

Gateway Integrated Multi-Benefit Regional Water Management Project

Benefits and Cost Analysis

Los Angeles Gateway Water Management Authority

Pico Rivera Emergency Intertie

Tables 9, 12, 15, 19, and 20 are included in this document to quantify water supply costs and benefits for the Pico Rivera Emergency Intertie (Project) proposed by the City of Pico Rivera (City) and the Pico Rivera Water Authority (Authority). Narrative supporting the tables is provided below:

Narrative Description of the Project's Economic Costs

The Project's economic costs consist of costs contained in the Project budget (Attachment 4), as well as annual administration, maintenance, and replacement costs associated with the Project.

Cost Details

Budget categories (a) through (h) are included in the cost details as described in Attachment 4.

Estimates of Without-Project conditions; e.g. Current and Future Water Supplies and Demand.

The City provides water service to over 65,000 residents through two separate water purveyors: the Authority and the Pico Water District (District). Each purveyor maintains an independent water distribution system and operates several water supply wells to extract the water from the Central Groundwater Basin. These two water systems are contiguous, but not physically connected, and they can support each other during major emergencies **if** appropriate facilities are in place. Operating pressures in both distribution systems are similar allowing them to transfer water between the two systems without impacting pressure at the delivery to the customer.

An emergency situation can occur within the service areas of City or the District caused by fire, main breaks, flood, storm, earthquake, extended electrical power outage, or other condition, including contamination of groundwater, which can adversely impact the two water systems and limit their ability to meet the production obligations. At present, there are no backup water sources available within the District's service area to continue to provide water services under emergency conditions, although the Authority maintains existing interties between other agencies.

A backup water source can be made available by constructing a water system inter-tie; a physical connection between two independent water systems used to transfer water during emergency events. This Project includes construction of a new inter-tie with the District as well as (i) changes to existing inter-connections with the City of Whittier, (ii) construction of new mains to strengthen the north-south service areas of the City water system for delivering water to the inter-ties, and (iii) the installation of well head treatment at Plant No. 1 to remove volatile activated carbon (VOC) in the local groundwater supply. Importantly, failure at that plant site may render the Authority water supply unavailable for thirty (30) days and the Authority will likely be required to meet fire flow during this period.

Estimates of With-Project Conditions; e.g. Improvements in New Water Supplies Made Available to Meet Demand

After a feasibility study, the preferred location for the Project was determined to be at the Paramount Boulevard and Dunlap Crossing Road intersection. With this Project in place, the Authority water wells in the southern part of the City will be able to feed the northern part, thus, significantly improving their

Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis

reliability. Also, the Project and the water main will enable the Authority to supply the District through its Plant No. 1 well sites, as well as feed the other inter-ties with the City of Whittier and San Gabriel Valley Water Company (located on the eastern side of the City) in case of an emergency.

Probabilities as to the Various Degrees of System Failure

The Pico Rivera water system in the northern part of the City is vulnerable to the following:

1. Potential groundwater contamination in the Plant No. 1 located in the northern part of the City due to presence of VOC in the groundwater in Whittier Narrows Area
 - a. One of the two primary wells of the northern system, Well No. 2, recently indicated the presence of Trichloroethylene (TCE) and Perchloroethylene (PCE) in the water and is currently undergoing monthly monitoring for VOC's as directed by the California Department of Health Services.
 - b. The other alternate well, Well No. 1, located in close proximity to Well No. 2, is also susceptible to the same problem. If this condition persists, and if tests in the future determine that the VOC's exceed the primary maximum contaminant level (MCL), the Authority will be forced to import water from the inter-ties from other agencies such as the District or the City of Whittier, until suitable treatment facilities are built. It may take a long time to build such facilities, not to mention the capital costs and purchasing costs (of water) for months in the interim. However, the Project and the mainline linking the north-south system will address these issues by allowing the transfer of water from the south system to the north system.
2. Loss of Authority water supply due to an event such as an earthquake.
3. Loss of fire flow capacity and supplemental capacity in the western part of the City.

Scenario 1 – No Intertie: estimated of cost for *purchasing* water from other agencies for a period of six (6) months if all three (3) event conditions above occur twice in 30 year study period:

Total volume of water purchased:	1,500 acre-feet (AF)
At a Unit Cost of \$1,032 per AF:	\$1,548,000
Administrative and Other Associated Costs:	10% or \$154,800
Per Occurrence:	\$1,702,800
<u>Total Cost for Two (2) Occurrences:</u>	<u>\$3,405,600</u>

Scenario 2 – Intertie and Main Constructed: estimated cost for *transferring* water from wells in the south to serve service areas in the north for a period of six (6) months if all three (3) event conditions above occur twice in 30 year study period:

Total volume of water transferred:	1,500 acre-feet (AF)
At a Unit Cost of \$350 per AF:	\$525,000
Administrative and Other Associated Costs:	10% or \$52,500
Per Occurrence:	\$577,500
<u>Total Cost for Two (2) Occurrences:</u>	<u>\$1,115,000</u>

TOTAL BENEFIT (2012): \$3,405,600 – \$1,155,000 = \$2,250,600 (OR \$75,020 PER YEAR IN 2012)

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Description of Methods used to Estimate Without- and With-Project Conditions.

With and without Project conditions are based on discussions with the Project engineer, the City, the Authority, the District, the Gateway Water Management Authority (GWMA), and various Project proponents, as well as information contained in the attached Exhibits described below.

Alternatively, another way to address the current emergency issue is by installing backup water wells, water mains, and water storage tanks. However, this option is cost prohibitive considering the short duration of an emergency water need and the likelihood of occurrence of such event.

Description of the Distribution of Local, Regional, and Statewide Benefits

Benefits are primarily local in nature. However, any reduction in demand on SWP water (either for purchase or transfer) will benefit water agencies throughout the state whose need for additional water exceeds that of the City, the Authority, and the District.

Identification of Beneficiaries

The City, the Authority, the District, the Gateway region, all local water users and rate payers, Metropolitan Water District, and all urban water suppliers intending to purchase SWP water in the future.

When the Benefits will be Received

The benefits will be realized as of the completion date of the emergency intertie with the extension of the 12" main on Paramount Boulevard from Loch Lomond Drive to Beverly Road.

Uncertainty of the Benefits

N/A

Description of any Adverse Effects

N/A

Narrative Discussion that Describes, Qualifies, and Supports the Values Entered in the Tables

Water valuation is based on the treatment surcharge per acre foot for 2014, which is the actual amount charged by Metropolitan Water District local entities for State Water Project (SWP) water for designated uses and purposes.

Estimated administration, operations, maintenance, and replacement costs for the Project are based on discussions with the City, the Authority, and the District, and maintenance data collected by David Taussig & Associates, Inc. for comparable projects.

Documentation to Support Information Presented

See *PRWA-PRD Inter-tie Analysis Memorandum*, provided by Atkins Group, dated October 29, 2012 (document analyzes various scenarios, emergencies, and the associated mitigation measures).

Please also see the following attached: **Exhibit A** - Metropolitan Water District Rates and Charges

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9 – Annual Project Physical Benefits

Project Name: Pico Rivera Emergency Intertie

Type of Benefit Claimed: Reduced Emergency Water and Associated Costs

Measure of Benefit Claimed (Name of Units): Dollars

Additional Information About this Measure: The Reduction in Emergency Costs

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Reduction in Emergency Costs Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	\$75,020	\$75,020
2015	0	\$75,020	\$75,020
2016	0	\$75,020	\$75,020
2017	0	\$75,020	\$75,020
2018	0	\$75,020	\$75,020
2019	0	\$75,020	\$75,020
2020	0	\$75,020	\$75,020
2021	0	\$75,020	\$75,020
2022	0	\$75,020	\$75,020
2023	0	\$75,020	\$75,020
2024	0	\$75,020	\$75,020
2025	0	\$75,020	\$75,020
2026	0	\$75,020	\$75,020
2027	0	\$75,020	\$75,020
2028	0	\$75,020	\$75,020
2029	0	\$75,020	\$75,020
2030	0	\$75,020	\$75,020
2031	0	\$75,020	\$75,020
2032	0	\$75,020	\$75,020
2033	0	\$75,020	\$75,020
2034	0	\$75,020	\$75,020
2035	0	\$75,020	\$75,020
2036	0	\$75,020	\$75,020
2037	0	\$75,020	\$75,020
2038	0	\$75,020	\$75,020
2039	0	\$75,020	\$75,020
2040	0	\$75,020	\$75,020
2041	0	\$75,020	\$75,020
2042	0	\$75,020	\$75,020
2043	0	\$75,020	\$75,020

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 12 – Non-monetized Benefits Checklist		
No.	Question	Enter “Yes”, “No” or “Neg”
	Community/Social Benefits	
	Will the proposal	
1	Provide education or technology benefits?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Include educational features that should result in water supply, water quality, or flood damage reduction benefits?	
	- Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management?	
	- Provide some other education or technological benefit?	
2	Provide social recreation or access benefits?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Provide new or improved outdoor recreation opportunities?	
	- Provide more access to open space?	
	- Provide some other recreation or public access benefit?	
3	Help avoid, reduce or resolve various public water resources conflicts?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Provide more opportunities for public involvement in water management?	
	- Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation?	
	- Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	Promote social health and safety?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Increase urban water supply reliability for fire-fighting and critical services following seismic events?	
	- Reduce risk to life from dam failure or flooding?	
	- Reduce exposure to water-related hazards?	
5	Have other social benefits?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Redress or increase inequitable distribution of environmental burdens?	
	- Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
	Environmental Stewardship Benefits:	
	Will the proposal	
6	Benefit wildlife or habitat in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat?	
	- Contribute to an existing biological opinion or recovery plan for a listed special status species?	
	- Preserve or restore designated critical habitat of a listed species?	
	- Enhance wildlife protection or habitat?	
7	Improve water quality in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Cause an improvement in water quality in an impaired water body or sensitive habitat?	
	- Prevent water quality degradation?	
	- Cause some other improvement in water quality?	
8	Reduce net emissions in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net production of greenhouse gasses?	
	- Reduce net emissions of other harmful chemicals into the air or water?	
9	Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?	Yes

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Sustainability Benefits:		Yes, please see attachment 3 and attachment 8.
Will the proposal		
10	Improve the overall, long-term management of California groundwater resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce extraction of non-renewable groundwater?	
	- Promote aquifer storage or recharge?	
11	Reduce demand for net diversions for the regions from the Delta?	No
12	Provide a long-term solution in place of a short-term one?	Yes
13	Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net energy use on a permanent basis?	
	- Increase renewable energy production?	
	- Include new buildings or modify buildings to include certified LEED features?	
	- Provide a net increase in recycling or reuse of materials?	
	- Replace unsustainable land or water management practices with recognized sustainable practices?	
14	Improve water supply reliability in ways not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Provide a more flexible mix of water sources?	
	- Reduce likelihood of catastrophic supply outages?	
	- Reduce supply uncertainty?	
	- Reduce supply variability?	
15	Other (If the above listed categories do not apply, provide non-monetized benefit description)?	N/A

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 15 – Annual Benefit									
(All benefits should be in 2012 dollars)									
Project: <u>Pico Rivera Emergency Intertie</u>									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project ⁽¹⁾	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽²⁾	Annual \$ Value (f) x (g)	Discount Factor (6%)	Discounted Benefits (h) x (i)
2012							\$0	1.000	\$0
2013							\$0	0.943	\$0
2014	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.890	\$66,768
2015	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.840	\$62,988
2016	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.792	\$59,423
2017	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.747	\$56,059
2018	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.705	\$52,886
2019	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.665	\$49,893
2020	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.627	\$47,068
2021	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.592	\$44,404
2022	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.558	\$41,891
2023	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.527	\$39,520
2024	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.497	\$37,283
2025	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.469	\$35,172
2026	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.442	\$33,181
2027	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.417	\$31,303
2028	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.394	\$29,531
2029	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.371	\$27,860
2030	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.350	\$26,283
2031	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.331	\$24,795
2032	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.312	\$23,392
2033	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.294	\$22,068
2034	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.278	\$20,818
2035	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.262	\$19,640
2036	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.247	\$18,528
2037	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.233	\$17,480
2038	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.220	\$16,490
2039	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.207	\$15,557
2040	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.196	\$14,676
2041	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.185	\$13,845
2042	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.174	\$13,062
2043	Reduced Emergency Costs	Dollars	0	\$75,020	\$75,020	N/A	\$75,020	0.164	\$12,322
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$974,186
Comments:									

