Monterey Peninsula, Carmel Bay, and South Monterey Bay
Integrated Regional Water Management
2014 Drought Grant Proposal

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Attachment 3. Project Justification

Attachment 3 includes a summary of the proposed project, including the purpose and how the Proposal meets the need(s) created by the California drought. Attachment 3 also contains the estimated physical benefits of the *five* projects included in this proposal; justifies how the projects are technically feasible; describes how the projects can achieve the claimed level of benefits; and explains whether the benefits will be attained through the least cost alternative.

Attachment 3 is presented in the following sub-sections:

- Project Summary Table (DWR Table 4)
- Regional Map
- Project Description
- Project Map
- Project Physical Benefits (DWR Table 5)
- Technical Analysis of Physical Benefits Claimed
- Cost Effectiveness Analysis (DWR Table 6)

Relationship between IRWM Regions

The primary area where overlap and opportunities occur for inter-regional projects between the Greater Monterey County and the Monterey Peninsula, Carmel Bay, and South Monterey Bay regions is in the vicinity of the Seaside/Salinas Valley Groundwater Basin divide and for the Monterey Peninsula in particular, the management of the Seaside Basin as a place of storage and extraction (Figure 1). The Seaside Basin and former Fort Ord area constitutes a geographic area within which a significant opportunity exists for stakeholders in the two IRWM planning regions to collaborate and coordinate on projects of interest to both regions.

In Bulletin 118[1], DWR considers the Seaside Groundwater Basin (Basin 3-4.08) to be a sub-basin of the Salinas Valley Basin (Basin 3-4). Physically, a regional analysis of groundwater levels found that the boundary between the Seaside and Salinas Valley Groundwater Basins is represented by a groundwater flow divide, which is simply the high point in the regional water-level surface between pumping depressions in Seaside, the Salinas Valley, and the El Toro Creek area. The lack of wells and water extraction in proximal areas of the former Fort Ord lands and highland areas adjacent to the Salinas Valley may encourage this divide, which acts as a “ridge” of higher groundwater levels between lower groundwater level areas in adjacent areas of Seaside and Salinas Valley. Because a large portion of these lands is controlled by the Bureau of Land Management (BLM) or are not arable lands, it is unlikely that groundwater extraction in this area would increase in the foreseeable future.

Potable water is provided to customers in the Seaside basin by several dozen water distribution systems. Over 90% of the water is delivered by a single purveyor (Cal-Am). Cal-Am operates several water

[1] California Department of Water Resources California's Groundwater Bulletin 118 - Salinas Valley Groundwater Basin, Seaside Subbasin. Groundwater Basin Number: 3-4.08, Update February, 2004

distribution systems in the area, some of which are interconnected. The main system serves the Carmel Valley, Monterey Peninsula, and coastal subareas of the Seaside basin.

The Marina Coast Water District provides municipal supply water to existing and future developed areas on the former Fort Ord military base, some of which overlies the Seaside Groundwater Basin. Within the Seaside basin, this includes the residential areas and schools surrounding the Bayonet and Black Horse golf courses. The water is obtained from wells near Marina, in the Salinas Valley Groundwater basin. Although there is currently a general prohibition on groundwater exportation from the Salinas Valley, Section 52-9 "Powers of Agency" of the Monterey County Water Resources Agency Act enabling legislation states:

> *The Agency has perpetual succession and may do any of the following:*
> *(u) Prevent the export of groundwater from the Salinas River Groundwater Basin, except that use of water from the basin on any part of Fort Ord shall not be deemed an export. Nothing in this act prevents the development and use of the Seaside Groundwater Basin for use on any lands within or outside that basin.*

Currently wastewater from the Monterey Peninsula region is conveyed to the RTP for reuse in the Salinas Valley for irrigating crops in the Castroville area. Projects in this proposal would link water resources in the Salinas Valley with supplies to the Seaside Groundwater Basin and would augment the supply of recycled water to the Salinas Valley Groundwater Basin. These include diversions of stormwater runoff in the cities of Monterey and Salinas for treatment at the Regional Treatment Plant (RTP) and the Advanced Water Purification Demonstration Facility. There are ongoing discussions among agencies within the two IRWM regions about water supplies to the RTP and the proposed Seaside Basin Groundwater Replenishment (GWR) Project that would provide additional water to northern Salinas Valley for irrigation use and highly treated recycled water to the Seaside Groundwater Basin for injection and indirect potable reuse water.

The GWR Project, which could be completed and operational in late 2016 or early 2017, is subject to approval by the California Public Utilities Commission (CPUC). A decision by the CPUC for the completion of the GWR Project is not expected until the second quarter of 2015. Under the General Settlement Agreement between most of the parties involved, the GWR Project must meet certain requirements concerning source waters, schedule, cost, benefits, a Final Environmental Impact Report, water purchase agreement, design, and funding. A hearing on the project before the CPUC is scheduled for December 2014. As of July 2014, the GWR Project is on schedule to meet the requirements for the CPUC to approve the project. Projects in this proposal are consistent with the GWR Project proposal; however, these projects are not dependent on the GWR Project and can move forward without the approval of the GWR Project by the CPUC.

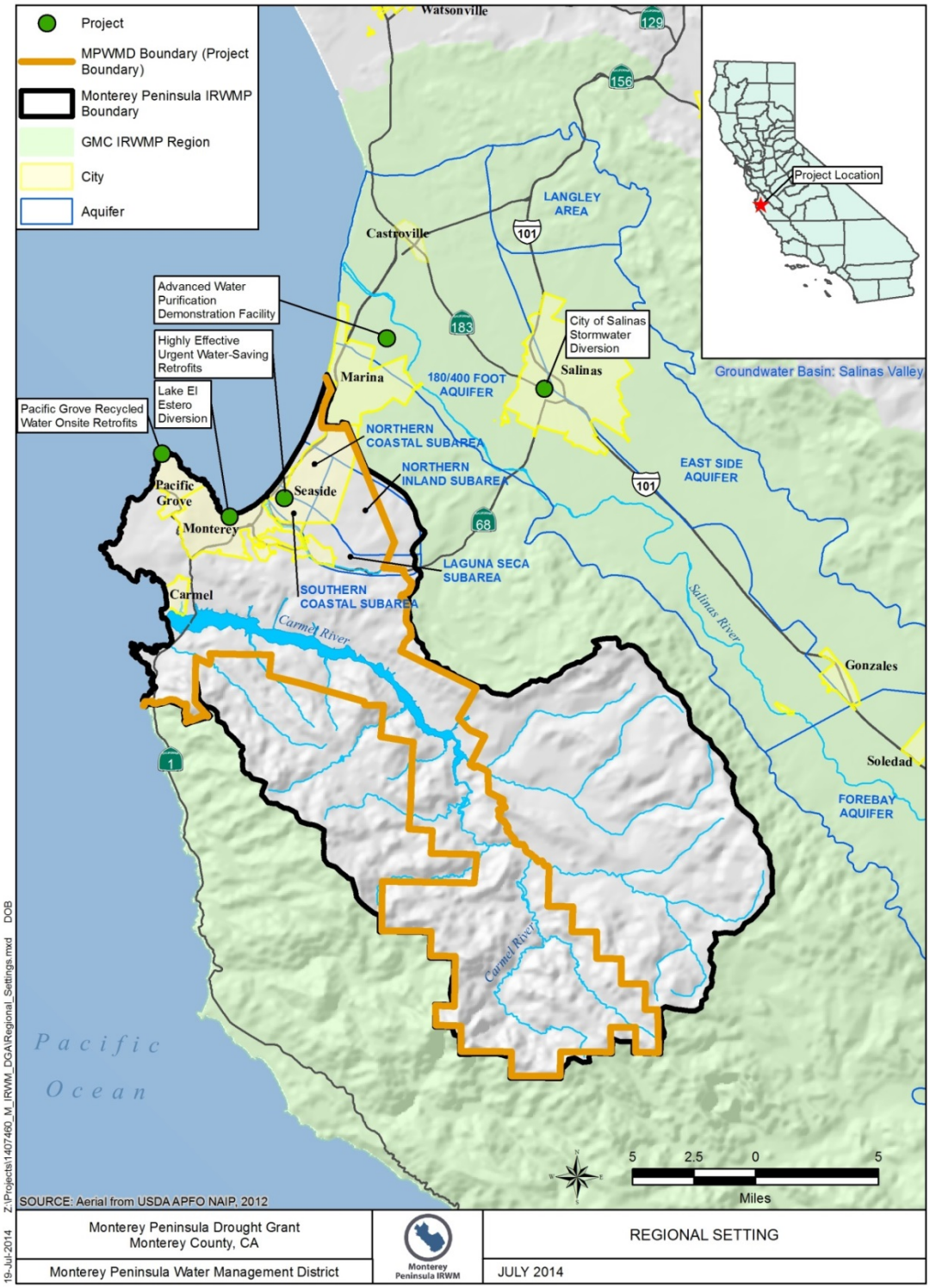
A common theme for this drought proposal is the Recycled Water Element. Four of the five proposed projects produce recycled water by treatment of stormwater which otherwise would drain directly to Monterey Bay or would be conveyed to the Bay via the Salinas River. Production of recycled water will augment local supplies of potable water and be used to offset groundwater pumping in the Carmel River Basin. Three of these projects will facilitate implementation of the GWR either by delivering stormwater to the Regional Treatment Plant or by improving the technology to be used to treat these inflows to potable standards.

PROJECT SUMMARY TABLE

The table below is used to determine the eligibility of each project, and is intended to provide a quick checklist for the project attributes related to the drought and to the IRWM Plan. Each proposed project matches at least one project element in both sections (i.e., Drought Project Element and IRWM Project Element).

