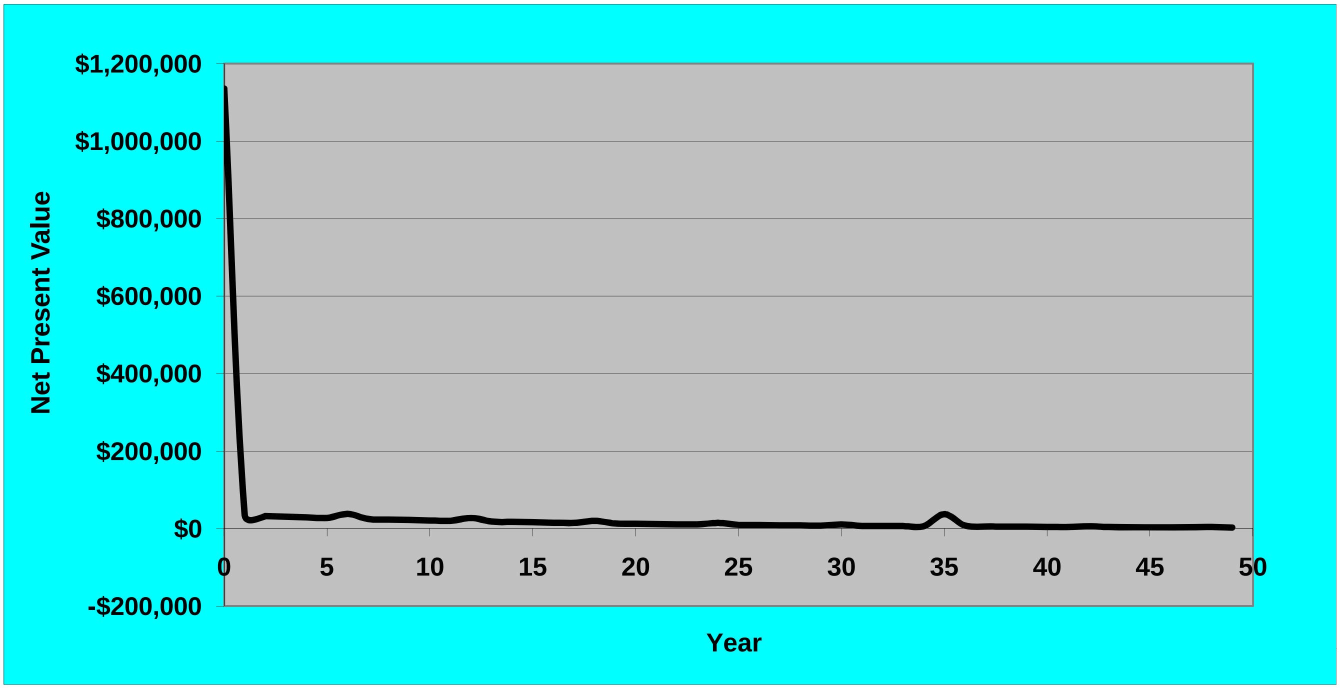
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility	Sediment Removal	Other [User	Total Irregular			Cash	Present Value
Cash Sum ($)								**$ 3,208,385**	**$ 1,804,777**		
0	1.000	**$ 1,135,583**						$ 1,135,583	$ 1,135,583	$ 1,135,583	$ 1,135,583
1	0.948	$ -	**$ 34,480**	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 33,630	$ 1,171,063	$ 1,169,213
2	0.898	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 31,877	$ 1,206,543	$ 1,201,090
3	0.852	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 30,215	$ 1,242,023	$ 1,231,305
4	0.807	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 28,640	$ 1,277,503	$ 1,259,945
5	0.765	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 27,147	$ 1,312,983	$ 1,287,092
6	0.725	$ -	$ 34,480	$ 1,000	$ 16,194	$ -	$ 17,194	$ 51,674	$ 37,476	$ 1,364,656	$ 1,324,569
7	0.687	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 24,390	$ 1,400,136	$ 1,348,959
8	0.652	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 23,119	$ 1,435,616	$ 1,372,077
9	0.618	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 21,913	$ 1,471,096	$ 1,393,991
10	0.585	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 20,771	$ 1,506,576	$ 1,414,762
11	0.555	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 19,688	$ 1,542,056	$ 1,434,450
12	0.526	$ -	$ 34,480	$ 1,000	$ 16,194	$ -	$ 17,194	$ 51,674	$ 27,179	$ 1,593,730	$ 1,461,630
13	0.499	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 17,689	$ 1,629,210	$ 1,479,319
14	0.473	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 16,767	$ 1,664,690	$ 1,496,085
15	0.448	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 15,893	$ 1,700,170	$ 1,511,978
16	0.425	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 15,064	$ 1,735,650	$ 1,527,042
17	0.402	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 14,279	$ 1,771,130	$ 1,541,321
18	0.381	$ -	$ 34,480	$ 1,000	$ 16,194	$ -	$ 17,194	$ 51,674	$ 19,712	$ 1,822,804	$ 1,561,033
19	0.362	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 12,829	$ 1,858,284	$ 1,573,862
20	0.343	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 12,160	$ 1,893,764	$ 1,586,022
21	0.325	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 11,526	$ 1,929,244	$ 1,597,548
22	0.308	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 10,925	$ 1,964,724	$ 1,608,473
23	0.292	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 10,356	$ 2,000,204	$ 1,618,829
24	0.277	$ -	$ 34,480	$ 1,000	$ 16,194	$ -	$ 17,194	$ 51,674	$ 14,296	$ 2,051,878	$ 1,633,125
25	0.262	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 9,304	$ 2,087,358	$ 1,642,429
26	0.249	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 8,819	$ 2,122,838	$ 1,651,248
27	0.236	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 8,359	$ 2,158,318	$ 1,659,607
28	0.223	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 7,923	$ 2,193,798	$ 1,667,530
29	0.212	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 7,510	$ 2,229,278	$ 1,675,041
30	0.201	$ -	$ 34,480	$ 1,000	$ 16,194	$ -	$ 17,194	$ 51,674	$ 10,368	$ 2,280,952	$ 1,685,409
31	0.190	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 6,748	$ 2,316,432	$ 1,692,156
32	0.180	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 6,396	$ 2,351,912	$ 1,698,552
33	0.171	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 6,063	$ 2,387,392	$ 1,704,615
34	0.162	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 5,746	$ 2,422,872	$ 1,710,361
35	0.154	$ -	$ 34,480	$ 1,000	$ -	$ 204,732	$ 205,732	$ 240,212	$ 36,877	$ 2,663,084	$ 1,747,239
36	0.146	$ -	$ 34,480	$ 1,000	$ 16,194	$ -	$ 17,194	$ 51,674	$ 7,519	$ 2,714,758	$ 1,754,758
37	0.138	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 4,894	$ 2,750,238	$ 1,759,652
38	0.131	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 4,639	$ 2,785,718	$ 1,764,290
39	0.124	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 4,397	$ 2,821,198	$ 1,768,687
40	0.117	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 4,168	$ 2,856,678	$ 1,772,855
41	0.111	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,950	$ 2,892,158	$ 1,776,805
42	0.106	$ -	$ 34,480	$ 1,000	$ 16,194	$ -	$ 17,194	$ 51,674	$ 5,453	$ 2,943,831	$ 1,782,259
43	0.100	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,549	$ 2,979,311	$ 1,785,808
44	0.095	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,364	$ 3,014,791	$ 1,789,172
45	0.090	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,189	$ 3,050,271	$ 1,792,361
46	0.085	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,023	$ 3,085,751	$ 1,795,383
47	0.081	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 2,865	$ 3,121,231	$ 1,798,248
48	0.077	$ -	$ 34,480	$ 1,000	$ 16,194	$ -	$ 17,194	$ 51,674	$ 3,955	$ 3,172,905	$ 1,802,203
49	0.073	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 2,574	$ 3,208,385	$ 1,804,777
50	0.069	$ 1	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,481	$ 2,440	$ 3,243,866	$ 1,807,217