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 19 – Annual Costs of Project

(All costs should be in 2012 Dollars)

Project: Pico Rivera Emergency Intertie

Year	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost ⁽¹⁾	Annual Costs ⁽²⁾					Total Costs (a) +...+ (g)	Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other		Discount Factor	Discounted Project Costs (h) x (i)
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012								\$0	1.000	\$0
2013								\$0	0.943	\$0
2014	\$800,000	\$0	\$0	\$10,000	\$0	\$0	\$0	\$810,000	0.890	\$720,897
2015	\$0	\$0	\$0	\$10,300	\$0	\$0	\$0	\$10,300	0.840	\$8,648
2016	\$0	\$0	\$0	\$10,609	\$0	\$0	\$0	\$10,609	0.792	\$8,403
2017	\$0	\$0	\$0	\$10,927	\$0	\$0	\$0	\$10,927	0.747	\$8,165
2018	\$0	\$0	\$0	\$11,255	\$0	\$0	\$0	\$11,255	0.705	\$7,934
2019	\$0	\$0	\$0	\$11,593	\$0	\$0	\$0	\$11,593	0.665	\$7,710
2020	\$0	\$0	\$0	\$11,941	\$0	\$0	\$0	\$11,941	0.627	\$7,492
2021	\$0	\$0	\$0	\$12,299	\$0	\$0	\$0	\$12,299	0.592	\$7,280
2022	\$0	\$0	\$0	\$12,668	\$0	\$0	\$0	\$12,668	0.558	\$7,074
2023	\$0	\$0	\$0	\$13,048	\$0	\$0	\$0	\$13,048	0.527	\$6,873
2024	\$0	\$0	\$0	\$13,439	\$0	\$0	\$0	\$13,439	0.497	\$6,679
2025	\$0	\$0	\$0	\$13,842	\$0	\$0	\$0	\$13,842	0.469	\$6,490
2026	\$0	\$0	\$0	\$14,258	\$0	\$0	\$0	\$14,258	0.442	\$6,306
2027	\$0	\$0	\$0	\$14,685	\$0	\$0	\$0	\$14,685	0.417	\$6,128
2028	\$0	\$0	\$0	\$15,126	\$0	\$0	\$0	\$15,126	0.394	\$5,954
2029	\$0	\$0	\$0	\$15,580	\$0	\$0	\$0	\$15,580	0.371	\$5,786
2030	\$0	\$0	\$0	\$16,047	\$0	\$0	\$0	\$16,047	0.350	\$5,622
2031	\$0	\$0	\$0	\$16,528	\$0	\$0	\$0	\$16,528	0.331	\$5,463
2032	\$0	\$0	\$0	\$17,024	\$0	\$0	\$0	\$17,024	0.312	\$5,308
2033	\$0	\$0	\$0	\$17,535	\$0	\$0	\$0	\$17,535	0.294	\$5,158
2034	\$0	\$0	\$0	\$18,061	\$0	\$0	\$0	\$18,061	0.278	\$5,012
2035	\$0	\$0	\$0	\$18,603	\$0	\$0	\$0	\$18,603	0.262	\$4,870
2036	\$0	\$0	\$0	\$19,161	\$0	\$0	\$0	\$19,161	0.247	\$4,732
2037	\$0	\$0	\$0	\$19,736	\$0	\$0	\$0	\$19,736	0.233	\$4,598
2038	\$0	\$0	\$0	\$20,328	\$0	\$0	\$0	\$20,328	0.220	\$4,468
2039	\$0	\$0	\$0	\$20,938	\$0	\$0	\$0	\$20,938	0.207	\$4,342
2040	\$0	\$0	\$0	\$21,566	\$0	\$0	\$0	\$21,566	0.196	\$4,219
2041	\$0	\$0	\$0	\$22,213	\$0	\$0	\$0	\$22,213	0.185	\$4,100
2042	\$0	\$0	\$0	\$22,879	\$0	\$0	\$0	\$22,879	0.174	\$3,984
2043	\$0	\$0	\$0	\$23,566	\$0	(\$520,000)	\$0	(\$496,434)	0.164	(\$81,542)
Total Present Value of Discounted Costs (Sum of column (j))										\$808,154
Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										
Comments:										

(1) Based on opportunity costs, sunk costs, and associated costs. 2043 debit reflects Salvage Value of Improvements.

(2) The incremental change in O&M costs attributable to the Project.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Costs and Benefits Summary

Table 20 summarizes the costs and benefits for the Project.

Table 20 – Proposal Benefits and Costs Summary							
Proposal: <u>Pico Rivera Emergency Intertie</u>							
Agency: <u>City of Pico Rivera</u>							
Project	Project Proponent	Total Present Value Project Costs ⁽¹⁾	Total Present Value Project Benefits			From Section D1 – Cost-Effectiveness Analysis, Cost Savings	From Section D2 – Briefly describe the main Non-monetized benefits
			From Section D3 – Monetized ⁽²⁾	From Section D4 – Flood Damage Reduction	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
		\$808,154	\$974,186	\$0	\$974,186		

Advance Groundwater Wellhead Treatment Facility

Tables 9(a), 9(b), 12, 15(a), 15(b), 19, and 20 are included in this document to quantify water supply costs and benefits, as well as other benefits, for the Advance Groundwater Wellhead Treatment Facility (Project) proposed by the City of Signal Hill (City). Narrative supporting the tables is provided below:

Narrative Description of the Project's Economic Costs

The Project's economic costs consist of costs contained in the Project budget (Attachment 4) herewith, as well as annual administration, maintenance, and replacement costs associated with the Project.

Although there are pumping costs associated with moving the water from the Project to end users, these costs would also be incurred using water purchased from the State Water Project (SWP). Since these costs offset each other, they were not included in the analysis.

Cost Details

Budget categories (a) through (h) are included in the cost details as described in Attachment 4.

Estimates of Without-Project conditions; e.g. Current and Future Water Supplies and Demand.

The Newport-Inglewood Fault runs directly through the City. This unique geology essentially divides the City on a northwest axis, as well as provides a natural southern boundary for the Central Basin Groundwater Aquifer, preventing seawater intrusion from the south. However, the portion of the Central Basin Groundwater Aquifer that is located directly underneath the City limits, directly north of the earthquake fault, has a high concentration of "organic color" within the groundwater.

Estimates of With-Project Conditions; e.g. Improvements in New Water Supplies Made Available to Meet Demand

This Project will construct an advance water treatment wellhead facility that will remove the organic color and treat this "new water source" for use as potable water supplies within the City.

As a result of combined efforts, this Project will produce 1,700 acre feet per year (AFY) of water that was previously untapped and unavailable. It is estimated that 1,700 AFY equates to the annual water consumption for 10,000+ people. Importantly, this Project will enable the City to not rely either directly/indirectly on Metropolitan Water District imported water.

By utilizing local groundwater in lieu of SWP water, there will also be a reduction of 1,310 tons of carbon dioxide released into the atmosphere annually (see Table 1 below). This pollution reduction will occur by reductions in the amount of energy that would have been used to pump this same amount of imported water over the Tehachapi Mountains and into Southern California.

Description of Methods used to Estimate Without- and With-Project Conditions

With and without Project conditions are based on discussions with the Project engineer, the City, and various Project proponents, as well as information contained in the attached Exhibits described below.

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Description of the Distribution of Local, Regional, and Statewide Benefits

Benefits are primarily local in nature. However, any reduction in demand on SWP water will benefit water agencies throughout the state whose need for additional water exceeds that of the City.

Identification of Beneficiaries

The City, the GWMA, all local water users and rate payers, Metropolitan Water District, and all urban water suppliers intending to purchase SWP water in the future.

When the Benefits will be Received

The benefits will be realized as of the completion date of the Project, when the treatment facility is capable of removing the organic color and treating this “new water source” for use as potable water supplies within the City.

Uncertainty of the Benefits

The benefits were calculated based on monitoring of dry weather flows. There will be variation in these flows, but it is expected that the demand for non-potable water will not exceed the amount extracted from the groundwater wells.

Description of any Adverse Effects

N/A

Narrative Discussion that Describes, Qualifies, and Supports the Values Entered in the Tables

Water valuation is based on the Tier 2 full service treated volumetric cost for 2014, which is the actual amount paid by the City and other local entities to purchase SWP water for designated uses and purposes.

Greenhouse gas (GHG) valuation is based on 2013 Reserve Price Notices published by the California Environmental Protection Agency Air Resources Board (ARB) as part of the State’s Cap-and-Trade Program. The program is a central element of California’s Global Warming Solutions Act (AB 32) and covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities, and transportation fuels. The regulation includes an enforceable GHG cap that will decline over time. ARB will distribute allowances, which are tradable permits, equal to the emission allowed under the cap. Not only do ARB auctions generally curtail the production of GHGs, but they also raise substantial funds for the State. See “California’s First Carbon-Credit Auction Raises \$290 Million,” Los Angeles Times, November 20, 2012.

Estimated administration, operations, maintenance, and replacement costs for the Project are based on discussions with the City and maintenance data collected by David Taussig & Associates, Inc. for comparable projects.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Documentation to Support Information Presented

See the following attached:

Exhibit A - Metropolitan Water District Rates and Charges

Exhibit B – 2013 Annual Auction Reserve Price Notice; California Cap-and-Trade Program Greenhouse Gas Allowance Auctions, Updated on January 15, 2013

Please also see *GREENHOUSE GAS EMISSIONS FROM THE SIGNAL HILL WATER TREATMENT FACILITY* (study calculates the indirect emissions of GHGs from electricity used for the water system of the Project). This study used the General Reporting Protocol (GRP), Version 3.1 developed by the California Climate Action Registry (CCAR) in 2009 to calculate GHG emissions. Please see Table 1 below.

Table 1: Indirect GHG Emissions from Electricity Use.

Emissions Scenario	Potable Water Estimate MG/yr	Electrical Consumption Factor kwh/MG	Annual Electrical Consumption MWh/yr	CO₂ Emission Factor (5) lbs/MWh	CH₄ Emission Factor (4) lbs/MWh	N₂O Emission Factor (4) lbs/MWh	CO₂ Emission MTCO₂/yr	CH₄ Emission MTCH₄/yr	N₂O Emission MTN₂O/yr	Annual CO₂e Emissions MTCO₂e/yr
Groundwater	463.69	3786.63	1755.82	630.89	0.0302	0.0081	502.46	0.0241	0.0065	504.98
SWP East Branch CA Aqueduct (1)	463.69	9820.43	4553.63	630.89	0.0302	0.0081	1303.1	0.0624	0.0167	1309.59

(1): Wilkinson et al (2006)

(2): Methodology taken from CCAR GHG Emissions Protocol 3.1 (2009)

(3): Chart layout taken from UC Davis - Appendix 3: Greenhouse Gas Calculations

(4): CH₄ and N₂O factors retrieved from CCAR (2009)

(5): CO₂ Emission Factor retrieved from CCAR Pup_Metrics_June-2009.xls

Assumptions:

Natural Gas is not a factor in this calculation

Southern California Edison provides all power

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9 (a) – Annual Project Physical Benefits

Project Name: Wellhead Treatment Facility

Type of Benefit Claimed: New Water Supply

Measure of Benefit Claimed (Name of Units): Acre-Feet

Additional Information About this Measure: Acre-Feet of New Water Supplied to the System

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Increase in Water Supply Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015	0	1,700	1,700
2016	0	1,700	1,700
2017	0	1,700	1,700
2018	0	1,700	1,700
2019	0	1,700	1,700
2020	0	1,700	1,700
2021	0	1,700	1,700
2022	0	1,700	1,700
2023	0	1,700	1,700
2024	0	1,700	1,700
2025	0	1,700	1,700
2026	0	1,700	1,700
2027	0	1,700	1,700
2028	0	1,700	1,700
2029	0	1,700	1,700
2030	0	1,700	1,700
2031	0	1,700	1,700
2032	0	1,700	1,700
2033	0	1,700	1,700
2034	0	1,700	1,700
2035	0	1,700	1,700
2036	0	1,700	1,700
2037	0	1,700	1,700
2038	0	1,700	1,700
2039	0	1,700	1,700
2040	0	1,700	1,700
2041	0	1,700	1,700
2042	0	1,700	1,700
2043	0	1,700	1,700
2044	0	1,700	1,700