Table 4 – 2014 IRWM Drought Solicitation Project Summary Table						
Drought Project Element		**City of Salinas Drought Relief Through Stormwater Diversion for Water Supply**	**Lake El Estero Diversion**	**Advanced Water Purification Demonstration Facility**	**Recycled Water Onsite Retrofits**	**HEART Pilot Program**
D.1	Provide immediate regional drought preparedness	x	x	x	x	x
D.2	Increase local water supply reliability and the delivery of safe drinking water		x	x	x	x
D.3	Assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective					x
D.4	Reduce water quality conflicts or ecosystem conflicts created by the drought	x	x	x	x	x
IRWM Project Element						
IR.1	Water supply reliability, water conservation, and water use efficiency	x	x	x	x	x
IR.2	Stormwater capture, storage, clean-up, treatment, and management	x	x	x	x	
IR.3	Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands					
IR.4	Non-point source pollution reduction, management, and monitoring	x	x			
IR.5	Groundwater recharge and management projects	x	x	x	x	
IR.6	Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users	x	x	x	x	
IR.7	Water banking, exchange, reclamation, and improvement of water quality	x	x	x	x	
IR.8	Planning and implementation of multipurpose flood management programs		x			
IR.9	Watershed protection and management	x	x	x		
IR.10	Drinking water treatment and distribution	x	x	x	x	
IR.11	Ecosystem and fisheries restoration and protection	x	x	x		x

REGIONAL MAP FOR: LAKE EL ESTERO DIVERSION, ADVANCED WATER PURIFICATION DEMONSTRATION FACILITY, RECYCLED WATER ONSITE RETROFITS, AND HEART PILOT PROGRAM



3.1 Drought Relief through Stormwater Diversion for Water Supply

3.1.1 Project Description

Project Name: City of Salinas Drought Relief through Stormwater Diversion for Water Supply

Implementing Agency/Organization(s): City of Salinas

Project Description: Divert stormwater and urban/industrial dry-weather runoff for reuse, protecting groundwater supply, reducing pollution into the Salinas River, and enhancing agricultural and drinking water supply.

Project Discussion: This project provides immediate regional drought preparedness. The project enhances the region's water supply by capturing highly polluted dry-weather urban and industrial runoff and stormwater runoff from neighborhoods in South Salinas and reclaiming that water for agricultural irrigation. The recycled water will be used as part of the Castroville Seawater Intrusion Project (CSIP), which provides recycled and diverted river water to 12,000 irrigated acres in the northern Salinas Valley to help offset groundwater pumping in the heavily seawater-intruded coastal aquifers of the Salinas Valley Groundwater Basin. The project will thus help reduce the advancement of seawater intrusion in the Salinas Valley Groundwater Basin, and more immediately, will help protect the drinking water supply for the disadvantaged community of Castroville.

Diverting surface runoff for reuse will increase water supply reliability and provide increased drought tolerance, not only for the coastal northern Salinas Valley and community of Castroville, but for the Greater Monterey County IRWM region as a whole, since almost the entire region depends upon the Salinas Valley Groundwater Basin for its water supply. Since the modifications will be permanent, the project will make more water available if the drought continues, during future droughts, and during non-drought operations. An additional and important benefit of the project is that it will significantly reduce the amount of pollutants discharged into the sensitive habitats of the Salinas River (designated as critical steelhead habitat) and the federally protected Monterey Bay National Marine Sanctuary (MBNMS). Expedited funding for this project is necessary to ensure that this water be made available if the drought continues into 2015.

Drought Impacts Addressed

1. Reduces Risk of Not Meeting Drinking Water Demand. As stated above, this project adds a new water source to CSIP. By providing this additional water source to CSIP, the project will increase the longevity of the groundwater supply by reducing overdraft and seawater intrusion. As the groundwater basin provides all water for the Castroville Community Services District (CCSD), this project will help protect the drinking water supply for that disadvantaged community, which is in jeopardy if the current drought continues into 2015.

2. Reduces Risk of Not Meeting Agricultural Water Demand. By the same argument, this project will help protect the groundwater supply for growers in northern Salinas Valley, an area that may see

crop reduction if the drought continues. The project will deliver more water directly to growers via CSIP by adding captured and reclaimed industrial and urban runoff as a supplemental water source.

3. Reduces Groundwater Overdraft and Seawater Intrusion. CSIP provides growers with recycled water to reduce groundwater usage and overdraft. The MRWPCA's wastewater treatment plant (WWTP), which provides the main CSIP water supply, is currently operating greatly under capacity. This project will collect and treat stormwater as well as dry-weather flows from industrial, agricultural and urban runoff from 1,630 acres in South Salinas. This stormwater diversion will provide an additional water source to MRWPCA's WWTP and CSIP, which will significantly help to reduce groundwater basin overdraft.

4. Reduces Drought-related TMDL Violations. The Salinas River is one of the more polluted inland water bodies in the country. Currently the highly polluted runoff from the City discharges into the Salinas River (critical steelhead habitat) and the MBNMS. Diverting this polluted water to the WWTP will help to mitigate pollution problems in these water bodies by decreasing the mass of potentially deleterious constituents released into the river—including oil and grease, nutrients, trace metals and synthetic organics, and pathogenic organisms.

In addition to the physical benefits described in Table 5, the following benefits are also achieved:

1. Increased Crop Production. Diverting and treating this water for agricultural use has the potential to increase crop yield, especially as the current drought depletes water availability and seawater intrusion threatens the groundwater supply. Furthermore, the additional water could help expand the service area for the CSIP.

2. Increased Number of Native Species. The Salinas River supports a steelhead population, but current levels of pollution threaten that population. The Salinas River also provides riparian habitat as part of the Salinas River National WildlifeRefuge, which is home to several endangered species. Reducing the amount of urban and industrial pollution discharged into the river will have a positive impact on steelhead and the threatened and endangered species in the wildlife refuge

3.1.2 Regional and Project Location Map

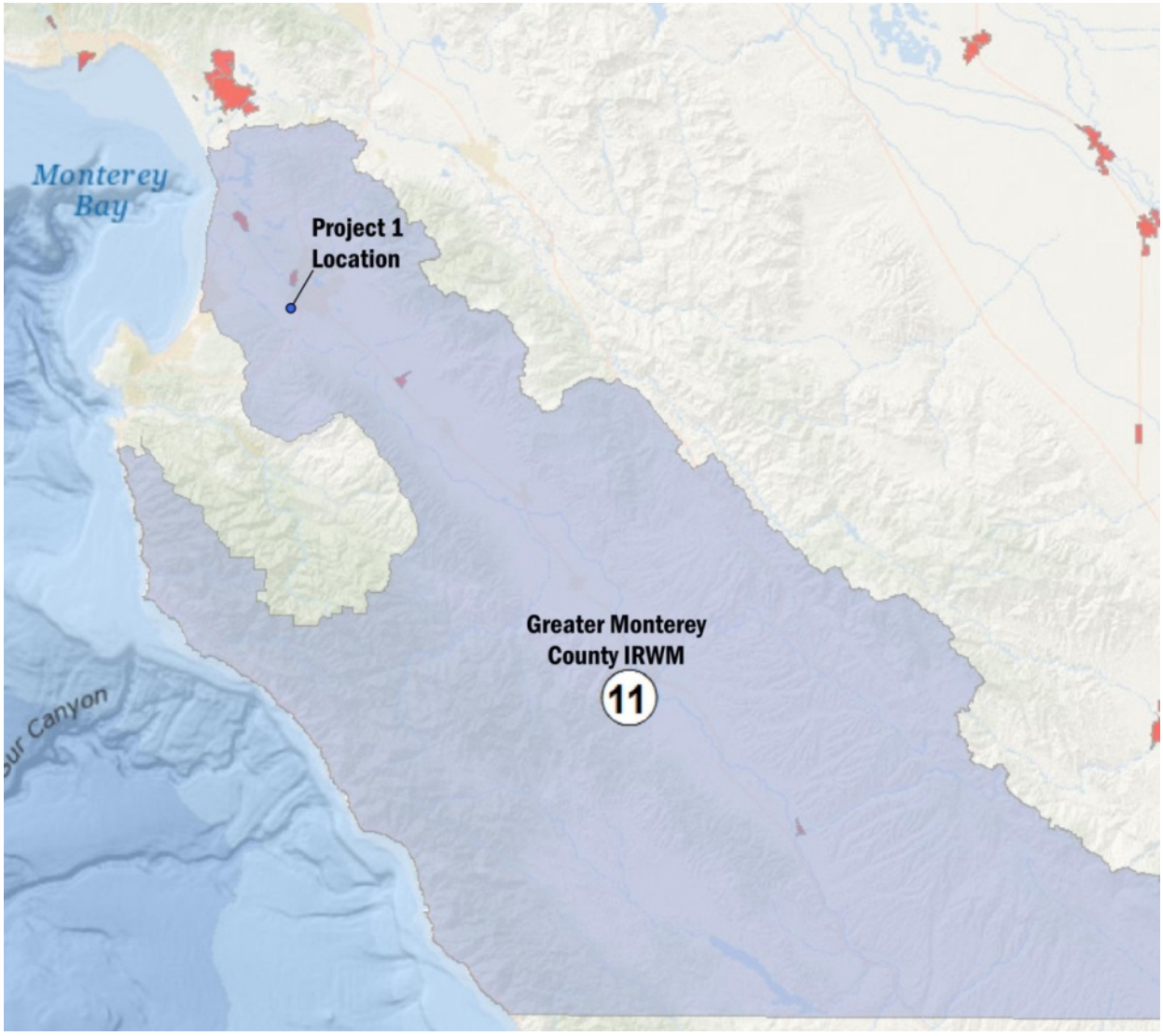


Figure 3.1-1 Regional Map and Project Location for City of Salinas

3.1.3 Project Maps

Project Maps for City of Salinas Drought Relief through Stormwater Diversion for Water Supply Project can be categorized into two parts:

1. For the project, the City will construct the new facilities on City-owned property northwest of Hitchcock Road and southwest of Davis Road, an area that receives runoff from the South Salinas as well as at Davis Road near Market Street (for the reclamation Ditch diversion). The City also will repurpose the Blanco Detention Basin to become part of the stormwater pretreatment system, prior to diversion and combination with raw sewage. Figures 3.1-2, 3.1-3 and 3.1-4 identify these areas and key project features and components.