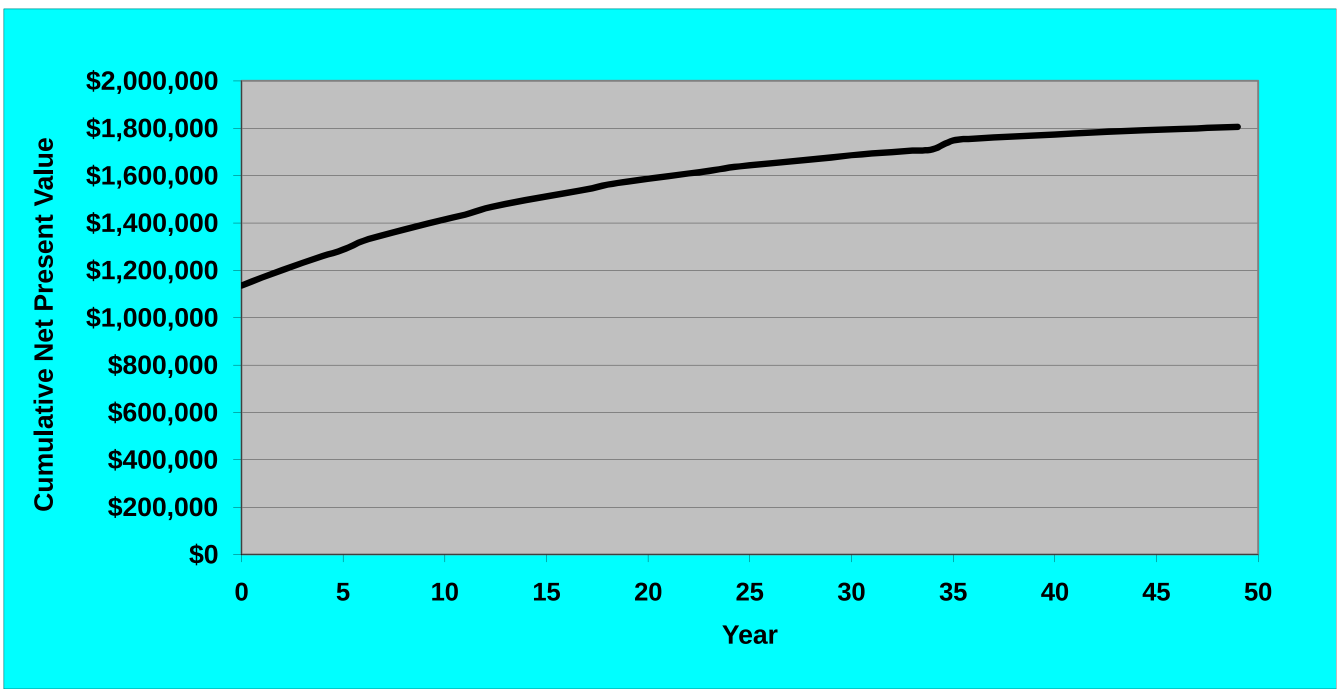
Combination BMPs

Site Name: Catchment 600954
Site Location: Sunnybrae Ave

Net Present Value over time



NPV - Cumulative



Tyrone Avenue Distributed BMP Site
Los Angeles River Reach 4

Combination BMPs

Site Name: Catchment 611527

Site Location: Tyrone Ave

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	25.50	25.50
Drainage Area Impervious Cover (IC)*	pct	80%		80%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	46,283		46,283
Flood Detention/Attenuation Volume	ft^3			0
Channel Protection/Erosion Control Volume**	ft^3			0
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		0	46,283

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.

** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	H		H
Main Pool Volume	yd^3	1,714		1,714
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	429		429

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Combination BMPs

CAPITAL COSTS

Site Name: Catchment 611527
Site Location: Tyrone Ave

Choose Capital Costing Option

B	Total Facility Cost	$ 447,355

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	25.50		25.50
Base Facility Cost per acre DA*	$ 21,000		$ 21,000
Default Cost Adjustment for Smaller Projects**	1.85		1.85
Resulting Base Cost per acre DA	$ 38,745		$ 38,745
Base Facility Cost (rounded up to nearest $100)	$ 988,000		**$ 988,000**
Engineering & Planning (default = 25% of Base Cost)	$ 247,000		$ 247,000
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 247,000**
Total Facility Cost	**$ 1,235,000**		**$ 1,235,000**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre

** Smaller projects generally incur higher unit costs for many components; factor added to adjust.

Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	12,437	1	$ 12,437
Cisterns	EA	60,000	1	$ 60,000
Permeable Pavement	AC	435,600	0.08	$ 34,848
Green Street/Bioretention Area	LF	72	1374	$ 98,933
Bioretention Area with Under Drains	LF	120	458	$ 54,963
Total Facility Base Cost				**$ 261,182**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Project Management		$ 39,177	1	$ 39,177
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 5,224	1	$ 5,224
Legal Services (2%)		$ 5,224	1	$ 5,224
Permitting & Construction Inspection (3%)		$ 7,835	1	$ 7,835
Sales Tax (9.75%)		$ 12,733	1	$ 12,733
Contingency (e.g., 35%)		$ 115,981	1	$ 115,981
Total Associated Capital Costs				**$ 186,174**
Total Facility Cost				**$ 447,355**

Combination BMPs

Site Name: Catchment 611527

Site Location: Tyrone Ave

Maintenance Costs

H	User entered HIGH maintenance level in Sheet 1.

** Change on Sheet 1 if desired/applicable **

User may enter lump sum here

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Inciden-tals Cost/Event ($)			Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Inspection, Reporting & Information Management	12		**12**	2		**2**	2.0		**2.0**	50		**50**	30		**30**	0		**0**	**260**		**260**
Vegetation Management with Trash & Minor Debris Removal	1		**1**	5		**5**	3.5		**3.5**	30		**30**	60		**60**	0		**0**	**825**		**825**
Vector Control	1	2	**2**	4		**4**	5.0	3	**3.0**	40		**40**	375		**375**	375		**375**	**2,675**	2,355	**2,355**
Cistern Pumping and water hauling		2	**2**		4	**4**		1	**1.0**		40	**40**		185	**185**			**0**	**0**	900	**900**
Permeable Pavement Sweeping	12		**12**	1		**1**	1.0		**1.0**	20		**20**	60		**60**	0		**0**	**80**		**80**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Inciden-tals Cost/Event ($)			Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		**12**			**0**			**0.0**			**0**			**0**			**0**	**1,000**		**1,000**
Remove existing pavement & aggregate; wash and/or replace & reinstall*		420	**420**			**0**			**0.0**			**0**			**0**		34,848	**34,848**		**34,848**	**34,848**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

Cost Item	Frequency (months betw. maint. events)			Sediment Quantity (yds3) [from Sheet 1]			Cost per yd3 to Remove, Dispose of Sediment												Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input										Model	User	Input
Sediment Removal	72		**72**	429		**429**	33.0		**33.0**										**14,142**		**14,142**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V.
Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Combination BMPs

Site Name: Catchment 611527
Site Location: Tyrone Ave

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		$261,182
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		$186,174
Capital Costs	Y		Y		**$447,355**

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	1	$260	$260
Vegetation Management with Trash & Minor Debris Removal	Y		Y	0.0833333	$825	$9,900
Vector Control	Y		Y	0.125	$2,355	$18,840
Cistern Pumping and water hauling	Y		Y	0.1666667	$900	$5,400
Permeable Pavement Sweeping	Y		Y	1	$80	$80
Totals, Regular Maintenance Activities						**$34,480**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	6	$14,142	$2,357
*Remove existing pavement & aggregate; wash and/or replace & reinstall**	Y		Y	35	$34,848	$996
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$4,353**