Comments:

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9 (b) – Annual Project Physical Benefits

Project Name: Wellhead Treatment Facility

Type of Benefit Claimed: Reduced Greenhouse Gas Emissions (Direct and Indirect)

Measure of Benefit Claimed (Name of Units): Metric Tons

Additional Information About this Measure: Metric Tons of Greenhouse Gases Emission

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Decrease in GHGs Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015	0	1,310	1,310
2016	0	1,310	1,310
2017	0	1,310	1,310
2018	0	1,310	1,310
2019	0	1,310	1,310
2020	0	1,310	1,310
2021	0	1,310	1,310
2022	0	1,310	1,310
2023	0	1,310	1,310
2024	0	1,310	1,310
2025	0	1,310	1,310
2026	0	1,310	1,310
2027	0	1,310	1,310
2028	0	1,310	1,310
2029	0	1,310	1,310
2030	0	1,310	1,310
2031	0	1,310	1,310
2032	0	1,310	1,310
2033	0	1,310	1,310
2034	0	1,310	1,310
2035	0	1,310	1,310
2036	0	1,310	1,310
2037	0	1,310	1,310
2038	0	1,310	1,310
2039	0	1,310	1,310
2040	0	1,310	1,310
2041	0	1,310	1,310
2042	0	1,310	1,310
2043	0	1,310	1,310
2044	0	1,310	1,310

Comments:

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 12 – Non-monetized Benefits Checklist		
No.	Question	Enter “Yes”, “No” or “Neg”
	Community/Social Benefits	
	Will the proposal	
1	Provide education or technology benefits?	No
	Examples are not limited to, but may include:	
	- Include educational features that should result in water supply, water quality, or flood damage reduction benefits?	
	- Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management?	
	- Provide some other education or technological benefit?	
2	Provide social recreation or access benefits?	No
	Examples are not limited to, but may include:	
	- Provide new or improved outdoor recreation opportunities?	
	- Provide more access to open space?	
	- Provide some other recreation or public access benefit?	
3	Help avoid, reduce or resolve various public water resources conflicts?	Yes
	Examples are not limited to, but may include:	
	- Provide more opportunities for public involvement in water management?	
	- Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation?	
	- Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	Promote social health and safety?	Yes
	Examples are not limited to, but may include:	
	- Increase urban water supply reliability for fire-fighting and critical services following seismic events?	
	- Reduce risk to life from dam failure or flooding?	
	- Reduce exposure to water-related hazards?	
5	Have other social benefits?	Yes
	Examples are not limited to, but may include:	
	- Redress or increase inequitable distribution of environmental burdens?	
	- Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
	Environmental Stewardship Benefits:	
	Will the proposal	
6	Benefit wildlife or habitat in ways that were not quantified in Attachment 7?	No
	Examples are not limited to, but may include:	
	- Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat?	
	- Contribute to an existing biological opinion or recovery plan for a listed special status species?	
	- Preserve or restore designated critical habitat of a listed species?	
	- Enhance wildlife protection or habitat?	
7	Improve water quality in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Cause an improvement in water quality in an impaired water body or sensitive habitat?	
	- Prevent water quality degradation?	
	- Cause some other improvement in water quality?	
8	Reduce net emissions in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Reduce net production of greenhouse gasses?	
	- Reduce net emissions of other harmful chemicals into the air or water?	
9	Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?	Yes

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Sustainability Benefits:		Yes, please see attachment 3 and attachment 8.
Will the proposal		
10	Improve the overall, long-term management of California groundwater resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce extraction of non-renewable groundwater?	
	- Promote aquifer storage or recharge?	
11	Reduce demand for net diversions for the regions from the Delta?	Yes
12	Provide a long-term solution in place of a short-term one?	Yes
13	Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net energy use on a permanent basis?	
	- Increase renewable energy production?	
	- Include new buildings or modify buildings to include certified LEED features?	
	- Provide a net increase in recycling or reuse of materials?	
	- Replace unsustainable land or water management practices with recognized sustainable practices?	
14	Improve water supply reliability in ways not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Provide a more flexible mix of water sources?	
	- Reduce likelihood of catastrophic supply outages?	
	- Reduce supply uncertainty?	
	- Reduce supply variability?	
15	Other (If the above listed categories do not apply, provide non-monetized benefit description)?	N/A

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 15 (a) – Annual Benefit (All benefits should be in 2012 dollars)									
Project: <u>Wellhead Treatment Facility</u>									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽¹⁾	Annual \$ Value (f) x (g)	Discount Factor (6%)	Discounted Benefits (h) x (i)
2012			0	0	0	\$1,032	\$0	1.000	\$0
2013			0	0	0	\$1,032	\$0	0.943	\$0
2014			0	0	0	\$1,032	\$0	0.890	\$0
2015	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.840	\$1,473,028
2016	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.792	\$1,389,649
2017	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.747	\$1,310,990
2018	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.705	\$1,236,783
2019	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.665	\$1,166,776
2020	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.627	\$1,100,732
2021	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.592	\$1,038,427
2022	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.558	\$979,648
2023	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.527	\$924,196
2024	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.497	\$871,883
2025	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.469	\$822,531
2026	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.442	\$775,973
2027	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.417	\$732,050
2028	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.394	\$690,613
2029	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.371	\$651,522
2030	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.350	\$614,643
2031	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.331	\$579,852
2032	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.312	\$547,030
2033	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.294	\$516,066
2034	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.278	\$486,855
2035	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.262	\$459,297
2036	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.247	\$433,299
2037	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.233	\$408,773
2038	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.220	\$385,635
2039	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.207	\$363,806
2040	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.196	\$343,214
2041	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.185	\$323,786
2042	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.174	\$305,459
2043	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.164	\$288,169
2044	Reduced Importation	Acre-Feet	0	1,700	1,700	\$1,032	\$1,754,400	0.155	\$271,857
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$21,492,542
Comments:									
<i>(1) Water valuation is based on the Tier 2 full service treated volumetric cost for 2014, which is the actual amount paid by the City of Signal Hill and other local entities to purchase State Water Project ("SWP") water for designated uses and purposes.</i>									

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 15 (b) – Annual Benefit (All benefits should be in 2012 dollars)									
Project: Wellhead Treatment Facility									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽¹⁾	Annual \$ Value (f) x (g)	Discount Factor (6%)	Discounted Benefits (h) x (i)
2012							\$0	1.000	\$0
2013							\$0	0.943	\$0
2014							\$0	0.890	\$0
2015	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.840	\$11,776
2016	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.792	\$11,110
2017	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.747	\$10,481
2018	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.705	\$9,888
2019	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.665	\$9,328
2020	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.627	\$8,800
2021	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.592	\$8,302
2022	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.558	\$7,832
2023	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.527	\$7,389
2024	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.497	\$6,970
2025	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.469	\$6,576
2026	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.442	\$6,204
2027	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.417	\$5,852
2028	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.394	\$5,521
2029	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.371	\$5,209
2030	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.350	\$4,914
2031	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.331	\$4,636
2032	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.312	\$4,373
2033	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.294	\$4,126
2034	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.278	\$3,892
2035	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.262	\$3,672
2036	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.247	\$3,464
2037	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.233	\$3,268
2038	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.220	\$3,083
2039	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.207	\$2,908
2040	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.196	\$2,744
2041	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.185	\$2,589
2042	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.174	\$2,442
2043	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.164	\$2,304
2044	Reduced Greenhouse Gas Emissions	Metric Tons	0	1,310	1,310	\$11	\$14,026	0.155	\$2,173
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$171,824
Comments:									
<i>(1) Greenhouse gas ("GHG") valuation is based on 2013 Reserve Price Notices published by the California Environmental Protection Agency Air Resources Board ("ARB") as part of the State's Cap-and-Trade Program.</i>									

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 19 – Annual Costs of Project

(All costs should be in 2012 Dollars)

Project: Wellhead Treatment Facility

Year	Initial Costs Grand Total Cost from Table 7 (row (i), column (a))	Adjusted Grant Total Cost ⁽¹⁾ (b)	Annual Costs ⁽²⁾					Discounting Calculations		
			Admin (c)	Operation (d)	Maintenance (e)	Replacement (f)	Other (g)	Total Costs (a) +...+ (g) (h)	Discount Factor (i)	Discounted Project Costs (h) x (i) (j)
2012	\$0	\$0						\$0	1.000	\$0
2013	\$0	\$0						\$0	0.943	\$0
2014	\$3,045,309	\$875,000	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$4,094,986	0.890	\$3,644,523
2015	\$3,045,309	\$875,000	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$4,094,986	0.840	\$3,438,229
2016	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.792	\$138,361
2017	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.747	\$130,529
2018	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.705	\$123,140
2019	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.665	\$116,170
2020	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.627	\$109,594
2021	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.592	\$103,391
2022	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.558	\$97,539
2023	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.527	\$92,018
2024	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.497	\$86,809
2025	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.469	\$81,895
2026	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.442	\$77,260
2027	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.417	\$72,887
2028	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.394	\$68,761
2029	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.371	\$64,869
2030	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.350	\$61,197
2031	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.331	\$57,733
2032	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.312	\$54,465
2033	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.294	\$51,382
2034	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.278	\$48,474
2035	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.262	\$45,730
2036	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.247	\$43,141
2037	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.233	\$40,699
2038	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.220	\$38,396
2039	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.207	\$36,222
2040	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.196	\$34,172
2041	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.185	\$32,238
2042	\$0	\$0	\$1,000	\$25,000	\$20,000	\$128,677	\$0	\$174,677	0.174	\$30,413
Total Present Value of Discounted Costs (Sum of column (j))										\$9,020,237
Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										
Comments:										

(1) Based on opportunity costs, sunk costs, and associated costs.

(2) The incremental change in O&M costs attributable to the Project.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Cost and Benefits Summary

Table 20 summarizes the costs and benefits for the Project.

Table 20 – Proposal Benefits and Costs Summary							
Proposal: <u>Wellhead Treatment Facility</u>							
Agency: <u>City of Signal Hill</u>							
Project	Project Proponent	Total Present Value Project Costs ⁽¹⁾	Total Present Value Project Benefits			From Section D1 – Cost-Effectiveness Analysis, Cost Savings	From Section D2 – Briefly describe the main Non-monetized benefits
			From Section D3 – Monetized ⁽²⁾	From Section D4 – Flood Damage Reduction	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
		\$9,020,237	\$21,664,366	\$0	\$21,664,366		
<i>(1) From Table 19, or RWMG method</i>							
<i>(2) From Table 15 or RWMG method</i>							

Catch Basin Trash Inserts and Face Plate Screens

Tables 9, 12, 15, 19, and 20 are included in this document to quantify water supply costs and benefits for the Regional Catch Basin Trash Inserts and Face Plate Screens Program (Project) proposed by the following 13 cities under the direction of the Gateway Water Management Authority (GWMA): Artesia, Bellflower, Bell Gardens, Commerce, Downey, Hawaiian Gardens, Lakewood, Norwalk, Paramount, Pico Rivera, Signal Hill, South Gate, and Vernon (collectively, the “Cities”). Narrative supporting the tables is provided below:

Narrative Description of the Project’s Economic Costs

The Project’s economic costs consist of costs contained in the Project budget (Attachment 4), as well as annual administration, maintenance, and replacement costs associated with the Project.

Cost Details

Budget categories (a) through (h) are included in the cost details as described in Attachment 4.

Estimates of Without-Project conditions; e.g. Current and Future Water Supplies and Demand.

A great deal of trash and litter are already being removed from storm water runoff draining to the Los Angeles River via catch basin inserts. However, no inserts have been installed to remove trash and litter from storm water runoff draining to the San Gabriel River and/or Los Cerritos Channel.

Dozens of existing beneficial uses are impaired by trash in the Los Angeles River and other rivers and streams, as outlined in Attachment 3. The problem is even more acute in Long Beach where debris flushed down from the upper reaches of the river collects. Common items that have been observed by Regional Board staff include Styrofoam cups, Styrofoam food containers, glass and plastic bottles, toys, balls, motor oil containers, antifreeze containers, construction materials, plastic bags, and cans. Heavier debris can be transported during storms as well.