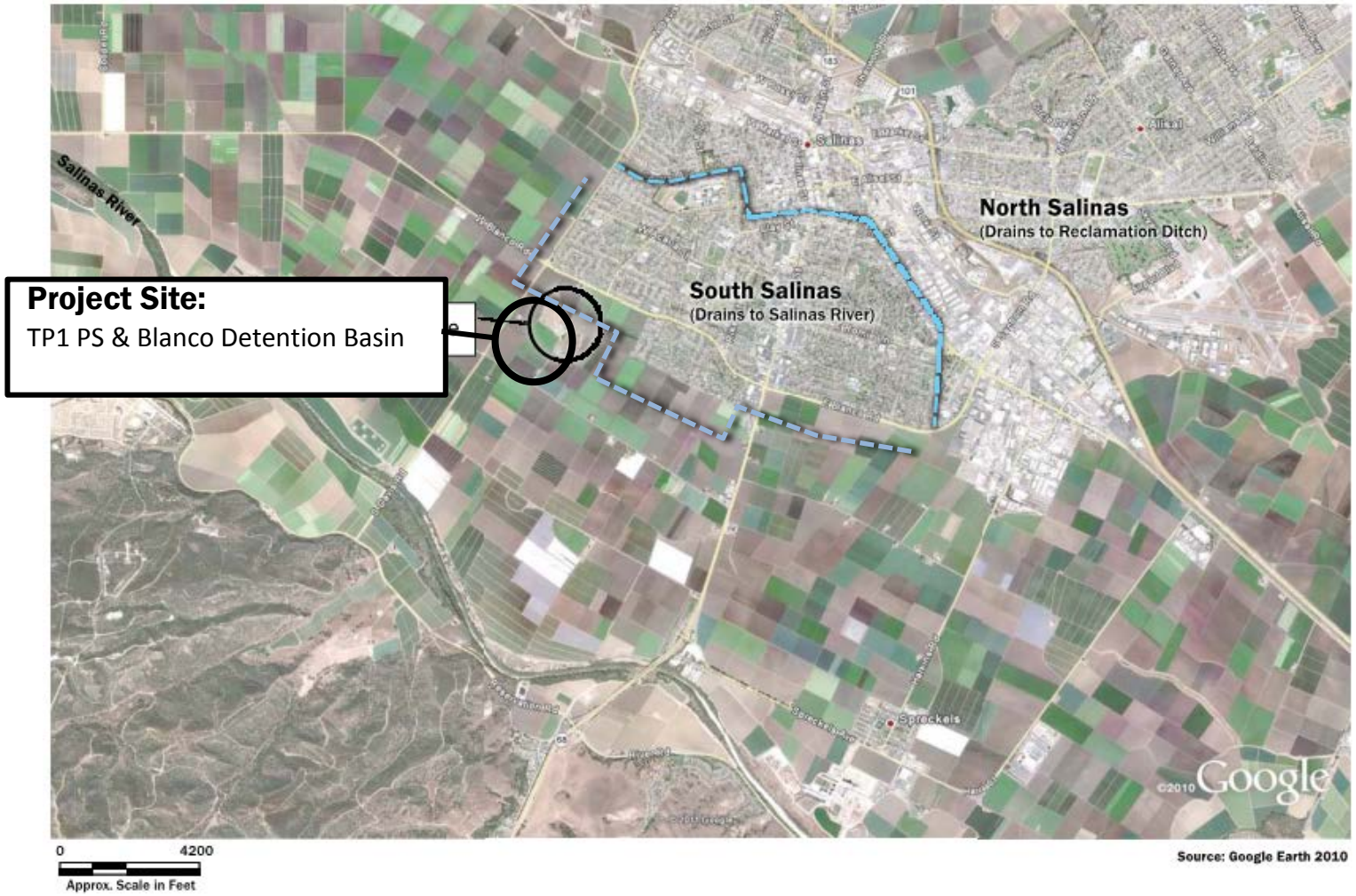


Figure 3.1-2.Project 1 Location Map

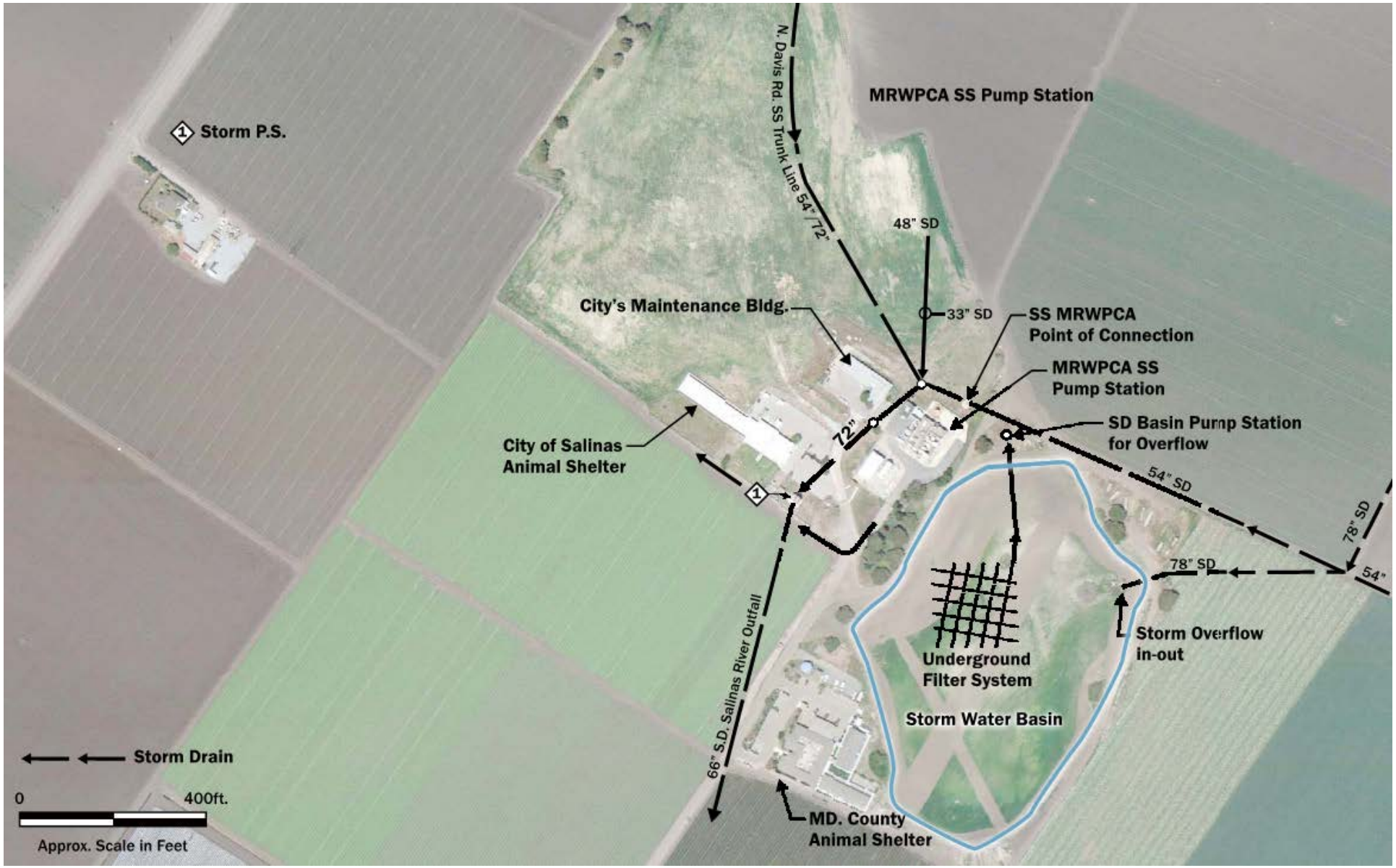


Figure 3.1-3. Project 1 Site for South Salinas Stormwater Diversion, Existing Storm Drain (SD) System and Existing Sanitary Sewer (SS) TP 1Pump Station