Combination BMPs

Site Name: Catchment 611527
Site Location: Tyrone Ave

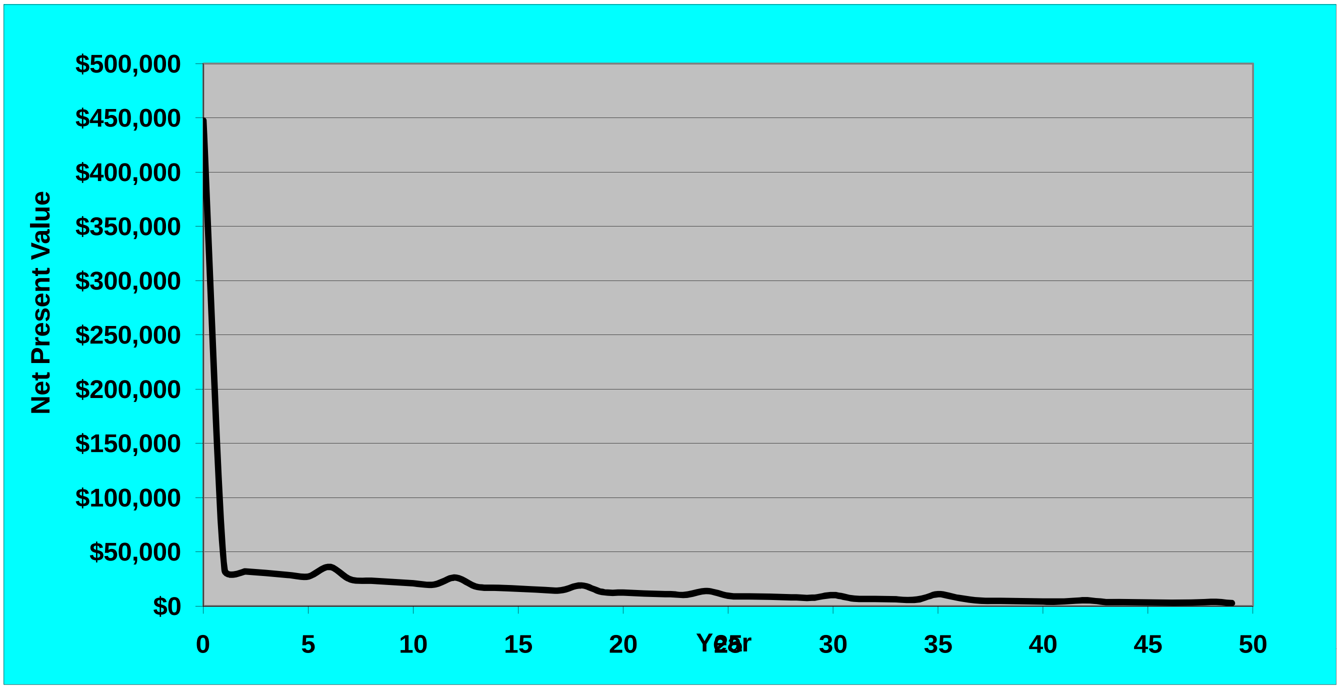
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility	Sediment Removal	Other [User	Total Irregular			Cash	Present Value
Cash Sum ($)								**$ 2,333,858**	**$ 1,085,467**		
0	1.000	**$ 447,355**						$ 447,355	$ 447,355	$ 447,355	$ 447,355
1	0.948	$ -	**$ 34,480**	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 33,630	$ 482,835	$ 480,985
2	0.898	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 31,877	$ 518,315	$ 512,863
3	0.852	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 30,215	$ 553,795	$ 543,078
4	0.807	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 28,640	$ 589,275	$ 571,718
5	0.765	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 27,147	$ 624,755	$ 598,865
6	0.725	$ -	$ 34,480	$ 1,000	$ 14,142	$ -	$ 15,142	$ 49,622	$ 35,988	$ 674,377	$ 634,853
7	0.687	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 24,390	$ 709,857	$ 659,243
8	0.652	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 23,119	$ 745,337	$ 682,362
9	0.618	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 21,913	$ 780,817	$ 704,275
10	0.585	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 20,771	$ 816,297	$ 725,046
11	0.555	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 19,688	$ 851,777	$ 744,735
12	0.526	$ -	$ 34,480	$ 1,000	$ 14,142	$ -	$ 15,142	$ 49,622	$ 26,100	$ 901,399	$ 770,835
13	0.499	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 17,689	$ 936,879	$ 788,524
14	0.473	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 16,767	$ 972,359	$ 805,291
15	0.448	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 15,893	$ 1,007,839	$ 821,183
16	0.425	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 15,064	$ 1,043,319	$ 836,247
17	0.402	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 14,279	$ 1,078,799	$ 850,526
18	0.381	$ -	$ 34,480	$ 1,000	$ 14,142	$ -	$ 15,142	$ 49,622	$ 18,929	$ 1,128,421	$ 869,455
19	0.362	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 12,829	$ 1,163,901	$ 882,284
20	0.343	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 12,160	$ 1,199,381	$ 894,444
21	0.325	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 11,526	$ 1,234,861	$ 905,970
22	0.308	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 10,925	$ 1,270,341	$ 916,895
23	0.292	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 10,356	$ 1,305,821	$ 927,251
24	0.277	$ -	$ 34,480	$ 1,000	$ 14,142	$ -	$ 15,142	$ 49,622	$ 13,728	$ 1,355,443	$ 940,979
25	0.262	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 9,304	$ 1,390,923	$ 950,283
26	0.249	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 8,819	$ 1,426,403	$ 959,102
27	0.236	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 8,359	$ 1,461,883	$ 967,462
28	0.223	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 7,923	$ 1,497,363	$ 975,385
29	0.212	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 7,510	$ 1,532,843	$ 982,895
30	0.201	$ -	$ 34,480	$ 1,000	$ 14,142	$ -	$ 15,142	$ 49,622	$ 9,956	$ 1,582,465	$ 992,852
31	0.190	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 6,748	$ 1,617,945	$ 999,599
32	0.180	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 6,396	$ 1,653,425	$ 1,005,995
33	0.171	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 6,063	$ 1,688,905	$ 1,012,058
34	0.162	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 5,746	$ 1,724,385	$ 1,017,804
35	0.154	$ -	$ 34,480	$ 1,000	$ -	$ 34,848	$ 35,848	$ 70,328	$ 10,797	$ 1,794,713	$ 1,028,601
36	0.146	$ -	$ 34,480	$ 1,000	$ 14,142	$ -	$ 15,142	$ 49,622	$ 7,221	$ 1,844,334	$ 1,035,822
37	0.138	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 4,894	$ 1,879,814	$ 1,040,716
38	0.131	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 4,639	$ 1,915,294	$ 1,045,354
39	0.124	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 4,397	$ 1,950,774	$ 1,049,751
40	0.117	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 4,168	$ 1,986,254	$ 1,053,919
41	0.111	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,950	$ 2,021,734	$ 1,057,869
42	0.106	$ -	$ 34,480	$ 1,000	$ 14,142	$ -	$ 15,142	$ 49,622	$ 5,237	$ 2,071,356	$ 1,063,106
43	0.100	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,549	$ 2,106,836	$ 1,066,655
44	0.095	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,364	$ 2,142,316	$ 1,070,019
45	0.090	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,189	$ 2,177,796	$ 1,073,208
46	0.085	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 3,023	$ 2,213,276	$ 1,076,230
47	0.081	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 2,865	$ 2,248,756	$ 1,079,095
48	0.077	$ -	$ 34,480	$ 1,000	$ 14,142	$ -	$ 15,142	$ 49,622	$ 3,798	$ 2,298,378	$ 1,082,893
49	0.073	$ -	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,480	$ 2,574	$ 2,333,858	$ 1,085,467
50	0.069	$ 1	$ 34,480	$ 1,000	$ -	$ -	$ 1,000	$ 35,481	$ 2,440	$ 2,369,339	$ 1,087,907

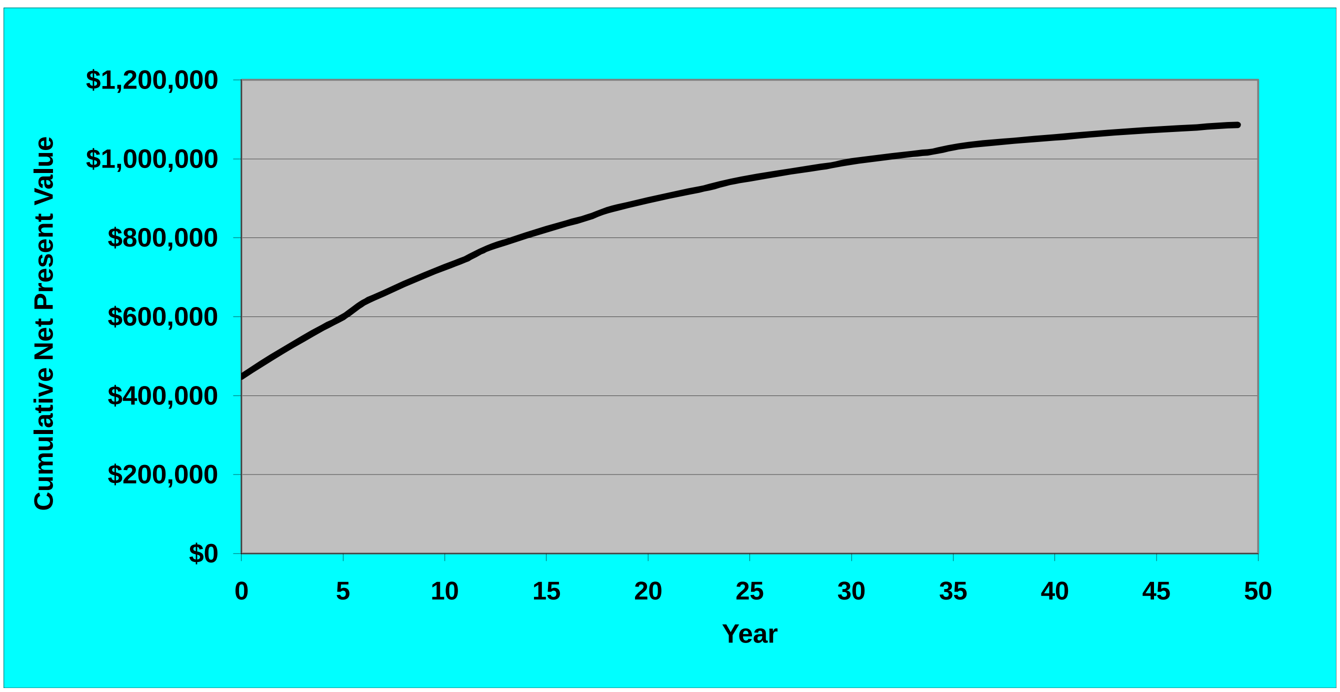
Combination BMPs

Site Name: Catchment 611527
Site Location: Tyrone Ave

Net Present Value over time



NPV - Cumulative



Laurel Canyon Boulevard Distributed BMP Site
Tujunga Wash

Combination BMPs

Site Name: Catchment 613731

Site Location: Laurel Canyon Blvd

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	32.42	32.42
Drainage Area Impervious Cover (IC)*	pct	80%		80%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	58,842		58,842
Flood Detention/Attenuation Volume	ft^3			0
Channel Protection/Erosion Control Volume**	ft^3			0
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		0	58,842

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.

** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	H		H
Main Pool Volume	yd^3	2,179		2,179
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	545		545

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Combination BMPs

CAPITAL COSTS

Site Name: Catchment 613731
Site Location: Laurel Canyon Blvd

Choose Capital Costing Option

B	Total Facility Cost	$ 1,051,755

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	32.42	[redacted]	32.42
Base Facility Cost per acre DA*	$ 15,000		$ 15,000
Default Cost Adjustment for Smaller Projects**	1.78		1.78
Resulting Base Cost per acre DA	$ 26,637		$ 26,637
Base Facility Cost (rounded up to nearest $100)	$ 863,600		**$ 863,600**
Engineering & Planning (default = 25% of Base Cost)	$ 215,900		$ 215,900
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 215,900**
Total Facility Cost	**$ 1,079,500**		**$ 1,079,500**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre
** Smaller projects generally incur higher unit costs for many components; factor added to adjust.
Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	29,241	1	$ 29,241
Permeable Pavement	AC	435,600	0.71	$ 309,276
Green Street/Bioretention Area	LF	69	2543	$ 175,495
Bioretention Area with Under Drains	LF	118	848	$ 100,040
Total Facility Base Cost				**$ 614,052**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Project Management		$ 92,108	1	$ 92,108
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 12,281	1	$ 12,281
Legal Services (2%)		$ 12,281	1	$ 12,281
Permitting & Construction Inspection (3%)		$ 18,422	1	$ 18,422
Sales Tax (9.75%)		$ 29,935	1	$ 29,935
Contingency (e.g., 35%)		$ 272,677	1	$ 272,677
Total Associated Capital Costs				**$ 437,704**
Total Facility Cost				**$ 1,051,755**

Combination BMPs

Site Name: Catchment 613731

Site Location: Laurel Canyon Blvd

Maintenance Costs

H | **User entered HIGH maintenance level in Sheet 1.**

** Change on Sheet 1 if desired/applicable **

User may enter lump sum here

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Inciden-tals Cost/Event ($)			Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Inspection, Reporting & Information Management	12		**12**	2		**2**	2.0		**2.0**	50		**50**	30		**30**	0		**0**	**260**		**260**
Vegetation Management with Trash & Minor Debris Removal	1		**1**	5		**5**	3.5		**3.5**	30		**30**	60		**60**	0		**0**	**825**		**825**
Vector Control	1	2	**2**	4		**4**	5.0	3	**3.0**	40		**40**	375		**375**	375		**375**	**2,675**	2,355	**2,355**
Permeable Pavement Sweeping	12		**12**	1		**1**	1.0		**1.0**	20		**20**	60		**60**			**0**	**80**		**80**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Inciden-tals Cost/Event ($)			Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		**12**			**0**			**0.0**			**0**			**0**			**0**	**1,000**		**1,000**
Remove existing pavement & aggregate; wash and/or replace & reinstall*		420	**420**			**0**			**0.0**			**0**			**0**		309,276	**309,276**		**309,276**	**309,276**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

Cost Item	Frequency (months betw. maint. events)			Sediment Quantity (yds3) [from Sheet 1]			Cost per yd3 to Remove, Dispose of Sediment												Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input										Model	User	Input
Sediment Removal	72		**72**	545		**545**	33.0		**33.0**										**17,980**		**17,980**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V.
Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Combination BMPs

Site Name: Catchment 613731
Site Location: Laurel Canyon Blvd

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		$614,052
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		$437,704
Capital Costs	Y		Y		**$1,051,755**

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	1	$260	$260
Vegetation Management with Trash & Minor Debris Removal	Y		Y	0.0833333	$825	$9,900
Vector Control	Y		Y	0.125	$2,355	$18,840
Permeable Pavement Sweeping	Y		Y	1	$80	$80
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Regular Maintenance Activities						**$29,080**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	6	$17,980	$2,997
*Remove existing pavement & aggregate; wash and/or replace & reinstall**	Y		Y	35	$309,276	$8,836
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$12,833**

Combination BMPs

Site Name: Catchment 613731
Site Location: Laurel Canyon Blvd

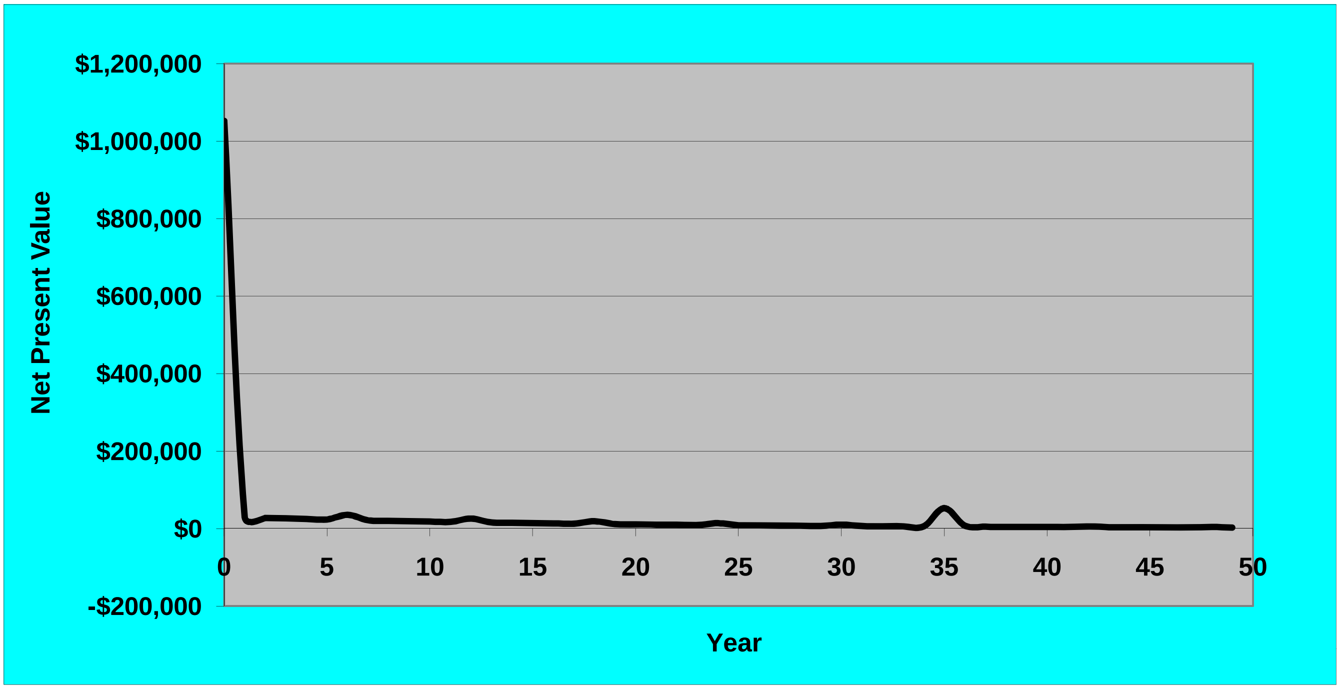
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility	Sediment Removal	Other [User	Total Irregular			Cash	Present Value
Cash Sum ($)								**$ 2,978,788**	**$ 1,650,293**		
0	1.000	**$ 1,051,755**						$ 1,051,755	$ 1,051,755	$ 1,051,755	$ 1,051,755
1	0.948	$ -	**$ 29,080**	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 28,512	$ 1,081,835	$ 1,080,267
2	0.898	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 27,025	$ 1,111,915	$ 1,107,292
3	0.852	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 25,617	$ 1,141,995	$ 1,132,909
4	0.807	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 24,281	$ 1,172,075	$ 1,157,190
5	0.765	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 23,015	$ 1,202,155	$ 1,180,205
6	0.725	$ -	$ 29,080	$ 1,000	$ 17,980	$ -	$ 18,980	$ 48,060	$ 34,855	$ 1,250,215	$ 1,215,060
7	0.687	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 20,678	$ 1,280,295	$ 1,235,738
8	0.652	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 19,600	$ 1,310,375	$ 1,255,339
9	0.618	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 18,578	$ 1,340,455	$ 1,273,917
10	0.585	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 17,610	$ 1,370,535	$ 1,291,527
11	0.555	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 16,692	$ 1,400,615	$ 1,308,218
12	0.526	$ -	$ 29,080	$ 1,000	$ 17,980	$ -	$ 18,980	$ 48,060	$ 25,278	$ 1,448,674	$ 1,333,497
13	0.499	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 14,997	$ 1,478,754	$ 1,348,493
14	0.473	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 14,215	$ 1,508,834	$ 1,362,708
15	0.448	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 13,474	$ 1,538,914	$ 1,376,182
16	0.425	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 12,771	$ 1,568,994	$ 1,388,954
17	0.402	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 12,106	$ 1,599,074	$ 1,401,059
18	0.381	$ -	$ 29,080	$ 1,000	$ 17,980	$ -	$ 18,980	$ 48,060	$ 18,333	$ 1,647,134	$ 1,419,392
19	0.362	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 10,876	$ 1,677,214	$ 1,430,269
20	0.343	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 10,309	$ 1,707,294	$ 1,440,578
21	0.325	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 9,772	$ 1,737,374	$ 1,450,350
22	0.308	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 9,262	$ 1,767,454	$ 1,459,612
23	0.292	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 8,780	$ 1,797,534	$ 1,468,392
24	0.277	$ -	$ 29,080	$ 1,000	$ 17,980	$ -	$ 18,980	$ 48,060	$ 13,296	$ 1,845,594	$ 1,481,688
25	0.262	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 7,888	$ 1,875,674	$ 1,489,576
26	0.249	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 7,477	$ 1,905,754	$ 1,497,052
27	0.236	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 7,087	$ 1,935,834	$ 1,504,139
28	0.223	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 6,718	$ 1,965,914	$ 1,510,857
29	0.212	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 6,367	$ 1,995,994	$ 1,517,224
30	0.201	$ -	$ 29,080	$ 1,000	$ 17,980	$ -	$ 18,980	$ 48,060	$ 9,643	$ 2,044,053	$ 1,526,867
31	0.190	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 5,721	$ 2,074,133	$ 1,532,588
32	0.180	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 5,422	$ 2,104,213	$ 1,538,010
33	0.171	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 5,140	$ 2,134,293	$ 1,543,150
34	0.162	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 4,872	$ 2,164,373	$ 1,548,022
35	0.154	$ -	$ 29,080	$ 1,000	$ -	$ 309,276	$ 310,276	$ 339,356	$ 52,098	$ 2,503,729	$ 1,600,120
36	0.146	$ -	$ 29,080	$ 1,000	$ 17,980	$ -	$ 18,980	$ 48,060	$ 6,993	$ 2,551,789	$ 1,607,113
37	0.138	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 4,149	$ 2,581,869	$ 1,611,262
38	0.131	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 3,933	$ 2,611,949	$ 1,615,195
39	0.124	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 3,728	$ 2,642,029	$ 1,618,922
40	0.117	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 3,533	$ 2,672,109	$ 1,622,456
41	0.111	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 3,349	$ 2,702,189	$ 1,625,805
42	0.106	$ -	$ 29,080	$ 1,000	$ 17,980	$ -	$ 18,980	$ 48,060	$ 5,072	$ 2,750,248	$ 1,630,877
43	0.100	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 3,009	$ 2,780,328	$ 1,633,886
44	0.095	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 2,852	$ 2,810,408	$ 1,636,738
45	0.090	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 2,703	$ 2,840,488	$ 1,639,441
46	0.085	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 2,563	$ 2,870,568	$ 1,642,004
47	0.081	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 2,429	$ 2,900,648	$ 1,644,433
48	0.077	$ -	$ 29,080	$ 1,000	$ 17,980	$ -	$ 18,980	$ 48,060	$ 3,678	$ 2,948,708	$ 1,648,111
49	0.073	$ -	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,080	$ 2,182	$ 2,978,788	$ 1,650,293
50	0.069	$ 1	$ 29,080	$ 1,000	$ -	$ -	$ 1,000	$ 30,081	$ 2,069	$ 3,008,869	$ 1,652,362