Trash in waterways causes significant water quality problems. Small and large floatables can inhibit the growth of aquatic vegetation, decreasing spawning areas and habitats for fish and other living organisms. Wildlife living in rivers and in riparian areas can be harmed by ingesting or becoming entangled in floating trash. Except for large items such as shopping carts, settleables are not always obvious to the eye. Some debris (e.g. diapers, medical and household waste, and chemicals) are a source of bacteria and toxic substances. Floating debris that is not trapped and removed will eventually end up on the beaches or in the open ocean, repelling visitors away from our beaches and degrading coastal waters.

The prevention and removal of trash in the Los Angeles River, San Gabriel River, and Los Cerritos Channel ultimately will lead to improved water quality and protection of aquatic life and habitat, expansion of opportunities for public recreational access, enhancement of public interest in the rivers and public participation in restoration activities, and propagation of the vision of the river as a whole and enhancement of the quality of life of riparian residents.

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Estimates of With-Project Conditions; e.g. Improvements in New Water Supplies Made Available to Meet Demand

This Project intends to remedy this situation by installing inserts and face plate screens at high-priority (i.e., high-litter) locations. Thirteen (13) cities are participating in this phase of the regional initiative to reduce or eliminate trash in the rivers and water bodies in accordance with current and future total maximum daily load (TMDL) requirements.

The share of the waste allocation for the Cities included in the Gateway Water Management Authority is approximately 10% of the total waste allocation for the entire Los Angeles Watershed monitored by the Los Angeles County Department of Public Works. The total cleanup cost for the entire Los Angeles River Watershed is estimated to be \$5,157,388 (which includes approximately \$1,000,000 for the cleanup of 75,000 catch basins, and \$4,157,388 for the cleanup and collection of trash on 31 miles of beaches). Therefore, the Project will reduce trash cleanup costs for the Cities by \$515,739 per year.

Description of Methods used to Estimate Without- and With-Project Conditions.

With and without Project conditions are based on discussions with the Project engineer, the Cities, the GWMA, and various Project proponents, as well as information contained in the attached Exhibits described below.

Description of the Distribution of Local, Regional, and Statewide Benefits

Benefits are primarily local in nature. However, any cost savings will benefit water agencies throughout the state whose need for additional water exceeds that of the Cities and the GWMA.

Identification of Beneficiaries

The City, the GWMA, the Gateway region, all residents and visitors, Metropolitan Water District, and all urban water suppliers.

When the Benefits will be Received

The benefits will be realized as of the installation date of the first round of catch basin inserts in the Cities.

Uncertainty of the Benefits

N/A

Description of any Adverse Effects

N/A

Narrative Discussion that Describes, Qualifies, and Supports the Values Entered in the Tables

Estimated administration, operations, maintenance, and replacement costs for the Project are based on discussions with the Cities and the GWMA, and maintenance data collected by David Tausig & Associates, Inc. for comparable projects.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Documentation to Support Information Presented

Please see “TRASH TOTAL MAXIMUM DAILY LOADS FOR THE LONG ANGELES RIVER WATERSHED,” prepared by the California Regional Water Quality Control Board – Los Angeles Region, dated August 9, 2007.

The California Water Quality Control Plan, Los Angeles Region, also known as the *Basin Plan*, sets standards for surface waters and ground waters in the regions. These standards are comprised of designated beneficial uses for surface and ground water, and numeric and narrative objectives necessary to support beneficial uses and the state’s antidegradation policy. The Basin Plan implements the Porter-Cologne Water Quality Act (also known as the “California Water Code”) and serves as the State Water Quality Control Plan applicable to the Los Angeles River, as required pursuant to the federal Clean Water Act (CWA).

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9 – Annual Project Physical Benefits			
Project Name: <u>Regional Catch Basin Trash Inserts</u>			
Type of Benefit Claimed: <u>Reduced Trash Cleanup Costs</u>			
Measure of Benefit Claimed (Name of Units): <u>Dollars</u>			
Additional Information About this Measure: <u>The Reduction in Trash Cleanup Costs</u>			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project ⁽¹⁾	Reduction in Emergency Costs Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	\$515,739	\$515,739
2015	0	\$515,739	\$515,739
2016	0	\$515,739	\$515,739
2017	0	\$515,739	\$515,739
2018	0	\$515,739	\$515,739
2019	0	\$515,739	\$515,739
2020	0	\$515,739	\$515,739
2021	0	\$515,739	\$515,739
2022	0	\$515,739	\$515,739
2023	0	\$515,739	\$515,739
2024	0	\$515,739	\$515,739
2025	0	\$515,739	\$515,739
2026	0	\$515,739	\$515,739
2027	0	\$515,739	\$515,739
2028	0	\$515,739	\$515,739
2029	0	\$515,739	\$515,739
2030	0	\$515,739	\$515,739
2031	0	\$515,739	\$515,739
2032	0	\$515,739	\$515,739
2033	0	\$515,739	\$515,739
2034	0	\$515,739	\$515,739
2035	0	\$515,739	\$515,739
2036	0	\$515,739	\$515,739
2037	0	\$515,739	\$515,739
2038	0	\$515,739	\$515,739
2039	0	\$515,739	\$515,739
2040	0	\$515,739	\$515,739
2041	0	\$515,739	\$515,739
2042	0	\$515,739	\$515,739
2043	0	\$515,739	\$515,739

(1) Source: Trash Total Maximum Daily Loads for the Los Angeles River Watershed (California Regional Water Quality Board) (August, 2007). Based on the share of the waste allocation for the 13 cities under the Gateway Water Management Authority (See Table 5), of approximately 10%, and the total cleanup cost of \$5,157,388 (approximately \$1,000,000 for the cleanup of 75,000 catch basins, and \$4,157,388 for the collection of trash on 31 miles of beaches).

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 12 – Non-monetized Benefits Checklist		
No.	Question	Enter “Yes”, “No” or “Neg”
	Community/Social Benefits	
	Will the proposal	
1	Provide education or technology benefits?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Include educational features that should result in water supply, water quality, or flood damage reduction benefits?	
	- Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management?	
	- Provide some other education or technological benefit?	
2	Provide social recreation or access benefits?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Provide new or improved outdoor recreation opportunities?	
	- Provide more access to open space?	
	- Provide some other recreation or public access benefit?	
3	Help avoid, reduce or resolve various public water resources conflicts?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Provide more opportunities for public involvement in water management?	
	- Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation?	
	- Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	Promote social health and safety?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Increase urban water supply reliability for fire-fighting and critical services following seismic events?	
	- Reduce risk to life from dam failure or flooding?	
	- Reduce exposure to water-related hazards?	
5	Have other social benefits?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Redress or increase inequitable distribution of environmental burdens?	
	- Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
	Environmental Stewardship Benefits:	
	Will the proposal	
6	Benefit wildlife or habitat in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat?	
	- Contribute to an existing biological opinion or recovery plan for a listed special status species?	
	- Preserve or restore designated critical habitat of a listed species?	
	- Enhance wildlife protection or habitat?	
7	Improve water quality in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Cause an improvement in water quality in an impaired water body or sensitive habitat?	
	- Prevent water quality degradation?	
	- Cause some other improvement in water quality?	
8	Reduce net emissions in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net production of greenhouse gasses?	
	- Reduce net emissions of other harmful chemicals into the air or water?	
9	Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?	Yes

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Sustainability Benefits:		Yes, please see attachment 3 and attachment 8.
Will the proposal		
10	Improve the overall, long-term management of California groundwater resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce extraction of non-renewable groundwater?	
	- Promote aquifer storage or recharge?	
11	Reduce demand for net diversions for the regions from the Delta?	No
12	Provide a long-term solution in place of a short-term one?	Yes
13	Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net energy use on a permanent basis?	
	- Increase renewable energy production?	
	- Include new buildings or modify buildings to include certified LEED features?	
	- Provide a net increase in recycling or reuse of materials?	
	- Replace unsustainable land or water management practices with recognized sustainable practices?	
14	Improve water supply reliability in ways not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Provide a more flexible mix of water sources?	
	- Reduce likelihood of catastrophic supply outages?	
	- Reduce supply uncertainty?	
	- Reduce supply variability?	
15	Other (If the above listed categories do not apply, provide non-monetized benefit description)?	N/A

Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis

Table 15 – Annual Benefit									
(All benefits should be in 2012 dollars)									
Project: Regional Catch Basin Trash Inserts									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project ⁽¹⁾	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽²⁾	Annual \$ Value (f) x (g)	Discount Factor (6%)	Discounted Benefits (h) x (i)
2012							\$0	1.000	\$0
2013							\$0	0.943	\$0
2014	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.890	\$459,006
2015	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.840	\$433,024
2016	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.792	\$408,513
2017	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.747	\$385,390
2018	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.705	\$363,576
2019	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.665	\$342,996
2020	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.627	\$323,581
2021	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.592	\$305,265
2022	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.558	\$287,986
2023	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.527	\$271,685
2024	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.497	\$256,306
2025	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.469	\$241,798
2026	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.442	\$228,112
2027	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.417	\$215,200
2028	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.394	\$203,019
2029	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.371	\$191,527
2030	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.350	\$180,686
2031	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.331	\$170,458
2032	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.312	\$160,810
2033	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.294	\$151,707
2034	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.278	\$143,120
2035	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.262	\$135,019
2036	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.247	\$127,376
2037	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.233	\$120,166
2038	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.220	\$113,365
2039	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.207	\$106,948
2040	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.196	\$100,894
2041	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.185	\$95,183
2042	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.174	\$89,795
2043	Reduced Trash Cleanup Costs	Dollars	0	\$515,739	\$515,739	N/A	\$515,739	0.164	\$84,713
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$6,697,224
Comments:									

(1) See Table 9.

Table 19 – Annual Costs of Project

(All costs should be in 2012 Dollars)

Project: Regional Catch Basin Trash Inserts

Year	Initial Costs Grand Total Cost from Table 7 (row (i), column (d)) (a)	Adjusted Grant Total Cost ⁽¹⁾ (b)	Annual Costs ⁽²⁾					Discounting Calculations		
			Admin (c)	Operation (d)	Maintenance (e)	Replacement (f)	Other (g)	Total Costs (a) +...+ (g) (h)	Discount Factor (i)	Discounted Project Costs (h) x (i) (j)
2012								\$0	1.000	\$0
2013								\$0	0.943	\$0
2014	\$1,317,858	\$0	\$0	\$0	\$10,000	\$0	\$0	\$1,327,858	0.890	\$1,181,789
2015	\$1,317,858	\$0	\$0	\$0	\$10,000	\$0	\$0	\$1,327,858	0.840	\$1,114,895
2016	\$1,317,858	\$0	\$0	\$0	\$10,000	\$0	\$0	\$1,327,858	0.792	\$1,051,788
2017	\$1,317,858	\$0	\$0	\$0	\$10,000	\$0	\$0	\$1,327,858	0.747	\$992,253
2018	\$1,317,858	\$0	\$0	\$0	\$10,000	\$0	\$0	\$1,327,858	0.705	\$936,088
2019	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.665	\$6,651
2020	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.627	\$6,274
2021	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.592	\$5,919
2022	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.558	\$5,584
2023	\$0	\$0	\$0	\$0	\$10,000	\$131,786	\$0	\$141,786	0.527	\$74,691
2024	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.497	\$4,970
2025	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.469	\$4,688
2026	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.442	\$4,423
2027	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.417	\$4,173
2028	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.394	\$3,936
2029	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.371	\$3,714
2030	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.350	\$3,503
2031	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.331	\$3,305
2032	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.312	\$3,118
2033	\$0	\$0	\$0	\$0	\$10,000	\$131,786	\$0	\$141,786	0.294	\$41,707
2034	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.278	\$2,775
2035	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.262	\$2,618
2036	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.247	\$2,470
2037	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.233	\$2,330
2038	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.220	\$2,198
2039	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.207	\$2,074
2040	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.196	\$1,956
2041	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.185	\$1,846
2042	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.174	\$1,741
2043	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000	0.164	\$1,643
Total Present Value of Discounted Costs (Sum of column (j))										\$5,475,119
Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										

Comments:

(1) Based on opportunity costs, sunk costs, and associated costs.
 (2) The incremental change in O&M costs attributable to the Project.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Costs and Benefits Summary

Table 20 summarizes the costs and benefits for the Project.