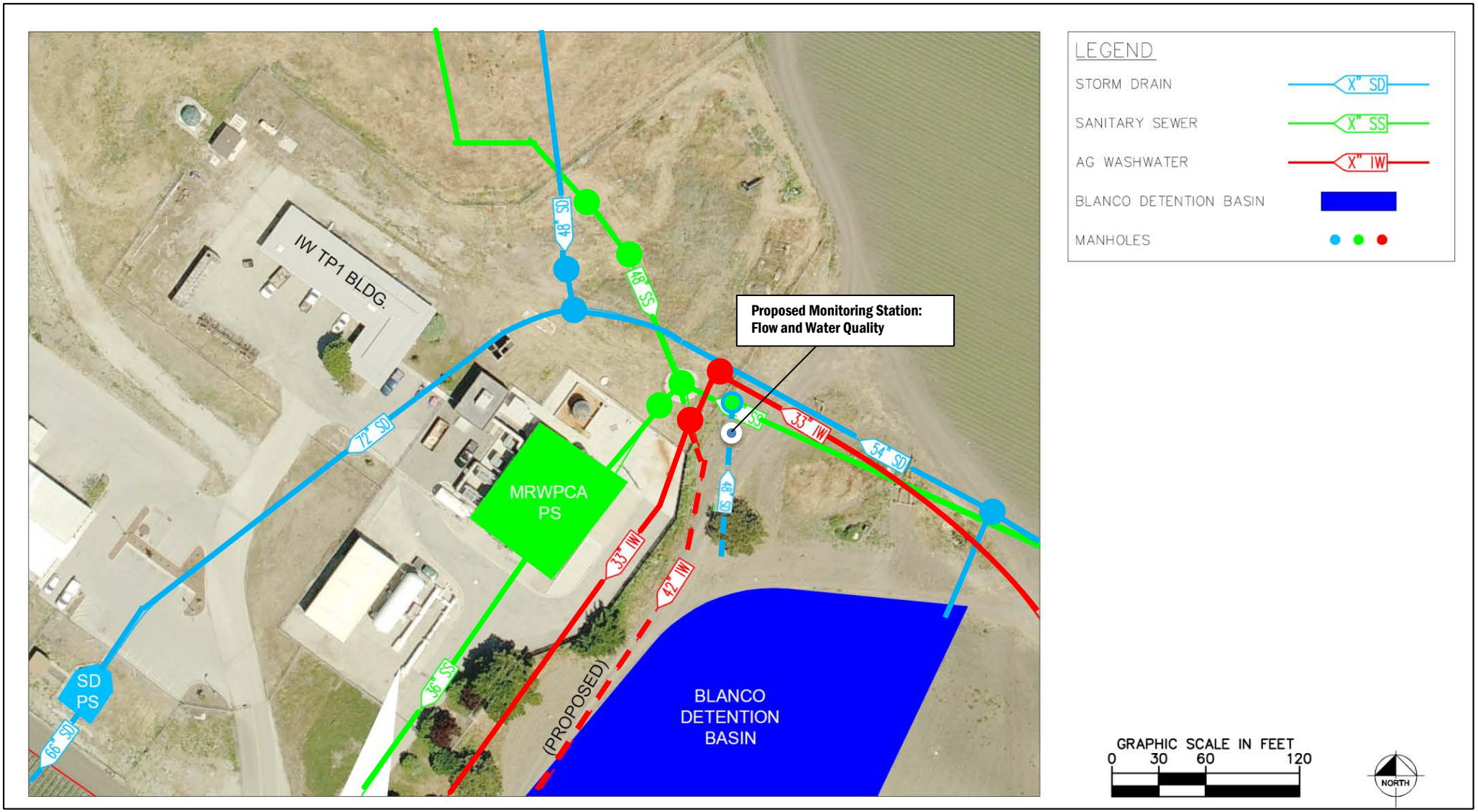


Figure 3.1-4. Project 1 Facilities

2. This project will provide benefits to the aquifers in Castroville region of California's Central Coast as well as the critical steelhead habitat in the Salinas River. Seawater intrusion reduction benefits will affect groundwater supplies in the aquifer in the Castroville area as well as agricultural land in the CSIP program, areas shown in Figure 3.1-5 and 3.1-6. Pollution mitigation benefits will have direct and ancillary benefits for the Salinas River, MBNMS and the Salinas River Nation Wildlife Preserve as shown in Figure 3.1-7.

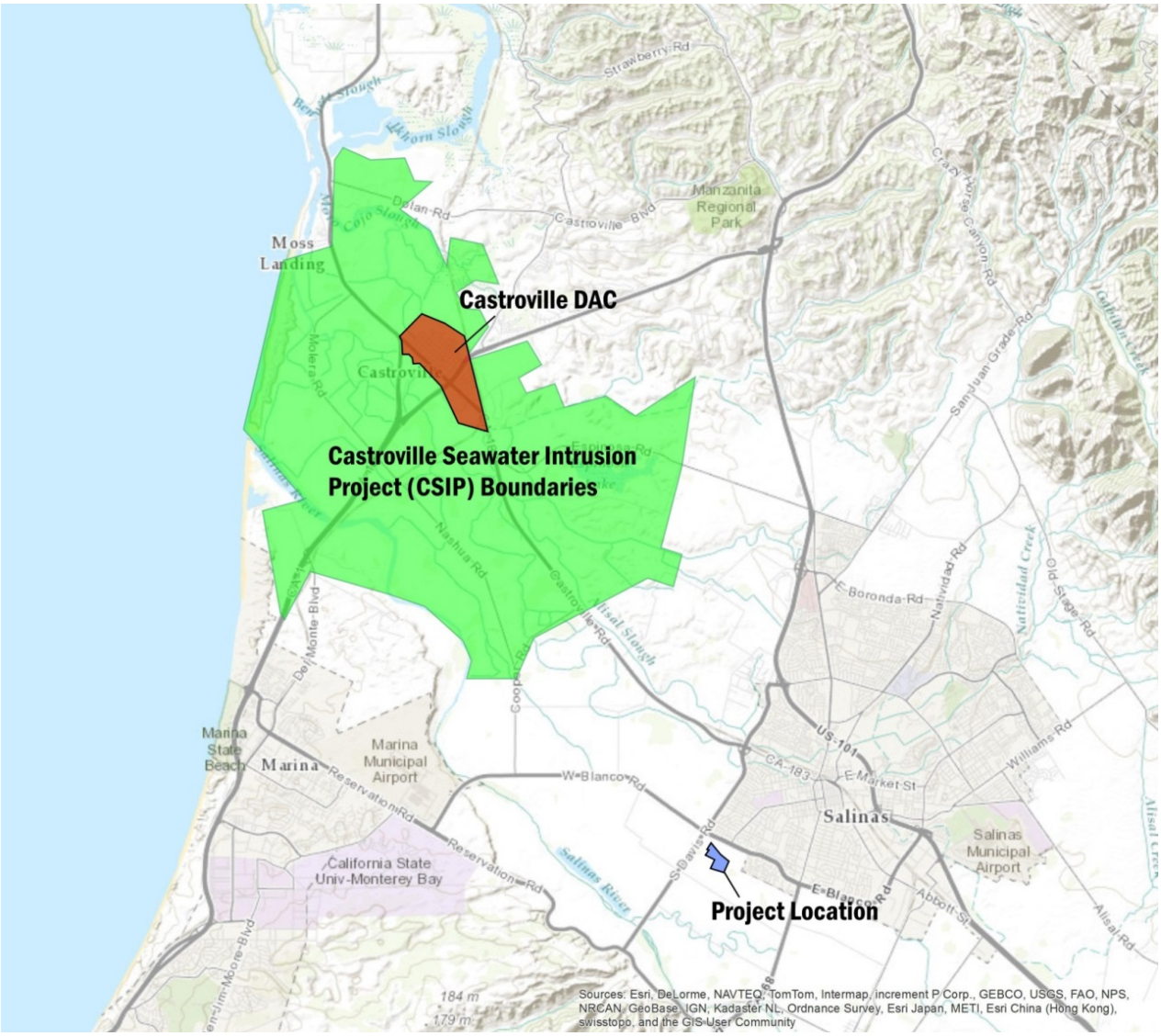


Figure 3.1-5. Region of Benefit: Drought Preparedness, Agricultural Water via CSIP