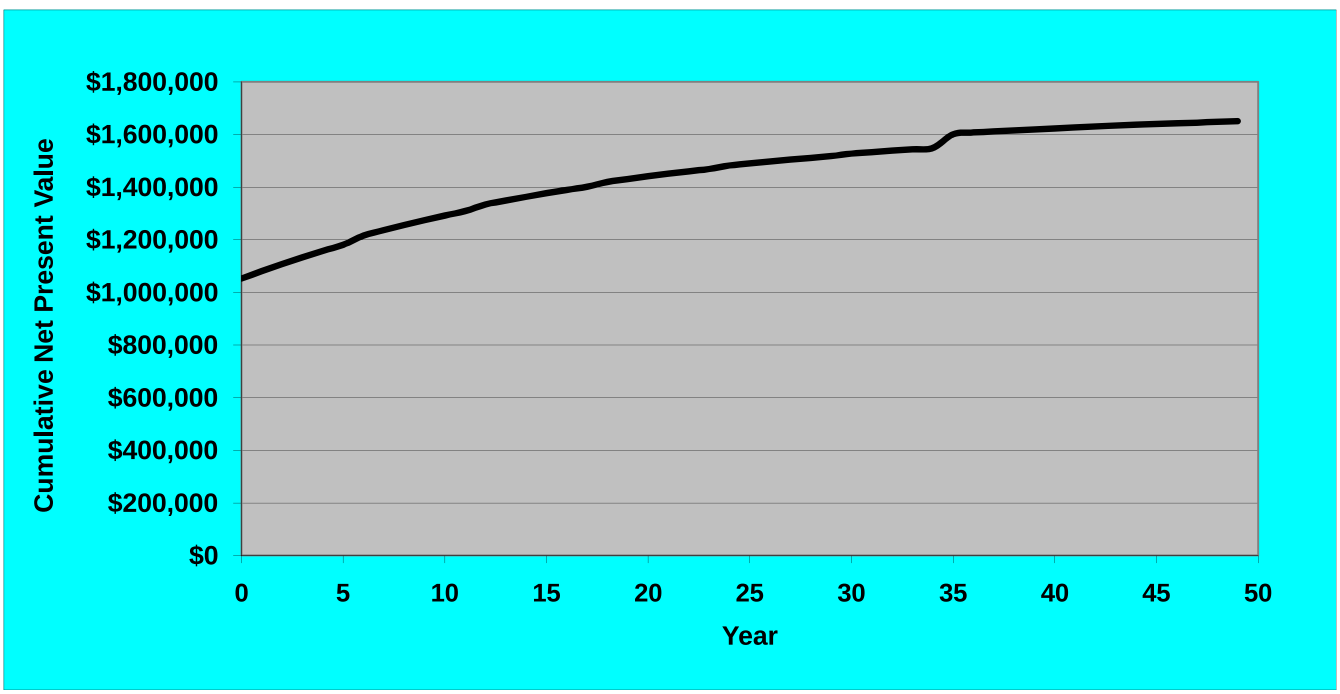
Combination BMPs

Site Name: Catchment 613731
Site Location: Laurel Canyon Blvd

Net Present Value over time



NPV - Cumulative



Cesar Chavez Street Distributed BMP Site
Los Angeles River Reach 2

Combination BMPs

Site Name: Catchment 800901

Site Location: Cesar Chavez Ave

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	24.00	24.00
Drainage Area Impervious Cover (IC)*	pct	80%		80%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	43,560		43,560
Flood Detention/Attenuation Volume	ft^3			0
Channel Protection/Erosion Control Volume**	ft^3			0
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		0	43,560

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.

** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	H		H
Main Pool Volume	yd^3	1,613		1,613
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	403		403

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Combination BMPs

CAPITAL COSTS

Site Name: Catchment 800901
Site Location: Cesar Chavez Ave

Choose Capital Costing Option

B	Total Facility Cost	$ 500,663

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	24.00		24.00
Base Facility Cost per acre DA*	$ 9,000		$ 9,000
Default Cost Adjustment for Smaller Projects**	1.86		1.86
Resulting Base Cost per acre DA	$ 16,740		$ 16,740
Base Facility Cost (rounded up to nearest $100)	$ 401,800		**$ 401,800**
Engineering & Planning (default = 25% of Base Cost)	$ 100,450		$ 100,450
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 100,450**
Total Facility Cost	**$ 502,250**		**$ 502,250**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre
** Smaller projects generally incur higher unit costs for many components; factor added to adjust.
Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	13,919	1	$ 13,919
Green Street/Bioretention Area	LF	60	2860	$ 171,608
Bioretention Area with Under Drains	LF	112	953	$ 106,778
Total Facility Base Cost				**$ 292,305**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Project Management		$ 43,846	1	$ 43,846
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 5,846	1	$ 5,846
Legal Services (2%)		$ 5,846	1	$ 5,846
Permitting & Construction Inspection (3%)		$ 8,769	1	$ 8,769
Sales Tax (9.75%)		$ 14,250	1	$ 14,250
Contingency (e.g., 35%)		$ 129,802	1	$ 129,802
Total Associated Capital Costs				**$ 208,358**
Total Facility Cost				**$ 500,663**

Combination BMPs

Site Name: Catchment 800901

Site Location: Cesar Chavez Ave

Maintenance Costs

H	User entered HIGH maintenance level in Sheet 1.

** Change on Sheet 1 if desired/applicable **

User may enter lump sum here

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Inciden-tals Cost/Event ($)			Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Inspection, Reporting & Information Management	12		**12**	2		**2**	2.0		**2.0**	50		**50**	30		**30**	0		**0**	**260**		**260**
Vegetation Management with Trash & Minor Debris Removal	1		**1**	5		**5**	3.5		**3.5**	30		**30**	60		**60**	0		**0**	**825**		**825**
Vector Control	1	1.5	**2**	4		**4**	5.0	3	**3.0**	40		**40**	375		**375**	375		**375**	**2,675**	2,355	**2,355**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)

Cost Item	Frequency (months betw. maint. events)			Hours per Event			Average Labor Crew Size			Avg. (Pro-Rated) Labor Rate/Hr. ($)			Machinery Cost/Hour ($)			Materials & Inciden-tals Cost/Event ($)			Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input	Model	User	Input
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		**12**			**0**			**0.0**			**0**			**0**			**0**	**1,000**		**1,000**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

Cost Item	Frequency (months betw. maint. events)			Sediment Quantity (yds3) [from Sheet 1]			Cost per yd3 to Remove, Dispose of Sediment												Total cost per visit ($)		
	Model	User	Input	Model	User	Input	Model	User	Input										Model	User	Input
Sediment Removal	72		**72**	403		**403**	33.0		**33.0**										**13,310**		**13,310**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V.
Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Combination BMPs

Site Name: Catchment 800901
Site Location: Cesar Chavez Ave

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		$292,305
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		$208,358
Capital Costs	Y		Y		**$500,663**