Table 20 – Proposal Benefits and Costs Summary							
Proposal: <u>Regional Catch Basin Trash Inserts</u>							
Agency: <u>Gateway IRWM</u>							
Project	Project Proponent	Total Present Value Project Costs ⁽¹⁾	Total Present Value Project Benefits			From Section D1 – Cost-Effectiveness Analysis, Cost Savings	From Section D2 – Briefly describe the main Non-monetized benefits
			From Section D3 – Monetized ⁽²⁾	From Section D4 – Flood Damage Reduction	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
		\$5,475,119	\$6,697,224	\$0	\$6,697,224		
		<i>(1) From Table 19, or RWMG method</i>					
		<i>(2) From Table 15 or RWMG method</i>					

Disadvantaged Communities Schools Retrofit Program

Tables 9(a), 9(b), 12, 15(a), 15(b), 19, and 20 are included in this document to quantify water supply costs and benefits, as well as other benefits, for the Disadvantaged Communities Schools Retrofit Program (the “Project”) proposed by the Central Basin Municipal Water District (the “District”). Narrative supporting the tables is provided below:

Narrative Description of the Project’s Economic Costs

The Project’s economic costs consist of costs contained in the Project budget (Attachment 4), as well as annual administration, maintenance, and replacement costs associated with the Project.

Cost Details

Budget categories (a) through (h) are included in the cost details as described in Table 7.

Estimates of Without-Project conditions; e.g. Current and Future Water Supplies and Demand.

The Project will improve water management and result in quantifiable water savings and reductions in energy consumption through water conservation. Significantly, the District relies heavily on imported water from the Metropolitan Water District of Southern California (“MWD”). Therefore, this Project will provide a more reliable water supply and promote sustainable water solutions through reducing the need to import additional water supplies and maximizing water use efficiency, leveraging existing funding opportunities, building regional partnerships with local retail agencies, and meeting multiple goals across geographic and water resources service areas.

Estimates of With-Project Conditions; e.g. Improvements in New Water Supplies Made Available to Meet Demand

This Project will be comprised of two components: (1) A retrofit program to install water and energy saving devices and (2) An energy and water conservation educational program. Both components will be implemented solely in five (5) Disadvantaged Communities (“DAC”) schools.

The cornerstone of the Project is retrofitting sanitary devices and irrigation equipment at five (5) middle schools in five (5) different cities and school districts. Specifically, this Project will retrofit the schools with High-Efficiency Toilets, Zero Consumption or High-Efficiency Urinals, Custom Flow Control Valves, Waterbrooms, irrigation management systems, water saving irrigation heads, artificial turf, and California-Friendly plants where applicable.

Potential energy retrofits will be coordinated with Southern California Edison. Additionally, an educational program will be implemented to increase student, faculty, and staff’s knowledge of water and energy conservation and runoff reduction. A partnership with Southern California Edison and Southern California Gas Company will be pursued to fund a portion of the educational component.

Once the work at all five (5) middle schools is complete, the District will save an estimated 24.5 acre-feet per year of water per school (from the interior fixture changes and the weather based irrigation

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

controllers and rating sprinkler heads) for a total annual water savings of 123 acre-feet per year. This is based on a detailed analysis of one of the five schools.

Specifically, Project engineers documented the following device usages: toilets, urinals, irrigation upgrades, and faucets, and discovered that at an average annual attendance of 1,462 students (mean value for all five (5) schools) that the Project would save 7,977,011 gallons per school per year (10,509,253 gallons existing – 2,532,242 gallons under retrofit conditions). This translates into the savings described above. Importantly, a 10% “bump” was added to the student population to account for teachers and administrators.

Description of Methods used to Estimate Without- and With-Project Conditions.

With and without Project conditions are based on discussions with the Project engineer, the District, other cities and districts within Gateway’s service area, and various Project proponents, as well as information contained in the attached Exhibits described below.

Description of the Distribution of Local, Regional, and Statewide Benefits

Benefits are primarily local in nature. However, any reduction in demand on SWP water will benefit water agencies throughout the state whose need for additional water exceeds that of the District and its communities.

Identification of Beneficiaries

The District, the entire Gateway region, all local water users and rate payers (especially those in DACs), Metropolitan Water District, and all urban water suppliers intending to purchase SWP water in the future. The Program leverages funding to augment costs for all Project partners and participants.

When the Benefits will be Received

The benefits will be realized as of the completion of the first phase of Project retrofits in 2014-2015.

Uncertainty of the Benefits

N/A

Description of any Adverse Effects

N/A

Narrative Discussion that Describes, Qualifies, and Supports the Values Entered in the Tables

Water valuation is based on the Tier 2 full service treated volumetric cost for 2014, which is the actual amount paid by the District, various cities and other districts, and other local entities to purchase SWP water for designated uses and purposes.

Greenhouse gas (“GHG”) valuation is based on 2013 Reserve Price Notices published by the California Environmental Protection Agency Air Resources Board (“ARB”) as part of the State’s Cap-and-Trade Program. The program is a central element of California’s Global Warming Solutions Act (AB 32) and covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities,

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

and transportation fuels. The regulation includes an enforceable GHG cap that will decline over time. ARB will distribute allowances, which are tradable permits, equal to the emission allowed under the cap. Not only do ARB auctions generally curtail the production of GHGs, but they also raise substantial funds for the State. See “California’s First Carbon-Credit Auction Raises \$290 Million,” Los Angeles Times, November 20, 2012.

Estimated administration, operations, maintenance, and replacement costs for the Project are based on discussions with the District, various cities, and maintenance data collected by David Taussig & Associates, Inc. for comparable projects.

Documentation to Support Information Presented

See the following attached:

Exhibit A - Metropolitan Water District Rates and Charges

Exhibit B – 2013 Annual Auction Reserve Price Notice; California Cap-and-Trade Program Greenhouse Gas Allowance Auctions, Updated on January 15, 2013

Exhibit C – DAC Water Savings Calculations, provided by the District

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9(a) – Annual Project Physical Benefits

Project Name: DAC Schools Retrofit Program

Type of Benefit Claimed: Potable Water Savings

Measure of Benefit Claimed (Name of Units): Acre-Feet

Additional Information About this Measure: Acre-Feet of Potable Water Saved

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project ⁽¹⁾	Increase in Water Supply Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	123	123
2015	0	123	123
2016	0	123	123
2017	0	123	123
2018	0	123	123
2019	0	123	123
2020	0	123	123
2021	0	123	123
2022	0	123	123
2023	0	123	123
2024	0	123	123
2025	0	123	123
2026	0	123	123
2027	0	123	123
2028	0	123	123
2029	0	123	123
2030	0	123	123
2031	0	123	123
2032	0	123	123
2033	0	123	123

Comments:

(1) Based on an average water savings of 24.5 acre-feet per year, per school, based on a detailed analysis of one of the five schools scheduled to participate in the Project.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9(b) – Annual Project Physical Benefits

Project Name: DAC Schools Retrofit Program

Type of Benefit Claimed: Reduced Greenhouse Gas Emissions

Measure of Benefit Claimed (Name of Units): Metric Tons

Additional Information About this Measure: Metric Tons of Greenhouse Gases Emission

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Decrease in GHGs Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	140	140
2015	0	140	140
2016	0	140	140
2017	0	140	140
2018	0	140	140
2019	0	140	140
2020	0	140	140
2021	0	140	140
2022	0	140	140
2023	0	140	140
2024	0	140	140
2025	0	140	140
2026	0	140	140
2027	0	140	140
2028	0	140	140
2029	0	140	140
2030	0	140	140
2031	0	140	140
2032	0	140	140
2033	0	140	140
Comments:			

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 12 – Non-monetized Benefits Checklist		
No.	Question	Enter “Yes”, “No” or “Neg”
	Community/Social Benefits	
	Will the proposal	
1	Provide education or technology benefits?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Include educational features that should result in water supply, water quality, or flood damage reduction benefits?	
	- Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management?	
	- Provide some other education or technological benefit?	
2	Provide social recreation or access benefits?	No
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Provide new or improved outdoor recreation opportunities?	
	- Provide more access to open space?	
	- Provide some other recreation or public access benefit?	
3	Help avoid, reduce or resolve various public water resources conflicts?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Provide more opportunities for public involvement in water management?	
	- Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation?	
	- Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	Promote social health and safety?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Increase urban water supply reliability for fire-fighting and critical services following seismic events?	
	- Reduce risk to life from dam failure or flooding?	
	- Reduce exposure to water-related hazards?	
5	Have other social benefits?	No
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Redress or increase inequitable distribution of environmental burdens?	
	- Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
	Environmental Stewardship Benefits:	
	Will the proposal	
6	Benefit wildlife or habitat in ways that were not quantified in Attachment 7?	No
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat?	
	- Contribute to an existing biological opinion or recovery plan for a listed special status species?	
	- Preserve or restore designated critical habitat of a listed species?	
	- Enhance wildlife protection or habitat?	
7	Improve water quality in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Cause an improvement in water quality in an impaired water body or sensitive habitat?	
	- Prevent water quality degradation?	
	- Cause some other improvement in water quality?	
8	Reduce net emissions in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net production of greenhouse gasses?	
	- Reduce net emissions of other harmful chemicals into the air or water?	
9	Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?	Yes

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

	Sustainability Benefits: Will the proposal	Yes, please see attachment 3 and attachment 8.
10	Improve the overall, long-term management of California groundwater resources?	Yes
	Examples are not limited to, but may include: - Reduce extraction of non-renewable groundwater? - Promote aquifer storage or recharge?	Yes, please see attachment 3 and attachment 8.
11	Reduce demand for net diversions for the regions from the Delta?	Yes
12	Provide a long-term solution in place of a short-term one?	Yes
13	Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?	Yes
	Examples are not limited to, but may include: - Reduce net energy use on a permanent basis? - Increase renewable energy production? - Include new buildings or modify buildings to include certified LEED features? - Provide a net increase in recycling or reuse of materials? - Replace unsustainable land or water management practices with recognized sustainable practices?	Yes, please see attachment 3 and attachment 8.
14	Improve water supply reliability in ways not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include: - Provide a more flexible mix of water sources? - Reduce likelihood of catastrophic supply outages? - Reduce supply uncertainty? - Reduce supply variability?	
15	Other (If the above listed categories do not apply, provide non-monetized benefit description)?	N/A

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Table 15(a) – Annual Benefit (All benefits should be in 2012 dollars)									
Project: DAC Schools Retrofit Program									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project ⁽¹⁾	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽²⁾	Annual \$ Value ⁽²⁾ (f) x (g)	Discount Factor ⁽¹⁾	Discounted Benefits ⁽¹⁾ (h) x (i)
2012							\$0	1.000	\$0
2013							\$0	0.943	\$0
2014	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.890	\$112,513
2015	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.840	\$106,145
2016	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.792	\$100,136
2017	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.747	\$94,468
2018	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.705	\$89,121
2019	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.665	\$84,077
2020	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.627	\$79,317
2021	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.592	\$74,828
2022	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.558	\$70,592
2023	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.527	\$66,596
2024	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.497	\$62,827
2025	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.469	\$59,271
2026	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.442	\$55,916
2027	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.417	\$52,751
2028	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.394	\$49,765
2029	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.371	\$46,948
2030	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.350	\$44,290
2031	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.331	\$41,783
2032	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.312	\$39,418
2033	Potable Water Savings (Reduced Importation)	Acre-Feet	0	123	123	\$1,032	\$126,420	0.294	\$37,187
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$1,367,950
Comments:									

(1) Water valuation is based on the Tier 2 full service treated volumetric cost for 2014, which is the actual amount paid by the Agency and other local entities to purchase State Water Project ("SWP") water for designated uses and purposes.