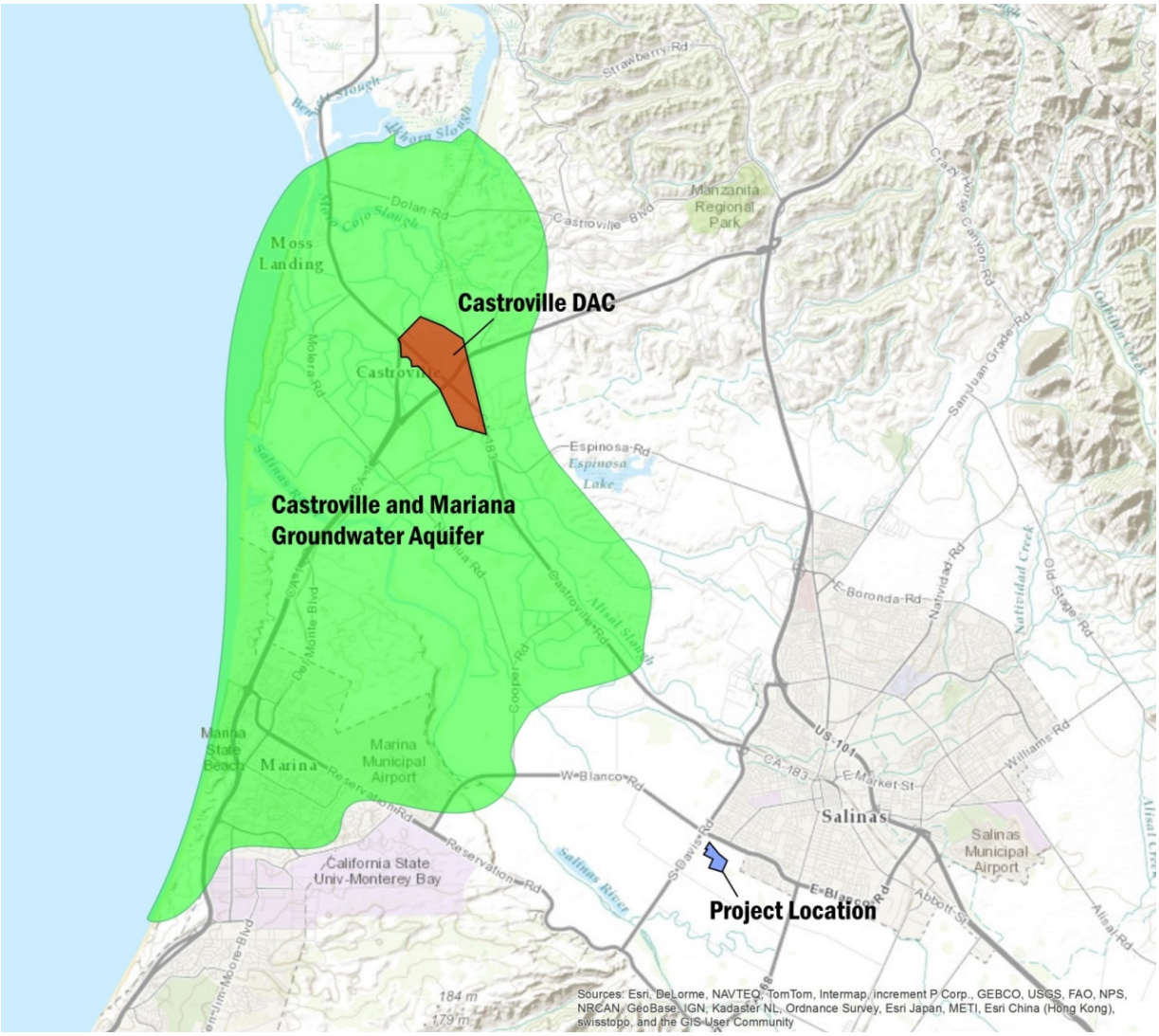


Figure 3.1-6. Region of Benefit: Drought Preparedness, Drinking Water via Groundwater Supply

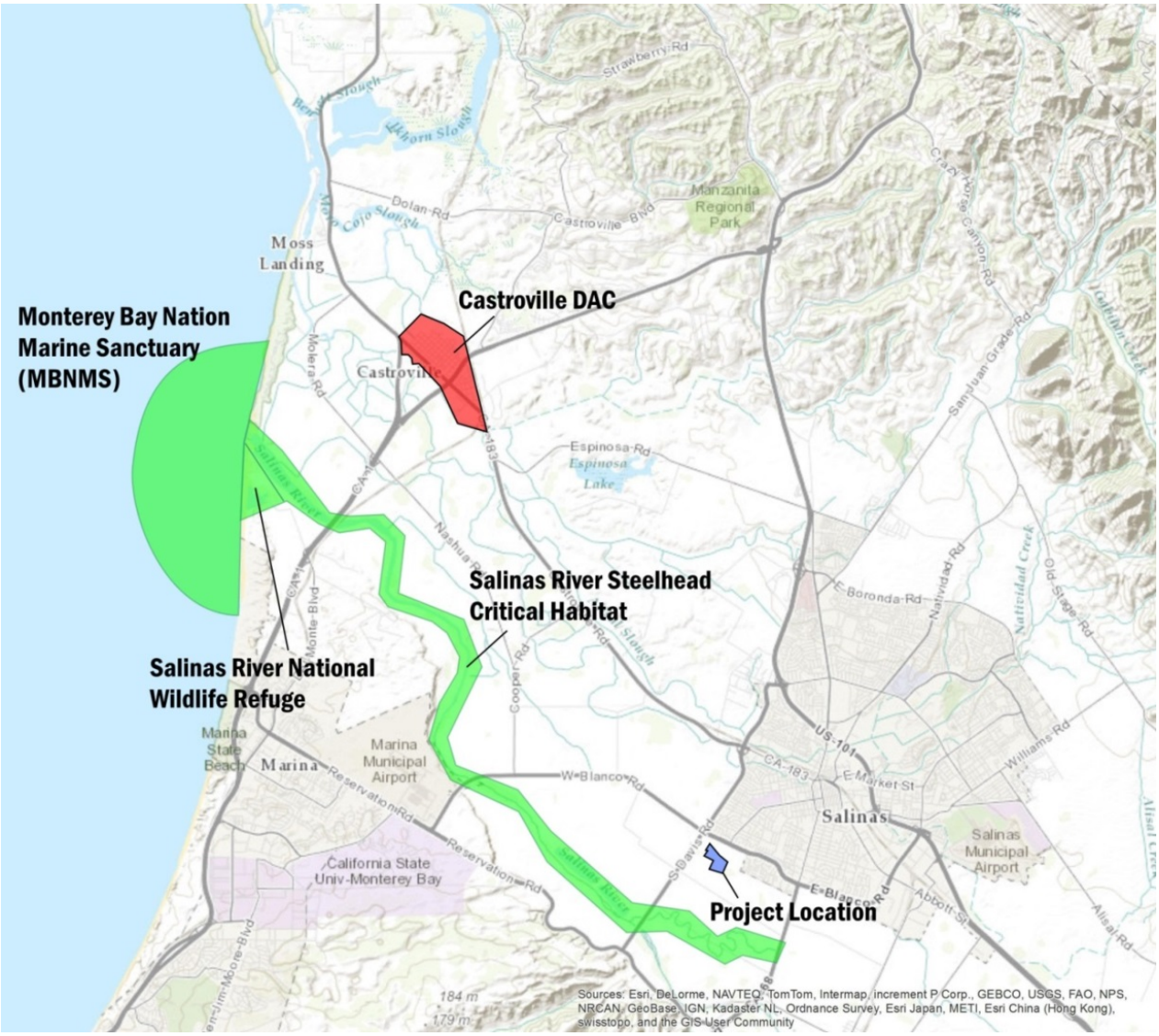


Figure 3.1-7. Region of Benefit: Pollution Mitigation

3.1.4 Project Physical Benefits

Table 3-1. Physical Benefit Number 1

Table 5 – Annual Project Physical Benefits **Project Name:** **Drought Relief through Stormwater Diversion for Water Supply** **Type of Benefit Claimed:** **Water Available for Reuse from South Salinas Urban and Industrial Runoff** **Units of the Benefit Claimed :** **AFY** **Additional Information About this Benefit :**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
2015	0	250	250
2016	0	250	250
Etc.	0	250	250
Comments: Benefit will continue indefinitely once the project is implemented			

Table 3-2. Physical Benefit Number 2

Table 5 – Annual Project Physical Benefits **Project Name:** **Drought Relief through Stormwater Diversion for Water Supply** **Type of Benefit Claimed:** **South Salinas Dry Weather Runoff Pollution Reduction to Salinas River** **Units of the Benefit Claimed :** **Percent** **Additional Information About this Benefit :**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
2015	0	100	100
2016	0	100	100
Etc.	0	100	100
Comments: This table shows percent of pollution reduction rather than amount of constituents because the exact amount of constituents will vary. Tables 3-5 and 3-6 in section 3.15.2 Recent History Conditions and Backgrounds provide an example of the amounts and types of constituents that will be captured and prevented from entering the Salinas River and downstream habitats. The tables show the maximal results of water quality samples taken from two outfalls that capture runoff from South Salinas, monitored in February 2014. Benefits will continue indefinitely once the project is implemented.			

Table 3-3. Physical Benefit Number 3

Table 5 – Annual Project Physical Benefits			
Project Name: Drought Relief through Stormwater Diversion for Water Supply **Type of Benefit Claimed:** South Salinas Shoulder Month Pollution Reduction to Salinas River **Units of the Benefit Claimed :** Percent **Additional Information About this Benefit :**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
2015	0	80	80
2016	0	80	80
Etc.	0	80	80
Comments: This table shows percent of pollution reduction rather than amount of constituents because the exact amount of constituents will vary. Tables 3-5 and 3-6 below provide an example of the amounts and types of constituents that will be captured and prevented from entering the Salinas River and downstream habitats. The tables show the maximal results of water quality samples taken from two outfalls that capture runoff from South Salinas, monitored in February 2014. Benefits will continue indefinitely once the project is implemented.			

Table 3-4. Physical Benefit Number 4

Table 5 – Annual Project Physical Benefits			
Project Name: Drought Relief through Stormwater Diversion for Water Supply **Type of Benefit Claimed:** South Salinas First Flush Pollution Reduction to Salinas River **Units of the Benefit Claimed :** Percent **Additional Information About this Benefit :**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
2015	0	95	95
2016	0	95	95
Etc.	0	95	95
Comments: This table shows percent of pollution reduction rather than amount of constituents because the exact amount of constituents will vary. Tables 3-5 and 3-6 below provide an example of the amounts and ty of constituents that will be captured and prevented from entering the Salinas River and downstream habita The tables show the maximal results of water quality samples taken from two outfalls that capture runoff fr South Salinas, monitored in February 2014. Benefits will continue indefinitely once the project is implement			

3.1.5 Technical Analysis of Physical Benefits Claimed

3.1.5.1 Technical Basis of the Project

The City of Salinas (City) drains part of its stormwater and dry-weather surface runoff to the Salinas River (South Salinas—about 1,630 acres south of Market Street), which flows to the Monterey Bay National Marine Sanctuary (MBNMS). Currently an average of about 200 acre-feet per year (AFY) of untreated urban and industrial stormwater runoff from South Salinas discharges into the Salinas River near Davis Road. The maximum annual volume in the last 80 years is estimated to be 650 AFY. In reality these runoff estimates are an underestimate of the total runoff as they are based on precipitation and do not account for dry-weather flows (agricultural and industrial runoff such as irrigation flow, washwater flow, etc.). During dry weather the City discharges an additional 50 to 100 AFY of surface runoff to the river from South Salinas. Thus the total average annual South Salinas discharge is about 250 to 300 AF with a potential maximum of 700 AF.[2]

Discharging runoff into the Monterey Bay through the Salinas River presents two problems: one, polluted water flows into critical steelhead habitat in the Salinas River and the MBNMS untreated, and two, large amounts of water that could otherwise be recycled and used to protect the threatened groundwater supply, flow to the sea. In the face of current drought conditions, increased seawater intrusion in the groundwater supply and the continuing decline of steelhead in the Salinas River are urgent concerns. To provide more water resources for groundwater recharge, indirect potable reuse and/or agricultural irrigation, while simultaneously reducing pollutant discharge into the Salinas River and MBNMS, the City and Monterey Regional Water Control Agency (MRWPCA) need to divert and treat this urban and industrial runoff to provide an additional water source to the area.