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	1	$260	$260
Vegetation Management with Trash & Minor Debris Removal	Y		Y	0.0833333	$825	$9,900
Vector Control	Y		Y	0.125	$2,355	$18,840
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Regular Maintenance Activities						**$29,000**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	6	$13,310	$2,218
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$3,218**

Combination BMPs

Site Name: Catchment 800901
Site Location: Cesar Chavez Ave

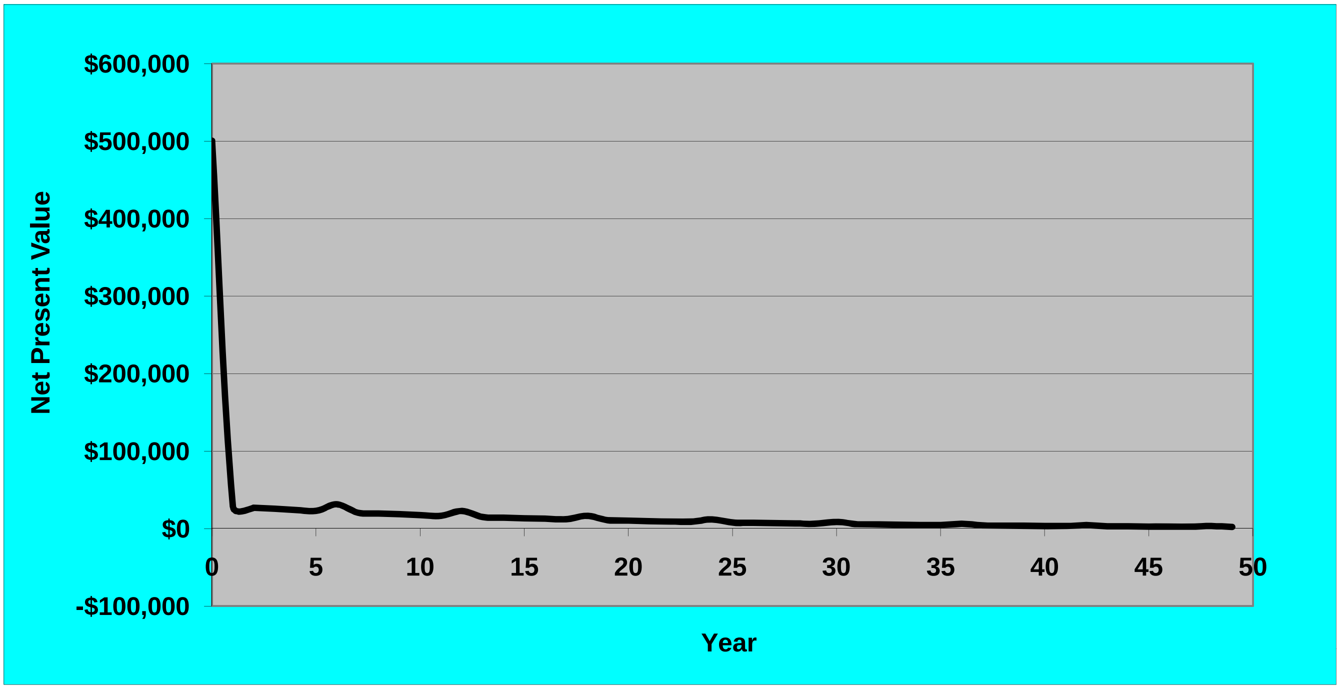
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility	Sediment Removal	Other [User	Total Irregular			Cash	Present Value
Cash Sum ($)								**$ 2,077,143**	**$ 1,038,990**		
0	1.000	**$ 500,663**						$ 500,663	$ 500,663	$ 500,663	$ 500,663
1	0.948	$ -	**$ 29,000**	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 28,436	$ 530,663	$ 529,099
2	0.898	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 26,954	$ 560,663	$ 556,053
3	0.852	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 25,548	$ 590,663	$ 581,601
4	0.807	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 24,217	$ 620,663	$ 605,818
5	0.765	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 22,954	$ 650,663	$ 628,772
6	0.725	$ -	$ 29,000	$ 1,000	$ 13,310	$ -	$ 14,310	$ 43,310	$ 31,410	$ 693,973	$ 660,182
7	0.687	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 20,623	$ 723,973	$ 680,805
8	0.652	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 19,548	$ 753,973	$ 700,353
9	0.618	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 18,529	$ 783,973	$ 718,882
10	0.585	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 17,563	$ 813,973	$ 736,445
11	0.555	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 16,647	$ 843,973	$ 753,092
12	0.526	$ -	$ 29,000	$ 1,000	$ 13,310	$ -	$ 14,310	$ 43,310	$ 22,780	$ 887,283	$ 775,873
13	0.499	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 14,957	$ 917,283	$ 790,829
14	0.473	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 14,177	$ 947,283	$ 805,007
15	0.448	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 13,438	$ 977,283	$ 818,445
16	0.425	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 12,737	$ 1,007,283	$ 831,182
17	0.402	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 12,073	$ 1,037,283	$ 843,255
18	0.381	$ -	$ 29,000	$ 1,000	$ 13,310	$ -	$ 14,310	$ 43,310	$ 16,521	$ 1,080,593	$ 859,777
19	0.362	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 10,847	$ 1,110,593	$ 870,624
20	0.343	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 10,282	$ 1,140,593	$ 880,906
21	0.325	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 9,746	$ 1,170,593	$ 890,652
22	0.308	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 9,238	$ 1,200,593	$ 899,890
23	0.292	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 8,756	$ 1,230,593	$ 908,646
24	0.277	$ -	$ 29,000	$ 1,000	$ 13,310	$ -	$ 14,310	$ 43,310	$ 11,982	$ 1,273,903	$ 920,628
25	0.262	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,867	$ 1,303,903	$ 928,495
26	0.249	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,457	$ 1,333,903	$ 935,952
27	0.236	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 7,068	$ 1,363,903	$ 943,020
28	0.223	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 6,700	$ 1,393,903	$ 949,719
29	0.212	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 6,350	$ 1,423,903	$ 956,070
30	0.201	$ -	$ 29,000	$ 1,000	$ 13,310	$ -	$ 14,310	$ 43,310	$ 8,690	$ 1,467,213	$ 964,760
31	0.190	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,706	$ 1,497,213	$ 970,465
32	0.180	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,408	$ 1,527,213	$ 975,873
33	0.171	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 5,126	$ 1,557,213	$ 980,999
34	0.162	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,859	$ 1,587,213	$ 985,858
35	0.154	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,606	$ 1,617,213	$ 990,464
36	0.146	$ -	$ 29,000	$ 1,000	$ 13,310	$ -	$ 14,310	$ 43,310	$ 6,302	$ 1,660,523	$ 996,766
37	0.138	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 4,138	$ 1,690,523	$ 1,000,904
38	0.131	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,922	$ 1,720,523	$ 1,004,826
39	0.124	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,718	$ 1,750,523	$ 1,008,544
40	0.117	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,524	$ 1,780,523	$ 1,012,068
41	0.111	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,340	$ 1,810,523	$ 1,015,408
42	0.106	$ -	$ 29,000	$ 1,000	$ 13,310	$ -	$ 14,310	$ 43,310	$ 4,571	$ 1,853,833	$ 1,019,979
43	0.100	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 3,001	$ 1,883,833	$ 1,022,980
44	0.095	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,845	$ 1,913,833	$ 1,025,824
45	0.090	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,696	$ 1,943,833	$ 1,028,521
46	0.085	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,556	$ 1,973,833	$ 1,031,076
47	0.081	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,422	$ 2,003,833	$ 1,033,499
48	0.077	$ -	$ 29,000	$ 1,000	$ 13,310	$ -	$ 14,310	$ 43,310	$ 3,315	$ 2,047,143	$ 1,036,814
49	0.073	$ -	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,000	$ 2,176	$ 2,077,143	$ 1,038,990
50	0.069	$ 1	$ 29,000	$ 1,000	$ -	$ -	$ 1,000	$ 30,001	$ 2,063	$ 2,107,144	$ 1,041,053