Table 15(b) – Annual Benefit (All benefits should be in 2012 dollars)									
Project: DAC Schools Retrofit Program									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽¹⁾	Annual \$ Value (f) x (g)	Discount Factor (6%)	Discounted Benefits (h) x (i)
2012							\$0	1.000	\$0
2013							\$0	0.943	\$0
2014	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.890	\$1,334
2015	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.840	\$1,259
2016	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.792	\$1,188
2017	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.747	\$1,120
2018	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.705	\$1,057
2019	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.665	\$997
2020	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.627	\$941
2021	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.592	\$887
2022	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.558	\$837
2023	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.527	\$790
2024	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.497	\$745
2025	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.469	\$703
2026	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.442	\$663
2027	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.417	\$626
2028	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.394	\$590
2029	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.371	\$557
2030	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.350	\$525
2031	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.331	\$496
2032	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.312	\$468
2033	Reduced Greenhouse Gas	Metric Tons	0	140	140	\$11	\$1,499	0.294	\$441
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$16,225
Comments:									

(1) Greenhouse gas ("GHG") valuation is based on 2013 Reserve Price Notices published by the California Environmental Protection Agency Air Resources Board ("ARB") as part of the State's Cap-and-Trade Program.

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Table 19 – Annual Costs of Project (All costs should be in 2012 Dollars) Project: <u>DAC Schools Retrofit Program</u>										
Year	Initial Costs Grand Total Cost from Table 7 (row (i), column (a))	Adjusted Grant Total Cost ⁽¹⁾ (b)	Annual Costs ⁽²⁾					Discounting Calculations		
			Admin (c)	Operation (d)	Maintenance (e)	Replacement (f)	Other (g)	Total Costs (a) +...+ (g) (h)	Discount Factor (i)	Discounted Project Costs (h) x (i) (j)
2012								\$0	1.000	\$0
2013	\$45,500	\$45,500	\$500					\$91,500	0.943	\$86,321
2014	\$45,500	\$45,500	\$500					\$91,500	0.890	\$81,435
2015	\$136,500	\$136,500	\$500					\$273,500	0.840	\$229,636
2016	\$136,500	\$136,500	\$500					\$273,500	0.792	\$216,638
2017	\$91,000	\$91,000	\$500					\$182,500	0.747	\$136,375
2018	\$0	\$0	\$500					\$500	0.705	\$352
2019	\$0	\$0	\$500					\$500	0.665	\$333
2020	\$0	\$0	\$500					\$500	0.627	\$314
2021	\$0	\$0	\$500					\$500	0.592	\$296
2022	\$0	\$0	\$500					\$500	0.558	\$279
2023	\$0	\$0	\$500					\$500	0.527	\$263
2024	\$0	\$0	\$500					\$500	0.497	\$248
2025	\$0	\$0	\$500					\$500	0.469	\$234
2026	\$0	\$0	\$500					\$500	0.442	\$221
Total Present Value of Discounted Costs (Sum of column (j)) Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										\$752,945
Comments:										

(1) Based on opportunity costs, sunk costs, and associated costs.

(2) The incremental change in O&M costs attributable to the Project.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Costs and Benefits Summary

Table 20 summarizes the costs and benefits for the Project.

Table 20 – Proposal Benefits and Costs Summary							
Proposal: <u>DAC Schools Retrofit Program</u>							
Agency: <u>Central Basin Municipal Water District</u>							
Project	Project Proponent	Total Present Value Project Costs ⁽¹⁾	Total Present Value Project Benefits			From Section D1 – Cost-Effectiveness Analysis, Cost Savings	From Section D2 – Briefly describe the main Non-monetized benefits
			From Section D3 – Monetized ⁽²⁾	From Section D4 – Flood Damage Reduction	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
		\$752,945	\$1,384,175	\$0	\$1,384,175		
<i>(1) From Table 19, or RWMG method</i>							
<i>(2) From Table 15 or RWMG method</i>							

Fernwood Water Improvement Park

Tables 9(a), 9(b), 9(c), 12, 15(a), 15(b), 18, 19, and 20 are included in this document to quantify the groundwater recharge and habit conservation benefits, as well as other benefits, of the Fernwood Water Improvement Park (the “Project”) proposed by the City of Lynwood (the “City”). Narrative supporting the tables is provided below:

Narrative Description of the Project’s Economic Costs

The Project’s economic costs consist of costs contained in the Project budget (Attachment 4), as well as annual administration, maintenance, and replacement costs associated with the Project.

Cost Details

Budget categories (a) through (h) are included in the cost details as described in Table 5.

Estimates of Without-Project conditions; e.g. Current and Future Water Supplies and Demand.

The Project is a multi-benefit project that serves disadvantaged communities in the City of Lynwood while meeting IRWMP water management objectives. The Project site is currently an *empty* 5.25-acre lot owned by the City located on a long stretch along Fernwood Ave., between Atlantic Ave. and Long Beach Blvd.

The City of Lynwood is a dense community with a median household income of \$43,654 or 72% below the State average (US Census 2006-2010). The unemployment rate in the City is 19%, which is more than twice the national rate (US Bureau of Labor Statistics 2012). A third (33%) of the population is under the age of 18, and according to a Lynwood Unified School District Report, almost 88% of students are eligible for free or reduced lunches.

Flooding along Fernwood Ave. is mostly due to Caltrans Interceptors along the embankment of the I-105 freeway. The size of this flood depends on the amount of rainfall and flow from the interceptors and the condition of the watershed area before and during the storm. Runoff occurs within the Fernwood watershed area when the ground is very wet and can no longer absorb any additional water.

While a one-year or a two-year storm generally does not create flooding, the actual impacts are dependent on the duration and intensity of the storm. A one-year or two-year storm lasting over two hours would generate approximately 1-1.5 inches of precipitation. This precipitation is considered as a base flow (or infiltration). However, with the additional Interceptors along the Fernwood embankment, additional water would be delivered to an already saturated field condition that would create a surface flow simulating a 10-year storm.

In a 10-year storm, a greater surface flow will occur and the flood would be upgraded from “damaging flood” to a “severe flood”. Similarly, the duration and intensity are key factors in determining the resulting flooding. With an already saturated field condition, additional water flowing from the interceptors would simulate a 15-25 year storm.

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Estimates of With-Project Conditions; e.g. Improvements in New Water Supplies Made Available to Meet Demand

The primary purpose and design concept behind this Project is to achieve multiple benefits to habitat, water conservation, recreation, and flood reduction. The Project will feature stormwater improvement elements such as infiltration areas and bioswales. The Project includes native shrubs and trees that will increase habitat for birds, butterfly species, and mammals. Moreover, the Project will also provide recreational opportunities for disadvantaged communities in the City.

The Project site drains primarily to the Los Angeles River, which serves as a major flood control channel for the Region. Since the Project will increase storage and infiltration capacity at the site, it is expected to reduce flows to the Los Angeles River and therefore enhance the capacity of this water body to provide flood protection. The Project site will also capture runoff and storm water that primarily drains to the Los Angeles River from the I-105 freeway, reduce flooding resulting from the 10-year and 25-year storms, and improve storm water quality to help the region meet requirements under the Municipal Separate Storm Sewer System Permit ("MS-4").

The Project is expected to improve water quality originating from approximately 100 acres to 230 acres of primarily Single Family Residential land uses and water that drains from the I-105 Freeway. Stormwater runoff from these areas typically contains metals, nutrients and bacteria, all of which are constituents that will be mitigated by the treatment features that will be included in the Project design (i.e. biofiltration and infiltration).

In addition the Project would reduce flooding along Fernwood Avenue during 10-year and 25-year storm events. Based on hydrology calculations assuming six (6) storms per year, the average amount of storm water that will be captured and reused through infiltration is 2.875 million gallons per year or about 8.84 acre-feet per year ("AFY"). Without this Project the 2.875 million gallons of stormwater run-off would end up flooding the streets and carrying pollutants into the storm drainage system.

The Project was designed by City residents this past spring through a community planning process led by Alcanza and funded by the Rivers and Mountains Conservancy to specifically identify an IRWMP disadvantaged community project.

Alcanza collaborated with the City and a local community based organization, From Lot to Spot ("FLTS") to reach disadvantaged community residents. Over the course of (4) four workshops, residents participated in the selection, design, and planning of the site. Community members ranked ten (10) sites based on potential recreational opportunities, as well as water capture and management benefits. The Project hydrologist, Geosyntec, then evaluated the community ranked sites based on IRWMP criteria.

Description of Methods used to Estimate Without- and With-Project Conditions.

With and without Project conditions are based on discussions with the Project engineer, the City, and various Project proponents, as well as information contained in the attached Exhibits described below.

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Description of the Distribution of Local, Regional, and Statewide Benefits

Benefits are primarily local in nature. However, any increase in groundwater recharge will benefit water agencies throughout the state whose need for additional water exceeds that of the City.

Identification of Beneficiaries

The City, all local water users and rate payers, and all recreation and habitat conservation proponents.

The City of Lynwood has already successfully completed construction of two smaller pocket parks on the south side of the I-105 freeway. Both these parks are approximately 12,000 square feet each and were designed as retention/infiltration basins to address storm water run-off and quality and provide passive recreational opportunities and native landscape ecofriendly materials. These projects are easily accessible from the Project.

When the Benefits will be Received

The benefits will be realized as of the completion date of the Project.

Uncertainty of the Benefits

Some uncertainty of benefits and how these will affect stormwater run-off over the long term life of the project are: the accurate storm predications of storm events, a major storm event may overwhelm the infiltration basins, long term maintenance and upkeep of the basins may reduce percolation rates, and over time fine sediments may also reduce infiltration efficiency.

One potential adverse physical affect is ponding water and the ability to breed mosquitoes. Ways to address this concern are proper maintenance of the basins and monitoring for signs of mosquito larva. The City has a full time ground maintenance crew who will be trained to properly maintain the basins and inspect for signs of mosquito larvae.

Description of any Adverse Effects

N/A

Narrative Discussion that Describes, Qualifies, and Supports the Values Entered in the Tables

Estimated valuation for groundwater recharge of \$70 per acre-foot was based on the City's locally subsidized rate for replenished or recharged water.

Valuation of habitat based on (i) recent habitat purchases made in Los Angeles County and (ii) a settlement agreement by and between the prior property owner (of the Project site) and the City of Lynwood (available upon request).

Per the Flood Rapid Assessment Model ("FRAM"), the cost of road repair and maintenance due to each flood event in the without-project condition was estimated to be \$100,000 per lane mile for a major road and \$30,000 per lane mile for a minor road.

Estimated administration, operations, maintenance, and replacement costs for the Project are based on discussions with the City, Gateway, and maintenance data collected by David Taussig & Associates, Inc. for comparable projects.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Documentation to Support Information Presented

Exhibit D - FRAM Model

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9(a) – Annual Project Physical Benefits

Project Name: Fernwood Water Improvement Park

Type of Benefit Claimed: Groundwater Recharge and Groundwater Management

Measure of Benefit Claimed (Name of Units): Acre-Feet

Additional Information About this Measure: Acre-Feet of Recharge into the Groundwater Basin

(a)	(b)	(c)	(d)
Physical Benefits			
Year	Without Project	With Project	Increase in Water Supply Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	9	9
2015	0	9	9
2016	0	9	9
2017	0	9	9
2018	0	9	9
2019	0	9	9
2020	0	9	9
2021	0	9	9
2022	0	9	9
2023	0	9	9
2024	0	9	9
2025	0	9	9
2026	0	9	9
2027	0	9	9
2028	0	9	9
2029	0	9	9
2030	0	9	9
2031	0	9	9
2032	0	9	9
2033	0	9	9
2034	0	9	9
2035	0	9	9
2036	0	9	9
2037	0	9	9
2038	0	9	9
2039	0	9	9
2040	0	9	9
2041	0	9	9
2042	0	9	9
2043	0	9	9

Comments:

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9(b) – Annual Project Physical Benefits

Project Name: Fernwood Water Improvement Park

Type of Benefit Claimed: Endangered Species Habitat

Measure of Benefit Claimed (Name of Units): Acres of Enhanced Habitat and Recreational Space

Additional Information About this Measure:

(a)	(b)	(c)	(d)
Physical Benefits			
Year	Without Project	With Project	Increase in Habitat Acreage Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	5.3	5.3
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0
2019	0	0	0
2020	0	0	0
2021	0	0	0
2022	0	0	0
2023	0	0	0
2024	0	0	0
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	0	0	0
2031	0	0	0
2032	0	0	0
2033	0	0	0
2034	0	0	0
2035	0	0	0
2036	0	0	0
2037	0	0	0
2038	0	0	0
2039	0	0	0
2040	0	0	0
2041	0	0	0
2042	0	0	0
2043	0	0	0

Comments:

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9(c) – Annual Project Physical Benefits

Project Name: Fernwood Water Improvement Park

Type of Benefit Claimed: Additional Lane Miles Protected During Major Flood Events.