The project is based on Caltrans Best Management Practices for near-source filtration and infiltration using a detention basin or media filter. The City chose to use a detention basin as a primary stormwater filtration system as it is proven to provide very effective primary filtration. Caltrans performed a study published in the BMP Retrofit Pilot Program Final Report, which analyzed the effectiveness of several implementations of detention basins and media filters. The study found that such filters are very effective at filtering effluent and removing trash and pollutants near their source, providing temporary storage and infiltration in the process.[3] Furthermore, as the detention basin is already in place, fully functional and under capacity, using the detention basin is the most cost-effective way to achieve the goal of 100% dry-weather runoff capture, and it is the preferred method of pollution reduction to the Salinas River as recommended in the Pollutant Load Reduction Plan Salinas River Outfall report.[4]

Regarding contaminant removal and water reuse feasibility, MRWPCA WWTP has a long record of effectively removing raw sewage constituents and will continue to use appropriate and proven processes to treat diverted water and deliver high quality recycled water. This recycled water has been made available to growers in the Castroville Seawater Intrusion Project (CSIP) since 1992, and has been proven

[2] This is a conservative estimate based on "Runoff Estimation for Salinas River Watershed Portion of the City of Salinas", July 18 2013, Pages 1-12

[3] Cal Trans, BMP Retrofit Pilot Program Final Report, January 2014, Page 16-3

[4] Prepared by Larry Walker Associates, Second Revision 2013, Page 33

to greatly reduce grower dependence on groundwater and reduce seawater intrusion in the 180/400-Foot Aquifers (shown in Figure 3-8b in section 3.1.5.4). Furthermore, the WWTP currently operates under capacity and is capable of treating and delivering the additional flow without any required modifications or upgrades. According to MRWPCA Recycled Water Program Assistant Mike McCullough, the WWTP uses about 21 million gallons per day (mgd) of 29.6 mgd available capacity.

3.1.5.2 Recent Historical Conditions and Background

Castroville Disadvantaged Community Drinking Water Issues: The Castroville Community Services District (CCSD) serves water to about 7,400 residents in the community of Castroville, a disadvantaged community (DAC). The CCSD currently delivers about 820 AFY (0.73 million gallons per day). The district draws water from the 400-Foot aquifer through three wells. The static water level is more than 100 feet below sea level for these wells, having dropped nearly 80 feet over the past three months. If the levels drop any lower they will be below the CCSD's level transmitters. As an apparent direct result of ongoing drought conditions, the water quality for two of these wells has degraded markedly, with chloride concentration at Well 3 increasing by over 130 mg/L in the past month to 476 mg/L of chloride. Owing to the continuing water table drop, CCSD's energy costs for pumping have increased about $3,000 per month, compared to the same wells and the same calendar dates last year. CCSDGeneral Manager Eric Tynan says he expects to lose one or two of these wells by the end of August. He hopes to drill a new well further to the east but the cost will be substantial, over $1 million.

CCSD also owns one well currently not in service that penetrates into a much deeper aquifer, roughly 1,400 feet deep. This well's water quality is problematic. Its arsenic (As) concentration is 17 micrograms per liter (µg/L), well above the maximum contaminant level of 10 µg/L. Furthermore, the deeper well water has elevated sulfur compounds and is odorous. CCSD estimated that an As treatment system would cost about $1 million per well. CCSD also is considering desalination, which would also be very costly, in lieu of drilling a new well or treating groundwater to remove As and sulfur compounds.

This project is designed to divert stormwater from South Salinas to provide more water to the CSIP, to prevent seawater contamination of the groundwater aquifer that serves CCSD. This project will provide a new water source to growers to alleviate the strains on the groundwater supply, thus protecting CCSD's threatened drinking water source, the 400-Foot aquifer. Grant funding will reduce drought impacts for CCSD and reduce irrigation well pumping from the 180/400-foot aquifer.

Salinas River Designated as Critical Habitat for Steelhead: South-Central California Coast steelhead (Oncorhynchus mykiss) is federally listed as threatened (listed in 1997 and reconfirmed in 2006). Critical habitat has been designated for South-Central California Coast steelhead within the Salinas River basin, which includes the Salinas River and the Salinas River Lagoon. The South-Central California Coast steelhead populations have declined from annual runs totaling 27,000 spawning adults to less than 500. Pollutants, including turbidity, have adverse impacts on steelhead habitat. The project will help reduce the amount of pollutants in the Salinas River and thereby help protect steelhead.

Monterey Bay National Marine Sanctuary: The Salinas River discharges into the federally protected Monterey Bay National Marine Sanctuary. The MBNMS encompasses four Critical Coastal Areas (CCA), two

Areas of Special Biological Significance (ASBS), and five Marine Protected Areas (MPA).[5] The MBNMS was designated in 1992 as a federally protected marine area offshore of California's Central Coast. Supporting one of the world's most diverse marine ecosystems, it is home to numerous mammals, seabirds, fishes, invertebrates and plants in a remarkably productive coastal environment. Nearshore coastal areas show a number of problems resulting primarily from nonpoint sources of pollution, including elevated levels of nitrates, sediments, persistent pesticides, metals, bacteria, pathogens, detergents, and oils.[6] According to the Monterey Bay National Marine Sanctuary Condition Report 2009 (Office of National Marine Sanctuaries, 2009, pp. 55-59)[7], "Pollutants associated with urban development and agricultural cultivation exert pressure on nearshore water quality conditions in the sanctuary. … Non- point sources flow into rivers that drain to the sanctuary and deliver substantial loads of persistent organic pollutants…to the nearshore environment."[8]

Salinas River Contaminants: The lower Salinas River (from the estuary to Gonzales Road) has the most pollutant impairments identified on the 2010 California Clean Water Act 303(d) list of any other water body on the Central Coast, with 19 impairments. Impairments in the lower Salinas River include: pesticides, chlorpyrifos, diazinon, chlordane, DDD, dieldrin, toxaphene, nitrate, PCBs, turbidity, unknown toxicity, fecal coliform, E. coli, enterococcus, sodium, chloride, electrical conductivity, total dissolved solids, and pH. South Salinas urban and industrial runoff contributes a significant amount of pollutants to the lower Salinas River. Constituents contained in urban and industrial runoff from South Salinas typically include nutrients, pathogens, salts, and pesticides.

According to the Fact Sheet for the City's stormwater Order No. R3-2012-0005, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0049981 (Permit) : "…there is evidence that stormwater discharges from the Permit coverage area are significant sources of the following pollutants that cause or may be causing or threatening to cause or contribute to water quality impairment in the Salinas River: nitrate/nitrite as N, orthophosphate as P, ammonia as N (total), chlorophyll a, fecal PCBs, turbidity, unknown toxicity, fecal coliform, E. coli, enterococcus, sodium, chloride, electrical conductivity, total dissolved solids, and pH. South Salinas urban and industrial runoff contributes a significant amount of pollutants to the lower Salinas River. Constituents contained in urban and industrial runoff from South Salinas typically include nutrients, pathogens, salts, and pesticides.

According to the Fact Sheet for the City's stormwater Order No. R3-2012-0005, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0049981 (Permit) : "…there is evidence that stormwater discharges from the Permit coverage area are significant sources of the following pollutants that cause or may be causing or threatening to cause or contribute to water quality impairment in the Salinas River: nitrate/nitrite as N, orthophosphate as P, ammonia as N (total), chlorophyll a, fecal coliform, total coliform, E. coli, total dissolved solids, boron (dissolved), chloride, and sodium."[9] The proposed project will provide 100% reduction in contaminants discharged into the Salinas River and MBNMS from dry-

[5] Protected areas include: Elkhorn Slough (CCA and MPA), Moro Cojo Estuary (MPA), Old Salinas River Estuary (CCA), Salinas River (CCA), Julia Pfeiffer Burns Underwater Park (CCA and ASBS), Point Lobos (MPA), Point Sur (MPA), Big Creek (MPA), and the ocean area

[6] Action Plan I: Implementing Solutions to Urban Runoff, Monterey Bay National Marine Sanctuary, 1996. Page 4

[7] Monterey Bay Condition Report 2009, pages 55-59

[8] National Marine Sanctuaries - Monterey Bay 2009 Condition Report , To see a summary of impacts on the nearshore environment, go to the MBNMS website:
http://sanctuaries.noaa.gov/science/condition/mbnms/welcome_near.html

[9] Filename "Att3_DG_ProJust_6of9.pdf", page 7

weather urban and industrial runoff from South Salinas. Tables 3-5 and 3-6 below summarize the maximum pollutant loads from South Salinas into the Salinas River that were detected during sampling that occurred in February 2014 (at the Salinas River Pump Station and Salinas River Outfall monitoring stations).[10]

Table 3-5. Pyrethroids

	Gamma-Cyhalothrin	Lambda-Cyhalothrin	Bifenthrin	Cyfluthrin	Esfenvalerate	Permethrin (cis-)	Permethrin (trans-)	Cypermethrin	Fenvalerate
	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
LC_{50}/CVR WQCB	N/A	1	4	0.3	N/A	10	10	1	N/A
February 2014	8.7	7.6	54.2	15.8	4	54.2	80.4	22.5	4.1

Table 3-6. Trace Constituents

	Turbidity	Dissolved Oxygen	Total Dissolved Solids	phosphate as P	Total Nitrate + Nitrite	Total	Total Ammonia	Unionized	Fecal	Total		
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	(MPN/ 100ml)	(MPN/ 100ml)	µg/L	µg/L
WQ Obj & Basin Plan Action Levels	126	<5.0		0.44	10			0.025	400		129	982
Feb. 2014	151.6	10.27	255	.24	2.5	.49	.29	.0017	7000	17000	22.8	82.1

Groundwater Overdraft: Over the last 80 plus years, the quality of water and storage capacity in northern Salinas Valley groundwater aquifer has degraded progressively owing to seawater intrusion. Figures 3.1-8a and 3.1-8b show the progression of seawater into the Salinas Valley Groundwater Basin aquifers of the Greater Monterey County region.