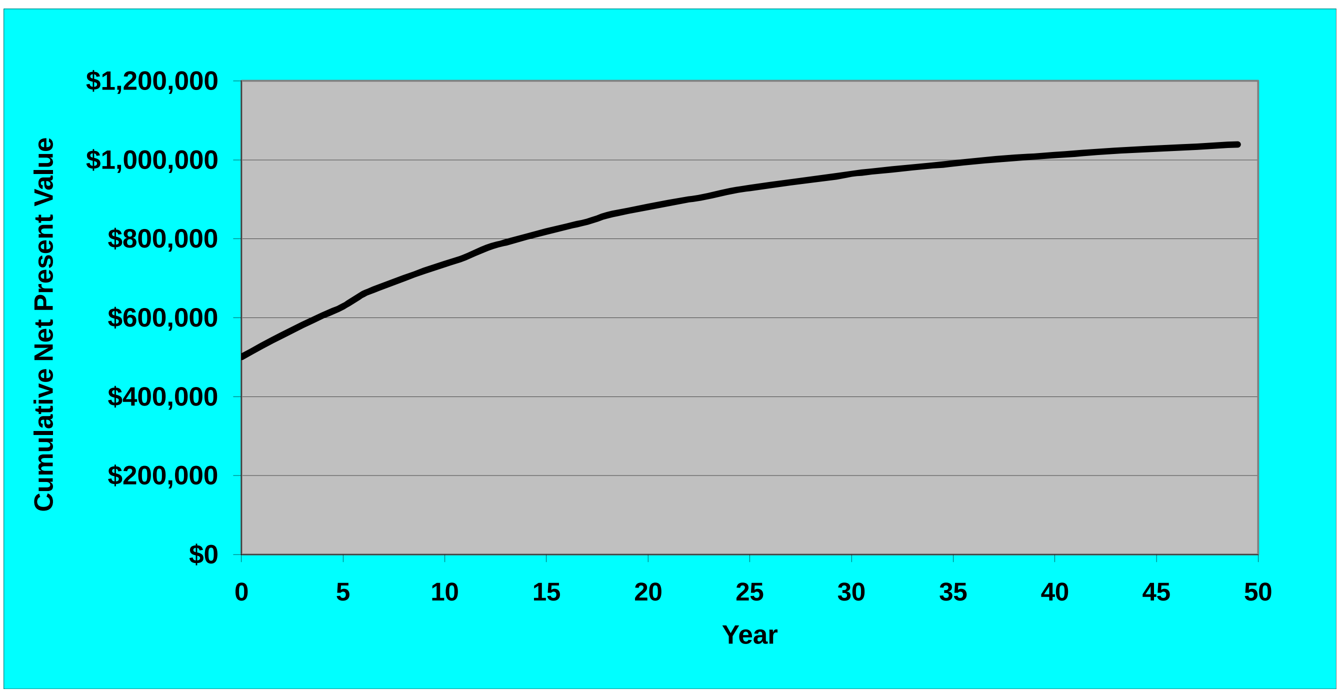
Combination BMPs

Site Name: Catchment 800901
Site Location: Cesar Chavez Ave

Net Present Value over time



NPV - Cumulative



Slauson Avenue Distributed BMP Site
Compton Creek

Combination BMPs

Site Name: Catchment 850150

Site Location: Slauson Ave

Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	10.00	43.02	43.02
Drainage Area Impervious Cover (IC)*	pct	80%		80%
Watershed Land Use Type *("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)*		R		R

* Included since frequently used to calculate storage volume.

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft^3	78,081		78,081
Flood Detention/Attenuation Volume	ft^3			0
Channel Protection/Erosion Control Volume**	ft^3			0
Other Volume (e.g., Recharge Volume)	ft^3			0
TOTAL FACILITY STORAGE VOLUME	ft^3		0	78,081

* Model default is 1/2-inch of capture over drainage area; actual volume will depend on regional regulatory requirements and site-specific characteristics, etc.
** For example, 24-hour extended detention storage.

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance *("H"=high; "M"=medium; "L"=low)*	-	H		H
Main Pool Volume	yd^3	2,892		2,892
Pct. Full when sediment removed from Basin*	pct	25%		25%
Quantity of Sediment Removed from Basin	yd^3	723		723

* Can adjust to be higher if expect heavy soils/sediment deposition to basin.

WHOLE LIFE COST OPTIONS	Unit	Model Default	User	Chosen Option
Discount Rate	%	5.50		5.5

Combination BMPs

CAPITAL COSTS

Site Name: Catchment 850150
Site Location: Slauson Ave

Choose Capital Costing Option

B	Total Facility Cost	$ 2,766,342

"A" - Simple Cost based on Drainage Area
"B" - User-Entered Engineer's Estimate

Method A: Simple Cost based on Drainage Area

Cost based on Drainage Area	Cost per Acre of DA Treated		(Chosen option)
	Model Default	User	
Drainage Area (DA) (acres)	43.02	[redacted]	43.02
Base Facility Cost per acre DA*	$ 31,000		$ 31,000
Default Cost Adjustment for Smaller Projects**	1.67		1.67
Resulting Base Cost per acre DA	$ 51,764		$ 51,764
Base Facility Cost (rounded up to nearest $100)	$ 2,226,900		**$ 2,226,900**
Engineering & Planning (default = 25% of Base Cost)	$ 556,725		$ 556,725
Land Cost	$ 0		$ 0
Other Costs	$ 0		$ 0
Total Associated Capital Costs (e.g., Engineering, Land, etc.)			**$ 556,725**
Total Facility Cost	**$ 2,783,625**		**$ 2,783,625**

*** Base Facility Cost guidelines (circa Year 2005)**
Very High = $15,000/acre
High = $5,000/acre
Medium = $3,000/acre
Low = $1,000/acre
** Smaller projects generally incur higher unit costs for many components; factor added to adjust.
Suggestion: Use higher or lower Base Costs to reflect higher or lower regional construction costs.
Some jurisdictions already have cost relationships established; check to see if any available.

Method B: User-Entered Engineer's Estimate

Select from the following list, as applicable to the project or facility type; add items where necessary.

Total Facility Base Costs	Unit	Unit Cost	Quantity	Cost
Mobilization	LS	76,909	1	$ 76,909
Permeable Pavement	AC	435,600	3.01	$ 1,311,156
Green Street/Bioretention Area	LF	58	2398	$ 139,091
Bioretention Area with Under Drains	LF	110	799	$ 87,931
Total Facility Base Cost				**$ 1,615,087**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Project Management		$ 242,263	1	$ 242,263
Engineering: Preliminary				$ -
Engineering: Final Design				$ -
Topographic Survey				$ -
Geotechnical				$ -
Landscape Design				
Land Acquisition (site, easements, etc.)		$ 0		$ -
Utility Relocation		$ 32,302	1	$ 32,302
Legal Services (2%)		$ 32,302	1	$ 32,302
Permitting & Construction Inspection (3%)		$ 48,453	1	$ 48,453
Sales Tax (9.75%)		$ 78,736	1	$ 78,736
Contingency (e.g., 35%)		$ 717,200	1	$ 717,200
Total Associated Capital Costs				**$ 1,151,255**
Total Facility Cost				**$ 2,766,342**

Combination BMPs

H	User entered HIGH maintenance level in Sheet 1.

** Change on Sheet 1 if desired/applicable **

Site Name: Catchment 850150

Site Location: Slauson Ave

Maintenance Costs

User may enter lump sum here

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**
Inspection, Reporting & Information Management	12		**12**	2		**2**	2.0		**2.0**	50		**50**	30		**30**	0		**0**	**260**		**260**
Vegetation Management with Trash & Minor Debris Removal	1		**1**	5		**5**	3.5		**3.5**	30		**30**	60		**60**	0		**0**	**825**		**825**
Vector Control	1	2	**2**	4		**4**	5.0	3	**3.0**	40		**40**	375		**375**	375		**375**	**2,675**	2,355	**2,355**
Permeable Pavement Sweeping	12		**12**	1	3	**3**	1.0		**1.0**	20		**20**	60		**60**	0		**0**	**80**	120	**120**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)																					
Cost Item	**Frequency (months betw. maint. events)**			**Hours per Event**			**Average Labor Crew Size**			**Avg. (Pro-Rated) Labor Rate/Hr. ($)**			**Machinery Cost/Hour ($)**			**Materials & Inciden-tals Cost/Event ($)**			**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**
Intermittent Facility Maintenance (Excluding Sediment Removal)	12		**12**			**0**			**0.0**			**0**			**0**			**0**	**1,000**		**1,000**
Remove existing pavement & aggregate; wash and/or replace & reinstall*		420	**420**			**0**			**0.0**			**0**			**0**		1,311,156	**1,311,156**		**1,311,156**	**1,311,156**
add additional activities if necessary			**0**			**0**			**0.0**			**0**			**0**			**0**	**0**		**0**

Cost Item	**Frequency (months betw. maint. events)**			**Sediment Quantity (yds3) [from Sheet 1]**			**Cost per yd3 to Remove, Dispose of Sediment**												**Total cost per visit ($)**		
	Model	**User**	**Input**	**Model**	**User**	**Input**	**Model**	**User**	**Input**										**Model**	**User**	**Input**
Sediment Removal	72		**72**	723		**723**	33.0		**33.0**										**23,858**		**23,858**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**
add additional activities if necessary			**0**			**0**			**0.0**										**0**		**0**

Note: For facilities judged to require larger or smaller amounts of maintenance (due to land area, etc.), consider multiplying the Model output in Column U by a multiplier (e.g., 120%) in Column V. Another quick means of adjustment would be to multiply the number of Hours per Event by a multiplier in the User Input field.