Measure of Benefit Claimed (Name of Units): Lane Miles

Additional Information About this Measure: Lane Miles of Major & Minor Roadways

(a)	(b)	(c)	(d)
Year	Without Project	With Project	Decrease in GHGs Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	8	8
2015	0	8	8
2016	0	8	8
2017	0	8	8
2018	0	8	8
2019	0	8	8
2020	0	8	8
2021	0	8	8
2022	0	8	8
2023	0	8	8
2024	0	8	8
2025	0	8	8
2026	0	8	8
2027	0	8	8
2028	0	8	8
2029	0	8	8
2030	0	8	8
2031	0	8	8
2032	0	8	8
2033	0	8	8
2034	0	8	8
2035	0	8	8
2036	0	8	8
2037	0	8	8
2038	0	8	8
2039	0	8	8
2040	0	8	8
2041	0	8	8
2042	0	8	8
2043	0	8	8

Comments:

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 12 – Non-monetized Benefits Checklist		
No.	Question	Enter “Yes”, “No” or “Neg”
	Community/Social Benefits	
	Will the proposal	
1	Provide education or technology benefits?	No
	Examples are not limited to, but may include:	
	- Include educational features that should result in water supply, water quality, or flood damage reduction benefits?	
	- Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management?	
	- Provide some other education or technological benefit?	
2	Provide social recreation or access benefits?	No
	Examples are not limited to, but may include:	
	- Provide new or improved outdoor recreation opportunities?	
	- Provide more access to open space?	
	- Provide some other recreation or public access benefit?	
3	Help avoid, reduce or resolve various public water resources conflicts?	Yes
	Examples are not limited to, but may include:	
	- Provide more opportunities for public involvement in water management?	
	- Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation?	
	- Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	Promote social health and safety?	Yes
	Examples are not limited to, but may include:	
	- Increase urban water supply reliability for fire-fighting and critical services following seismic events?	
	- Reduce risk to life from dam failure or flooding?	
	- Reduce exposure to water-related hazards?	
5	Have other social benefits?	No
	Examples are not limited to, but may include:	
	- Redress or increase inequitable distribution of environmental burdens?	
	- Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
	Environmental Stewardship Benefits:	
	Will the proposal	
6	Benefit wildlife or habitat in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat?	
	- Contribute to an existing biological opinion or recovery plan for a listed special status species?	
	- Preserve or restore designated critical habitat of a listed species?	
	- Enhance wildlife protection or habitat?	
7	Improve water quality in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Cause an improvement in water quality in an impaired water body or sensitive habitat?	
	- Prevent water quality degradation?	
	- Cause some other improvement in water quality?	
8	Reduce net emissions in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Reduce net production of greenhouse gasses?	
	- Reduce net emissions of other harmful chemicals into the air or water?	
9	Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?	Yes

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

	Sustainability Benefits: Will the proposal	Yes, please see attachment 3 and attachment 8.
10	Improve the overall, long-term management of California groundwater resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce extraction of non-renewable groundwater? - Promote aquifer storage or recharge?	
11	Reduce demand for net diversions for the regions from the Delta?	Yes
12	Provide a long-term solution in place of a short-term one?	Yes
13	Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net energy use on a permanent basis?	
	- Increase renewable energy production?	
	- Include new buildings or modify buildings to include certified LEED features?	
	- Provide a net increase in recycling or reuse of materials? - Replace unsustainable land or water management practices with recognized sustainable practices?	
14	Improve water supply reliability in ways not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Provide a more flexible mix of water sources?	
	- Reduce likelihood of catastrophic supply outages?	
	- Reduce supply uncertainty? - Reduce supply variability?	
15	Other (If the above listed categories do not apply, provide non-monetized benefit description)?	N/A

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Table 15(a) – Annual Benefit (All benefits should be in 2012 dollars)									
Project: Fernwood Water Improvement Park									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽¹⁾	Annual \$ Value ⁽¹⁾ (f) x (g)	Discount Factor ⁽¹⁾	Discounted Benefits ⁽¹⁾ (h) x (i)
2012									
2013									
2014	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.890	\$561
2015	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.840	\$529
2016	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.792	\$499
2017	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.747	\$471
2018	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.705	\$444
2019	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.665	\$419
2020	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.627	\$395
2021	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.592	\$373
2022	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.558	\$352
2023	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.527	\$332
2024	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.497	\$313
2025	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.469	\$295
2026	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.442	\$279
2027	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.417	\$263
2028	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.394	\$248
2029	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.371	\$234
2030	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.350	\$221
2031	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.331	\$208
2032	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.312	\$196
2033	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.294	\$185
2034	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.278	\$175
2035	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.262	\$165
2036	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.247	\$156
2037	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.233	\$147
2038	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.220	\$138
2039	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.207	\$131
2040	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.196	\$123
2041	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.185	\$116
2042	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.174	\$110
2043	Groundwater Recharge	Acre-Feet	0	9	9	\$70	\$630	0.164	\$103
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$8,181
Comments:									
Conservatively assumed that economic benefits would commence once the Project construction and implementation phases are near completion.									
<i>(1) Estimated valuation for groundwater recharge of \$70 per acre-foot based on the locally subsidized rate for replenished or recharged water.</i>									

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Table 15(b) – Annual Benefit (All benefits should be in 2012 dollars)									
Project: Fernwood Water Improvement Park									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽¹⁾	Annual \$ Value ⁽¹⁾ (f) x (g)	Discount Factor ⁽¹⁾	Discounted Benefits ⁽¹⁾ (h) x (i)
2012							\$0	1.000	\$0
2013							\$0	0.943	\$0
2014	Creation of Additional Habitat/Recreational Space	Acres	0	5.3	5.3	\$285,714	\$1,500,000	0.890	\$1,334,995
2015	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.840	\$0
2016	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.792	\$0
2017	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.747	\$0
2018	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.705	\$0
2019	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.665	\$0
2020	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.627	\$0
2021	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.592	\$0
2022	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.558	\$0
2023	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.527	\$0
2024	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.497	\$0
2025	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.469	\$0
2026	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.442	\$0
2027	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.417	\$0
2028	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.394	\$0
2029	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.371	\$0
2030	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.350	\$0
2031	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.331	\$0
2032	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.312	\$0
2033	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.294	\$0
2034	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.278	\$0
2035	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.262	\$0
2036	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.247	\$0
2037	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.233	\$0
2038	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.220	\$0
2039	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.207	\$0
2040	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.196	\$0
2041	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.185	\$0
2042	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.174	\$0
2043	Creation of Additional Habitat/Recreational Space	Acres	0	0	0	\$285,714	\$0	0.164	\$0
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$1,334,995
Comments:									

(1) Valuation of habitat based on (i) recent habitat purchases made in Los Angeles County and (ii) a settlement agreement by and between the prior property owner (of the Project site) and the City of Lynwood (available upon request). See Section XI above.

Table 18 – Present Value of Expected Annual Damage Reduction Benefits			
Project: Fernwood Water Improvement Park			
(a)	Expected Annual Damage Without Project ⁽¹⁾		\$100,381
(b)	Expected Annual Damage With Project ⁽¹⁾		\$6,511
(c)	Expected Annual Benefit	(a) – (b)	\$93,870
(d)	Present Value Coefficient ⁽²⁾		13.7648
(e)	Present Value of Future Benefits Transfer to Table 20, column (e).	(c) x (d)	\$1,292,102
(1)	See Flood Rapid Assessment Model (FRAM) attached.		
(2)	6% discount rate; 30-year analysis period.		

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 19 – Annual Costs of Project (All costs should be in 2012 Dollars)										
Project: <u>Ferwood Water Improvement Park</u>										
Year	Initial Costs Grand Total Cost from Table 7 (row (i), column (a))	Adjusted Grant Total Cost ⁽¹⁾ (b)	Annual Costs ⁽²⁾					Discounting Calculations		
			Admin (c)	Operation (d)	Maintenance (e)	Replacement (f)	Other (g)	Total Costs (a) +...+ (g) (h)	Discount Factor (i)	Discounted Project Costs (h) x (i) (j)
2012	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.000	\$0
2013	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.943	\$0
2014	\$479,489	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$486,239	0.890	\$432,751
2015	\$479,489	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$486,239	0.840	\$408,255
2016	\$479,489	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$486,239	0.792	\$385,147
2017	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.747	\$5,044
2018	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.705	\$4,758
2019	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.665	\$4,489
2020	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.627	\$4,235
2021	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.592	\$3,995
2022	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.558	\$3,769
2023	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.527	\$3,556
2024	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.497	\$3,355
2025	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.469	\$3,165
2026	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.442	\$2,986
2027	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.417	\$2,817
2028	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.394	\$2,657
2029	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.371	\$2,507
2030	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.350	\$2,365
2031	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.331	\$2,231
2032	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.312	\$2,105
2033	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.294	\$1,986
2034	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.278	\$1,873
2035	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.262	\$1,767
2036	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.247	\$1,667
2037	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.233	\$1,573
2038	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.220	\$1,484
2039	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.207	\$1,400
2040	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.196	\$1,321
2041	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.185	\$1,246
2042	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.174	\$1,175
2043	\$0	\$0	\$500	\$1,750	\$4,500	\$0	\$0	\$6,750	0.164	\$1,109
Total Present Value of Discounted Costs (Sum of column (j))										\$1,296,784
Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										
Comments:										
Administration is minimum because the efforts become part of other programs of the City.										
(1) Based on opportunity costs, sunk costs, and associated costs.										
(2) The incremental change in O&M costs attributable to the Project.										

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Costs and Benefits Summary

Table 20 summarizes the costs and benefits for the Project.

Table 20 – Proposal Benefits and Costs Summary							
Proposal: <u>Fernwood Water Improvement Park</u>							
Agency: <u>City of Lynwood</u>							
Project	Project Proponent	Total Present Value Project Costs ⁽¹⁾	Total Present Value Project Benefits			From Section D1 – Cost-Effectiveness Analysis, Cost Savings	From Section D2 – Briefly describe the main Non-monetized benefits
			From Section D3 – Monetized ⁽²⁾	From Section D4 – Flood Damage Reduction ⁽³⁾	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
	N/A	\$1,296,784	\$1,343,176	\$1,292,102	\$2,635,278		
	<i>(1) From Table 19, or RWMG method</i>						
	<i>(2) From Table 15 or RWMG method</i>						
	<i>(3) From Table 18 or RWMG method</i>						

Long Beach Graywater Program

Tables 9(a), 9(b), 12, 15(a), 15(b), 19, and 20 are included in this document to quantify water supply costs and benefits, as well as other benefits, for the Graywater Program (Project) proposed by the City of Long Beach (City). Narrative supporting the tables is provided below:

Narrative Description of the Project's Economic Costs

The Project's economic costs consist of costs contained in the Project budget (Attachment 4), as well as annual administration, maintenance, and replacement costs associated with the Project.

Cost Details

Budget categories (a) through (h) are included in the cost details as described in Attachment 4.

Estimates of Without-Project conditions; e.g. Current and Future Water Supplies and Demand.

The Project will improve water management and result in quantifiable water savings and reductions in energy consumption through water conservation. It will do so by evaluating residential landscape efficiency and retrofitting approximately 108 single family residential homes that currently use high water consuming devices, with high efficiency ones. Devices identified for retrofits include laundry machines, showers, and sinks. This Project is estimated to have an average annual water savings of approximately 2.1 acre feet per year (AFY), with an estimated lifespan of 10 years. With an annual Project benefit of 2.1 AFY, the greenhouse gas emissions would be reduced by an estimated 3 metric tons (as CO₂eq). This calculation is based on the amount of energy needed to pump 2.1 AFY of imported water over the Tehachapi Mountains and into Southern California.