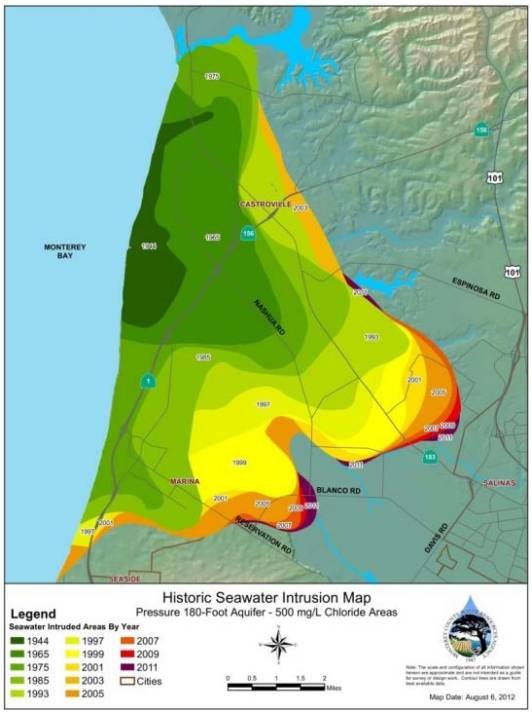
To offset groundwater overdraft and the resulting salt water intrusion, the MRWPCA regional wastewater treatment plant (WWTP) currently supplies recycled water to about 12,000 acres of agricultural land annually throughout the northern valley and adjacent community of Castroville. Additional water is provided to growers from the Salinas River Diversion Facility (i.e., diverted river water) to further offset groundwater overdraft. This program – the Castroville Seawater Intrusion Program – has greatly reduced

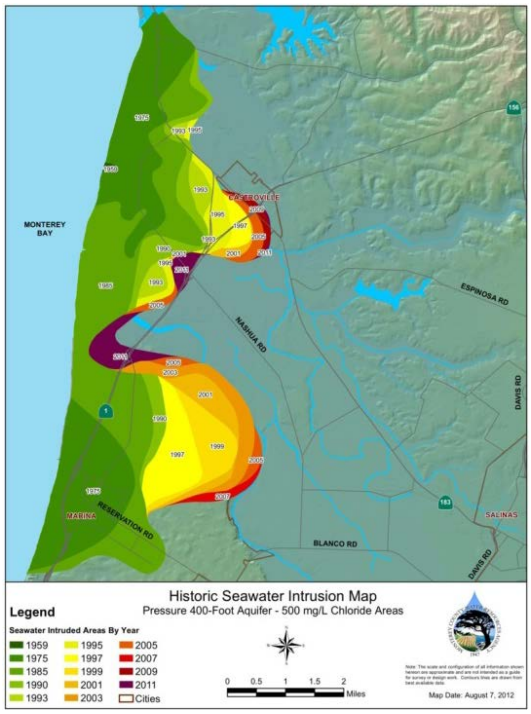
[10] Data obtained from City of Salinas Monitoring Program Sample Data, Filename "Att3_DG_ProJust_4of9.xls"

overdraft and slowed seawater intrusion since its inception in 1992. However, it has not solved the problem. As shown in Figure 3.1-8b, the CSIP program has slowed the advance of seawater into the groundwater aquifers, but it has not stopped it. This year due to drought, MCWRA has suspended diversions from the Salinas River Diversion Facility for growers in the northern valley because of insufficient supply in the Nacimiento and San Antonio reservoirs. In addition, reduced water conservation by sewer flow contributors has decreased the amount of water reaching the MRWPCA regional WWTP. As a result, the amount of water available to growers through the CSIP has been reduced, and growers are having to draw much more heavily on groundwater to irrigate their fields. As comparison: Last year, a total of 24,752 AF was used to irrigate approximately 12,000 acres of crops. Of that amount, 15,485 AF was recycled water, 6,093 AF was river water, and 3,175 AF was well water. This year through June, 11,301 AF has been used to irrigate crops, with 7,936 AF recycled and 3,365 AF well water. And the year is only halfway over.

Increased overdraft of the coastal aquifers due to drought is escalating the advancement of seawater intrusion into the Greater Monterey County region's primary water source. If the drought continues into 2015, growers and water agencies will be forced to continue to overdraft these aquifers, which could devastate the water supply in the area for both agricultural and residential use and further impact groundwater supply for the larger region. This project will slow the degradation of the aquifers by providing growers with an alternate source of water.

3.1.5.3 Estimates of Without-Project Conditions





Figures 3.1-8a and 3.1-8b. Seawater Intrusion Impacts in 180/ 400-Foot Aquifers[11]

Without this project, each issue described in the previous section "Historical Condition and Background" will either worsen or remain unimproved.

Castroville Disadvantaged Community Drinking Water Issues: Seawater intrusion in the 180/400 Aquifers will continue to degrade CCSD's water supply. As stated above, CCSD General Manager Eric Tynan says he expects to lose one or two of these wells by the end of August. Without this project, CCSD will be forced to choose from one of several very expensive options described above, each costing $1 million plus in initial investment. Any of these solutions will force CCSD to raise rates, which will affect the access to affordable drinking water for members of the DAC.

Pollutant Loads to the Salinas River: With reduced surface water flows due to the continued drought, concentrations of the harmful constituents will increase as the pollutant loading will remain the same without diverting the highly polluted surface runoff. This will continue to degrade the sensitive steelhead habitat and put undue pressure on a threatened species. Furthermore, the pollutant loading discharged from South Salinas to the Salinas River and into MBNMS will continue to exert pressure on the sanctuary and its associated CCAs, MPAs and ASBSs if this project is not implemented. As the proposed project is the most cost-effective method to provide this benefit, without its implementation it is doubtful that any reduction in this pollutant loading will be observed.

Groundwater Overdraft: Without diverting runoff as proposed in this project, there will be no increased flows to CSIP from South Salinas. This project utilizes a great deal of existing infrastructure, which makes it by far the most cost-effective solution to achieve the benefit of increased flow to CSIP. Without the implementation of this project, the urban runoff from South Salinas will continue to discharge into the Salinas River without being treated for reuse.

3.1.5.4 Description of methods used to estimate physical benefits

Project benefit estimates were based on historical data and studies for similar projects.
Water Available for Reuse from South Salinas Urban and Industrial Runoff – 250 AF/year: A recent study analyzed the estimated annual stormwater runoff from South Salinas to be 206 AFY.12 MRWPCA Recycled Water Program Assistant, Mike McCullough, estimates dry weather flows of roughly 50 AF based on average the water level observed in the South Salinas drainage infrastructure. Thus, the combination of the dry weather runoff and average annual stormwater flows is estimated to be 250 AFY. MRWPCA WWTP has a long record of effectively removing raw sewage constituents and will continue to use appropriate and proven processes to treat diverted water and deliver high quality recycled water. This recycled water has been made available to growers in the CSIP since 1992, and this proposed 250 AF diversion will be able to be delivered to CSIP with 100% certainty.

[11] Monterey County Water Resources Agency, Retrieved July 2014 at http://www.mcwra.co.monterey.ca.us/SVWP/01swi400.pdf and http://www.mcwra.co.monterey.ca.us/SVWP/01swi180.pdf

[12] This is a conservative estimate based on "Runoff Estimation for Salinas River Watershed Portion of the City of Salinas", July 18 2013, Filename "Att3_DG_ProJust_5of9.pdf", Pages 1-12

South Salinas Dry Weather Runoff Pollution Reduction to Salinas River – 100%: The current infrastructure is designed to capture all dry weather runoff, and it has a long standing record of doing so. However, currently the system discharges this water directly into the Salinas River at the Salinas River Outfall. By simply diverting this water in the MRWPCA WWTP, none of this water will reach the Salinas River. This assertion is based on the fact that the existing infrastructure to be used, MRWPCA's TP1 pump station and WWTP, currently operate under capacity in dry weather and are projected to do so into the future, especially as continued conservation reduces dry-weather hydraulic loading. Furthermore, the Pollution Load Reduction Plan study, prepared by Larry Walker Associates for the City of Salinas, showed that this method would be the most effective and reasonable method for addressing these pollution loads to the Salinas River. Dry-weather urban-runoff flow diversion and treatment is a best management practice.

South Salinas Shoulder Month Pollution Reduction to Salinas River – 80% plus: During the shoulder months (fall and spring), the WWTP has both hydraulic and biological treatment capacity to process the additional stormwater flow. For example, the available (unused) dry weather WWTP capacity exceeds 8 mgd (Mike McCullough, personal communications, July 16 and 17, 2014). Similarly the TP1 raw sewage pump station has about 20 mgd of unused capacity available. Typical watershed and sewage system response to rainfall events in the fall and spring is little rainfall response infiltration/inflow to increase the raw sewage flows. Such response is especially pertinent for storms during drought events because the soil column is desiccated and hence raw sewage flows do not increase because rainfall is absorbed into the ground. Surface runoff from hardscape area (e.g., sidewalks, driveways, parking lots and streets) still occurs because no rainfall is absorbed. [Note that 80% plus is used in lieu of 100% since weather patterns and storm intensity vary. Very rarely an early or late season storm could produce considerable rainfall and runoff, increasing both stormwater and sewage flows above available capacity.]