Combination BMPs

Site Name: Catchment 850150
Site Location: Slauson Ave

Cost Summary

CAPITAL COSTS	Included in WLC Calculation			Total Cost	
	Model	User	Chosen option		
Total Facility Base Cost	Y		Y		$1,615,087
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	Y		Y		$1,151,255
Capital Costs	Y		Y		**$2,766,342**

REGULAR MAINTENANCE ACTIVITIES	Included in WLC Calculation			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Inspection, Reporting & Information Management	Y		Y	1	$260	$260
Vegetation Management with Trash & Minor Debris Removal	Y		Y	0.0833333	$825	$9,900
Vector Control	Y		Y	0.125	$2,355	$18,840
Permeable Pavement Sweeping	Y		Y	1	$120	$120
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Regular Maintenance Activities						**$29,120**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Included in WLC			Years between Events	Cost per Event	Total Cost per Year
	Model	User	Chosen option			
Intermittent Facility Maintenance (Excluding Sediment Removal)	Y		Y	1	$1,000	$1,000
Sediment Removal	Y		Y	6	$23,858	$3,976
*Remove existing pavement & aggregate; wash and/or replace & reinstall**	Y		Y	35	$1,311,156	$37,462
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
add additional activities if necessary	Y		Y	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities						**$42,438**

Combination BMPs

Site Name: Catchment 850150
Site Location: Slauson Ave

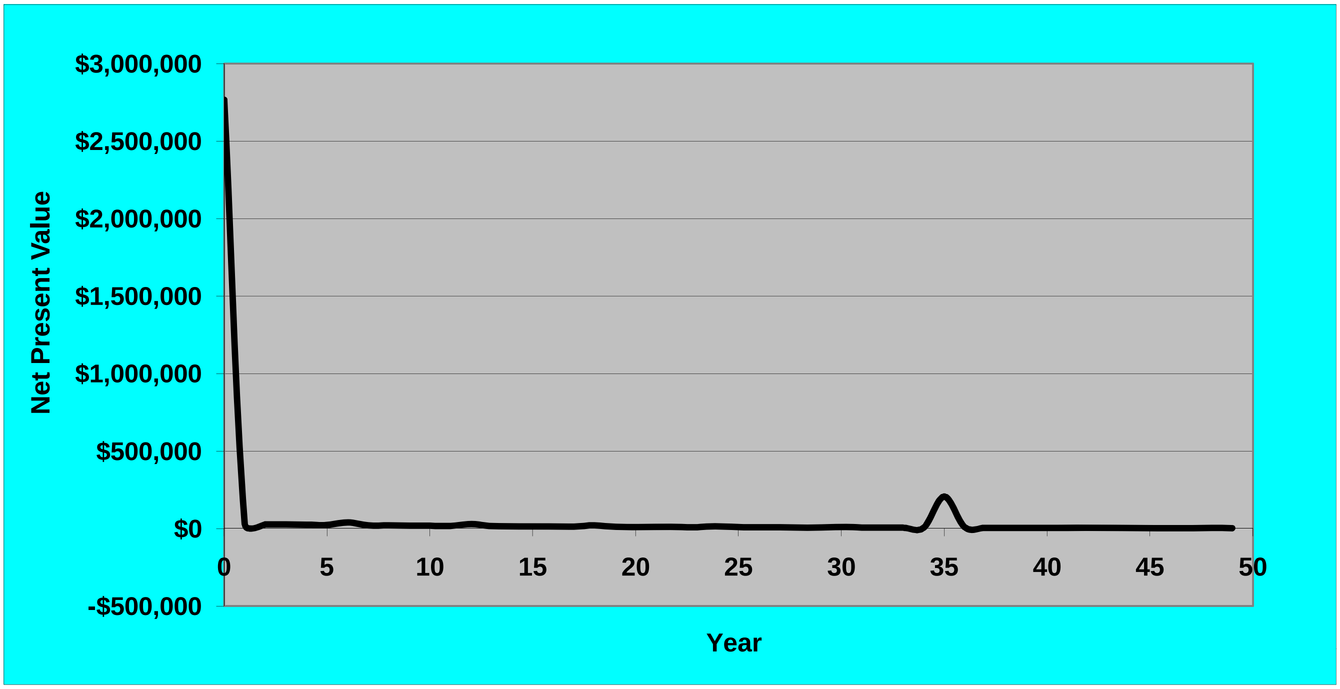
Whole Life Costs

Year	Discount Factor	Capital & Assoc. Costs	Regular Maint. Costs	Corrective & Infrequent Maint. Activities				Total Costs	Present Value of Costs	Cumulative Costs	
				Intermit. Facility	Sediment Removal	Other [User	Total Irregular			Cash	Present Value
Cash Sum ($)								**$ 5,744,243**	**$ 3,533,692**		
0	1.000	**$ 2,766,342**						$ 2,766,342	$ 2,766,342	$ 2,766,342	$ 2,766,342
1	0.948	$ -	**$ 29,120**	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 28,550	$ 2,796,462	$ 2,794,892
2	0.898	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 27,061	$ 2,826,582	$ 2,821,953
3	0.852	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 25,651	$ 2,856,702	$ 2,847,604
4	0.807	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 24,313	$ 2,886,822	$ 2,871,917
5	0.765	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 23,046	$ 2,916,942	$ 2,894,963
6	0.725	$ -	$ 29,120	$ 1,000	$ 23,858	$ -	$ 24,858	$ 53,978	$ 39,147	$ 2,970,920	$ 2,934,110
7	0.687	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 20,706	$ 3,001,040	$ 2,954,816
8	0.652	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 19,626	$ 3,031,160	$ 2,974,442
9	0.618	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 18,603	$ 3,061,280	$ 2,993,045
10	0.585	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 17,633	$ 3,091,400	$ 3,010,678
11	0.555	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 16,714	$ 3,121,520	$ 3,027,392
12	0.526	$ -	$ 29,120	$ 1,000	$ 23,858	$ -	$ 24,858	$ 53,978	$ 28,392	$ 3,175,498	$ 3,055,784
13	0.499	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 15,017	$ 3,205,618	$ 3,070,800
14	0.473	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 14,234	$ 3,235,738	$ 3,085,034
15	0.448	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 13,492	$ 3,265,858	$ 3,098,526
16	0.425	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 12,788	$ 3,295,978	$ 3,111,314
17	0.402	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 12,122	$ 3,326,098	$ 3,123,436
18	0.381	$ -	$ 29,120	$ 1,000	$ 23,858	$ -	$ 24,858	$ 53,978	$ 20,591	$ 3,380,076	$ 3,144,027
19	0.362	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 10,891	$ 3,410,196	$ 3,154,918
20	0.343	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 10,323	$ 3,440,316	$ 3,165,241
21	0.325	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 9,785	$ 3,470,436	$ 3,175,025
22	0.308	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 9,275	$ 3,500,556	$ 3,184,300
23	0.292	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 8,791	$ 3,530,676	$ 3,193,091
24	0.277	$ -	$ 29,120	$ 1,000	$ 23,858	$ -	$ 24,858	$ 53,978	$ 14,933	$ 3,584,655	$ 3,208,025
25	0.262	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 7,898	$ 3,614,775	$ 3,215,923
26	0.249	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 7,487	$ 3,644,895	$ 3,223,410
27	0.236	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 7,096	$ 3,675,015	$ 3,230,506
28	0.223	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 6,726	$ 3,705,135	$ 3,237,233
29	0.212	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 6,376	$ 3,735,255	$ 3,243,609
30	0.201	$ -	$ 29,120	$ 1,000	$ 23,858	$ -	$ 24,858	$ 53,978	$ 10,830	$ 3,789,233	$ 3,254,439
31	0.190	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 5,728	$ 3,819,353	$ 3,260,167
32	0.180	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 5,430	$ 3,849,473	$ 3,265,597
33	0.171	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 5,147	$ 3,879,593	$ 3,270,744
34	0.162	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 4,878	$ 3,909,713	$ 3,275,622
35	0.154	$ -	$ 29,120	$ 1,000	$ -	$ 1,311,156	$ 1,312,156	$ 1,341,276	$ 205,912	$ 5,250,989	$ 3,481,534
36	0.146	$ -	$ 29,120	$ 1,000	$ 23,858	$ -	$ 24,858	$ 53,978	$ 7,855	$ 5,304,967	$ 3,489,389
37	0.138	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 4,154	$ 5,335,087	$ 3,493,543
38	0.131	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 3,938	$ 5,365,207	$ 3,497,481
39	0.124	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 3,733	$ 5,395,327	$ 3,501,214
40	0.117	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 3,538	$ 5,425,447	$ 3,504,752
41	0.111	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 3,354	$ 5,455,567	$ 3,508,105
42	0.106	$ -	$ 29,120	$ 1,000	$ 23,858	$ -	$ 24,858	$ 53,978	$ 5,697	$ 5,509,545	$ 3,513,802
43	0.100	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 3,013	$ 5,539,665	$ 3,516,815
44	0.095	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 2,856	$ 5,569,785	$ 3,519,671
45	0.090	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 2,707	$ 5,599,905	$ 3,522,378
46	0.085	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 2,566	$ 5,630,025	$ 3,524,944
47	0.081	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 2,432	$ 5,660,145	$ 3,527,376
48	0.077	$ -	$ 29,120	$ 1,000	$ 23,858	$ -	$ 24,858	$ 53,978	$ 4,131	$ 5,714,123	$ 3,531,507
49	0.073	$ -	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,120	$ 2,185	$ 5,744,243	$ 3,533,692
50	0.069	$ 1	$ 29,120	$ 1,000	$ -	$ -	$ 1,000	$ 30,121	$ 2,071	$ 5,774,364	$ 3,535,764

Combination BMPs

Site Name: Catchment 850150
Site Location: Slauson Ave

Net Present Value over time



NPV - Cumulative