Currently, the City relies heavily on imported water from the Metropolitan Water District of Southern California (MWD). This Project will provide a more reliable water supply and promote sustainable water solutions through reducing the need to import additional water supplies and maximizing water use efficiency, leveraging existing funding opportunities, building regional partnerships with local retail agencies, and meeting multiple goals across geographic and water resources service areas.

Estimates of With-Project Conditions; e.g. Improvements in New Water Supplies Made Available to Meet Demand

The Project will:

- (1) Build on previous experience to expand the "Laundry to Landscape Project" into 99 additional homes in Long Beach disadvantaged communities, as well as augment existing programs to allow for appropriate landscape improvements for which the pilot project demonstrated a need.
- (2) Conduct nine (9) additional demonstration projects to study graywater solutions scaled for larger, multi-unit residences, residences with less open space, other uses for water from the "Laundry to Landscape Project," and other graywater sources (e.g., sinks/showers).
- (3) Monitor existing 36 pilot program installations to study long-term maintenance requirements.

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

- (4) Include an outreach program to secure participants in qualifying DAC census tracts and block groups.
- (5) Conduct installations with a team that includes a professional plumber, college students pursuing environmental degrees, and disadvantaged youth from the local community, thereby creating new knowledge-based skills in the community.

Again, a total of 108 properties will be retrofitted and will save approximately 2.1 AFY of potable water per residence (based on average of 130 gallons saved per week per installation). An additional unique benefit of the program is the direct engagement of DAC residents on water conservation issues and solutions.

Description of Methods used to Estimate Without- and With-Project Conditions.

With and without Project conditions are based on discussions with the Project engineer, the City, other cities within Gateway's service area, and various Project and DAC proponents, as well as information contained in the attached Exhibits described below.

Description of the Distribution of Local, Regional, and Statewide Benefits

Benefits are primarily local in nature. However, any reduction in demand on SWP water will benefit water agencies throughout the state whose need for additional water exceeds that of the City.

Identification of Beneficiaries

The City, the entire GWMA region, all local water users and rate payers (including especially DAC rate payers), Metropolitan Water District, and all urban water suppliers intending to purchase SWP water in the future.

When the Benefits will be Received

The benefits will be realized as of the completion of the first phase of Project retrofits in 2014-2015.

Uncertainty of the Benefits

N/A

Description of any Adverse Effects

N/A

Narrative Discussion that Describes, Qualifies, and Supports the Values Entered in the Tables

Water valuation is based on the Tier 2 full service treated volumetric cost for 2014, which is the actual amount paid by the City, various water districts, and other local entities to purchase SWP water for designated uses and purposes.

Greenhouse gas (GHG) valuation is based on 2013 Reserve Price Notices published by the California Environmental Protection Agency Air Resources Board (ARB) as part of the State's Cap-and-Trade Program. The program is a central element of California's Global Warming Solutions Act (AB 32) and covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities,

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

and transportation fuels. The regulation includes an enforceable GHG cap that will decline over time. ARB will distribute allowances, which are tradable permits, equal to the emission allowed under the cap. Not only do ARB auctions generally curtail the production of GHGs, but they also raise substantial funds for the State. See “California’s First Carbon-Credit Auction Raises \$290 Million,” Los Angeles Times, November 20, 2012.

Where applicable, estimated administration, operations, maintenance, and replacement costs for the Project are based on discussions with the City, various water districts, and maintenance data collected by David Taussig & Associates, Inc. for comparable projects.

Documentation to Support Information Presented

See the following attached:

Exhibit A – Metropolitan Water District Rates and Charges

Exhibit B – 2013 Annual Auction Reserve Price Notice; California Cap-and-Trade Program Greenhouse Gas Allowance Auctions, Updated on January 15, 2013

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9(a) – Annual Project Physical Benefits

Project Name: Long Beach Graywater Program

Type of Benefit Claimed: Potable Water Savings

Measure of Benefit Claimed (Name of Units): Acre-Feet

Additional Information About this Measure: Acre-Feet of Potable Water Saved by Project.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project ⁽¹⁾	Increase in Water Supply Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	2.1	2.1
2015	0	2.1	2.1
2016	0	2.1	2.1
2017	0	2.1	2.1
2018	0	2.1	2.1
2019	0	2.1	2.1
2020	0	2.1	2.1
2021	0	2.1	2.1
2022	0	2.1	2.1
2023	0	2.1	2.1
2024	0	2.1	2.1
2025	0	2.1	2.1

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 9(b) – Annual Project Physical Benefits

Project Name: Long Beach Graywater Program

Type of Benefit Claimed: Reduced Greenhouse Gas Emissions

Measure of Benefit Claimed (Name of Units): Metric Tons

Additional Information About this Measure: Metric Tons of Greenhouse Gases Emission

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Decrease in GHGs Resulting from Project (c) – (b)
2012	0	0	0
2013	0	0	0
2014	0	3	3
2015	0	3	3
2016	0	3	3
2017	0	3	3
2018	0	3	3
2019	0	3	3
2020	0	3	3
2021	0	3	3
2022	0	3	3
2023	0	3	3
2024	0	3	3
2025	0	3	3

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 12 – Non-monetized Benefits Checklist

No.	Question	Enter "Yes", "No" or "Neg"
Community/Social Benefits		
Will the proposal		
1	Provide education or technology benefits?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Include educational features that should result in water supply, water quality, or flood damage reduction benefits?	
	- Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management?	
	- Provide some other education or technological benefit?	
2	Provide social recreation or access benefits?	No
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Provide new or improved outdoor recreation opportunities?	
	- Provide more access to open space?	
	- Provide some other recreation or public access benefit?	
3	Help avoid, reduce or resolve various public water resources conflicts?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Provide more opportunities for public involvement in water management?	
	- Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation?	
	- Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	Promote social health and safety?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Increase urban water supply reliability for fire-fighting and critical services following seismic events?	
	- Reduce risk to life from dam failure or flooding?	
	- Reduce exposure to water-related hazards?	
5	Have other social benefits?	No
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Redress or increase inequitable distribution of environmental burdens?	
	- Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
Environmental Stewardship Benefits:		
Will the proposal		
6	Benefit wildlife or habitat in ways that were not quantified in Attachment 7?	No
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat?	
	- Contribute to an existing biological opinion or recovery plan for a listed special status species?	
	- Preserve or restore designated critical habitat of a listed species?	
	- Enhance wildlife protection or habitat?	
7	Improve water quality in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Cause an improvement in water quality in an impaired water body or sensitive habitat?	
	- Prevent water quality degradation?	
	- Cause some other improvement in water quality?	
8	Reduce net emissions in ways that were not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net production of greenhouse gasses?	
	- Reduce net emissions of other harmful chemicals into the air or water?	
9	Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?	Yes

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

	Sustainability Benefits: Will the proposal	Yes, please see attachment 3 and attachment 8.
10	Improve the overall, long-term management of California groundwater resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce extraction of non-renewable groundwater? - Promote aquifer storage or recharge?	
11	Reduce demand for net diversions for the regions from the Delta?	Yes
12	Provide a long-term solution in place of a short-term one?	Yes
13	Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?	Yes
	Examples are not limited to, but may include:	Yes, please see attachment 3 and attachment 8.
	- Reduce net energy use on a permanent basis?	
	- Increase renewable energy production?	
	- Include new buildings or modify buildings to include certified LEED features?	
	- Provide a net increase in recycling or reuse of materials?	
	- Replace unsustainable land or water management practices with recognized sustainable practices?	
14	Improve water supply reliability in ways not quantified in Attachment 7?	Yes
	Examples are not limited to, but may include:	
	- Provide a more flexible mix of water sources?	
	- Reduce likelihood of catastrophic supply outages?	
	- Reduce supply uncertainty? - Reduce supply variability?	
15	Other (If the above listed categories do not apply, provide non-monetized benefit description)?	N/A

Gateway Integrated Multi-Benefit Regional Water Management Project Benefits and Cost Analysis

Table 15(a) – Annual Benefit

(All benefits should be in 2012 dollars)

Project: Long Beach Graywater Program

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project ⁽¹⁾	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽²⁾	Annual \$ Value ⁽²⁾ (f) x (g)	Discount Factor ⁽¹⁾	Discounted Benefits ⁽¹⁾ (h) x (i)
2012							\$0	1.000	\$0
2013							\$0	0.943	\$0
2014	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.890	\$1,929
2015	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.840	\$1,820
2016	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.792	\$1,717
2017	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.747	\$1,619
2018	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.705	\$1,528
2019	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.665	\$1,441
2020	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.627	\$1,360
2021	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.592	\$1,283
2022	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.558	\$1,210
2023	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.527	\$1,142
2024	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.497	\$1,077
2025	Potable Water Savings (Reduced Importation)	Acre-Feet	0	2.1	2.1	\$1,032	\$2,167	0.469	\$1,016
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$17,141
Comments:									

Table 15(b) – Annual Benefit

(All benefits should be in 2012 dollars)

Project: Long Beach Graywater Program

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit \$ Value ⁽¹⁾	Annual \$ Value (f) x (g)	Discount Factor (6%)	Discounted Benefits (h) x (i)
2012							\$0	1.000	\$0
2013							\$0	0.943	\$0
2014	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.890	\$29
2015	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.840	\$27
2016	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.792	\$25
2017	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.747	\$24
2018	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.705	\$23
2019	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.665	\$21
2020	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.627	\$20
2021	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.592	\$19
2022	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.558	\$18
2023	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.527	\$17
2024	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.497	\$16
2025	Reduced Greenhouse Gas	Metric Tons	0	3	3	\$11	\$32	0.469	\$15
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									\$254
Comments:									

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Table 19 – Annual Costs of Project

(All costs should be in 2012 Dollars)

Project: Long Beach Graywater Program

Year	Initial Costs Grand Total Cost from Table 7 (row (i), column (a))	Adjusted Grant Total Cost ⁽¹⁾ (b)	Annual Costs ⁽²⁾					Total Costs (a) +...+ (g) (h)	Discounting Calculations	
			Admin (c)	Operation (d)	Maintenance (e)	Replacement (f)	Other (g)		Discount Factor (i)	Discounted Project Costs (h) x (i) (j)
2012	\$0	\$0						\$0	1.000	\$0
2013	\$0	\$0						\$0	0.943	\$0
2014	\$200,000	\$0						\$200,000	0.890	\$177,999
2015	\$200,000	\$0						\$200,000	0.840	\$167,924
2016	\$0	\$0						\$0	0.792	\$0
2017	\$0	\$0						\$0	0.747	\$0
2018	\$0	\$0						\$0	0.705	\$0
2019	\$0	\$0						\$0	0.665	\$0
2020	\$0	\$0						\$0	0.627	\$0
2021	\$0	\$0						\$0	0.592	\$0
2022	\$0	\$0						\$0	0.558	\$0
2023	\$0	\$0						\$0	0.527	\$0
2024	\$0	\$0						\$0	0.497	\$0
2025	\$0	\$0						\$0	0.469	\$0
2026	\$0	\$0						\$0	0.442	\$0
Total Present Value of Discounted Costs (Sum of column (j))										\$345,923
Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										
Comments:										

(1) Based on opportunity costs, sunk costs, and associated costs

(2) The incremental change in O&M costs attributable to the Project.

**Gateway Integrated Multi-Benefit Regional Water Management Project
Benefits and Cost Analysis**

Costs and Benefits Summary

Table 20 summarizes the costs and benefits for the Project.

Table 20 – Proposal Benefits and Costs Summary							
Proposal: <u>Graywater Program</u>							
Agency: <u>City of Long Beach</u>							
Project	Project Proponent	Total Present Value Project Costs ⁽¹⁾	Total Present Value Project Benefits			From Section D1 – Cost-Effectiveness Analysis, Cost Savings	From Section D2 – Briefly describe the main Non-monetized benefits
			From Section D3 – Monetized ⁽²⁾	From Section D4 – Flood Damage Reduction	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
		\$345,923	\$17,395	\$0	\$17,395		
<i>(1) From Table 19, or RWMG method</i>							
<i>(2) From Table 15 or RWMG method</i>							

Exhibit A
Metropolitan Water District Rates and Charges

Exhibit B
2013 Annual Auction Reserve Price Notice;
California Cap-and-Trade

Exhibit C

DAC Water Savings Calculations, provided by the District

Exhibit D
FRAM Model