South Salinas First Flush Pollution Reduction to Salinas River – 95% plus: The arguments presented above for shoulder months apply similarly for first flush capture with the added caveat that the TP1 pump station always would have capacity for the first flows from each storm since the pump station and connecting force main both operate well under design hydraulic capacity. Each storm's initial flow would enter the Blanco Detention Basin and flow to the TP1 pump station. [Note that 95% plus is used in lieu of 100% since weather patterns and storm intensity vary. Very rarely an early or late season storm could produce considerable rainfall and runoff, increasing both stormwater and sewage flows above available capacity.]

3.1.5.5 Identification of new facilities, policies and actions require to obtain physical benefits

The following key actions will need to occur and facilities constructed in order for the physical benefits to occur: 1) divert highly polluted dry-weather urban and industrial runoff and stormwater runoff from South Salinas to an existing stormwater detention basin; 2) use the detention basin and its underdrain system to remove visible trash and trace particulate contaminants; 3) convey diverted flow combined with the City's domestic and commercial raw sewage to the MRWPCA regional waste water treatment plant (WWTP) using existing, underutilized infrastructure (TP1 and raw sewage force to the WWTP); 4) treat the stormwater through the WWTP to produce secondary effluent, then treat the secondary effluent

through the Salinas Valley Reclamation Project Facility to produce extremely high quality tertiary effluent, suitable for agricultural irrigation on row crops; 5) distribute water to growers through the Castroville Seawater Intrusion Project (CSIP) distribution system, to irrigate approximately 12,000 acres.

New Facilities Required

Project implementation will utilize several existing facilities, including a pump station and conveyance infrastructure known to be greatly under capacity (TP1 and raw sewage pipeline). The City will upgrade a detention basin to capture urban and industrial runoff at TP1 and divert it to the WWTP. This project will use TP1 and the existing raw sewage force main to transfer runoff to the MRWPCA WWTP. After treatment, MRWPCA would direct the recycled water to where it would mitigate seawater intrusion and provide additional water for agriculture in the northern Salinas River valley as part of CSIP.

Construction will use methods that have been well proven over decades. As such, the proposed modifications are technically feasible to build. Operating such a pretreatment and diversion system is well proven by other agencies so no new technology is required. Engineering analyses will follow civil/environmental engineering norms and quality requirements.

Figure 3.1-9 shows the current pipelines and facilities at and adjacent to the TP1 site including major pipelines, the TP1 PS, and the Blanco Detention Basin.

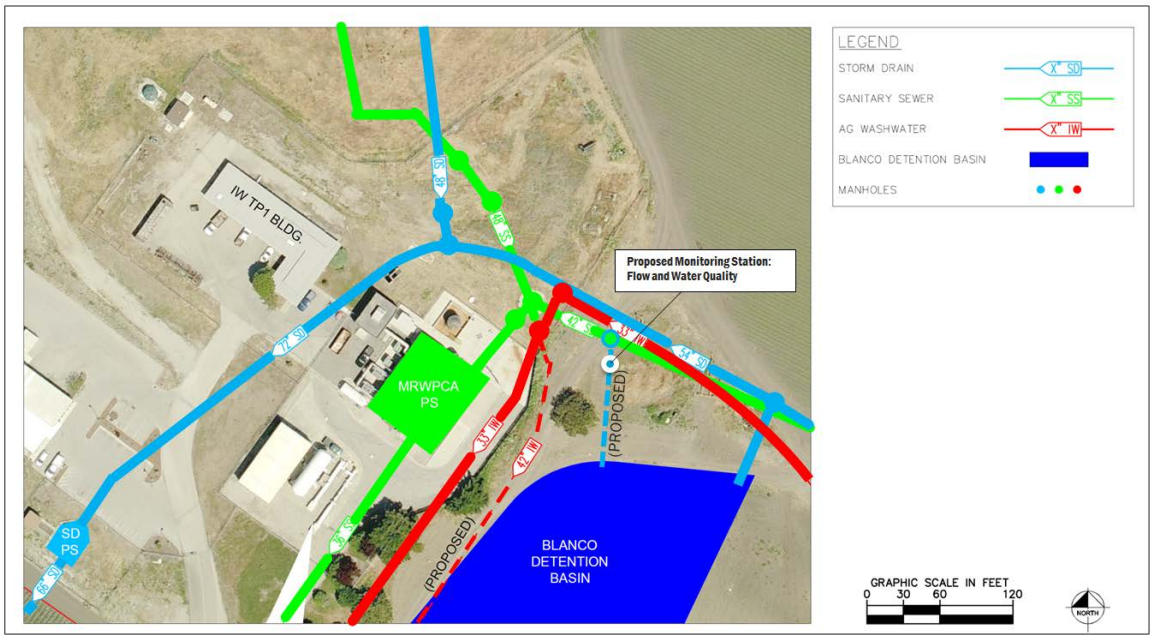


Figure 3.1-9. Project Facilities

Project Components

The City will divert an average of roughly 250 AF/year of urban surface water discharge from South Salinas (see Figure 3.1-9) into the City's Blanco Detention Basin. The City would divert water from the Detention Basin to the MRWPCA WWTP. The City would install a shunt at the City's former WWTP site (TP1, see Figure 3.1-9) to connect the two existing systems. Water in the basin will settle (to remove suspended solids) and filter through the soil as a pretreatment, then flow into a junction point for transfer to the MRWPCA-operated conveyance system. Shoulder-season wet weather events would be similarly diverted, provided flows do

not exceed MRWPCA capacity benchmarks (see values listed above). All diversions would reduce the amount of pollutants entering the Salinas River by capturing 100% of the dry-weather runoff from South Salinas and substantial flow during other seasons.
Once reclaimed, diverted water from South Salinas, up to 700 AFY, will be used for dry-season water supply (e.g., as agricultural irrigation water).

New facilities will include pipeline connections, perforated pipeline installation subsurface in Blanco Detention Basin, monitoring equipment and a pump station.

3.1.5.6 New Policies Required

No new policies will be required to achieve the benefits described.

3.1.5.7 Actions Required and Monitoring

The benefits described will require coordination between the City and MRWPCA to divert and treat the new water, respectively. Additionally, to assess the performance and effectiveness of the project, ongoing monitoring action will be required.

The City will supervise construction and perform construction management, conduct formal facilities startup and then monitor actual operational performance at the following numeric targets:

Drought Preparedness
An average of 250 additional AFY available for reuse through CSIP for immediate response to drought conditions and ongoing drought preparedness.

Reduced Pollution from South Salinas
100% reduction of contaminants discharging into the Salinas River and MBNMS from dry-weather urban and industrial runoff from the South Salinas. 80% plus reduction of shoulder month (late fall/early spring) discharge into Salinas River. 95% plus of first flush pollution captured.

A recording device on the flow meter, installed as part of the project, will report readings and will document the amount of flow diverted during dry weather and wet weather. Working in conjunction with MRWPCA WWTP operators, City and MRWPCA staff would make decisions about when to divert runoff from rainfall, i.e., not exceed the WWTP's hydraulic and /or biological treatment capacity. For the stormwater basin, where pretreatment of stormwater would occur, MRWPCA staff would take influent and effluent water samples, both to document the general stormwater water quality characteristics and determine pretreatment effectiveness. Likely parameters for analyses would include total and fecal coliform bacteria, total suspended solids, biochemical oxygen demand or chemical oxygen demand, trace constituents (selected metals and synthetic organic compounds), and nutrients.

The City and MRWPCA expects to sample monthly during dry-weather as well as during storm events. They will prepare and submit quarterly monitoring reports as well as a final summary to document overall project performance. Reporting for surface water constituents will use California Environmental Data Exchange Network (CEDEN) templates to submit data to Central Coast Regional Data Center.

Table A-2 – Project Performance Monitoring Project: Drought Relief through Stormwater Diversion for Water Supply		
Proposed Physical Benefits	Measurement tools and methods	Targets
250 AF/year additional water to CSIP	Flow meter at Blanco Detention Basin will be used to determine total flow diverted.	250 AFY
100% reduction of contaminants discharging into the Salinas River and MBNMS from dry-weather urban and industrial runoff from the	Flow meter at Blanco Detention Basin will be used to determine total flow diverted and total flow discharging into the Salinas River.	100% dry-weather flow diverted
80% plus reduction of shoulder month (late fall/early spring) discharge into Salinas River	Flow meter at Blanco Detention Basin will be used to determine total flow diverted and total flow discharging into the Salinas River. Stormwater sampling will be conducted to determine the level constituents.	80% shoulder month flow diverted
95% plus of first flush pollution captured	Flow meter at Blanco Detention Basin will be used to determine total flow diverted and total flow discharging into the Salinas River. Stormwater sampling will be conducted to determine the level constituents.	95% first flush flow diverted

3.1.5.8 Description of any potential adverse physical effects from the project

This project will have minimal adverse impact. Transporting stormwater to and treating stormwater through the MRWPCA regional WWTP will require some energy expenditures, hence resulting in a small increase in carbon dioxide emissions. However, diverting stormwater for treatment will help address potential climate change impacts by preventing adverse conditions such as anaerobic sediments in the Salinas River, a condition that could release methane. This methane release reduction, which is a far more potent greenhouse gas than carbon dioxide, will offset the above mentioned greenhouse gas impacts.

3.1.6 Cost Effectiveness Analysis

Table 6 – Cost Effective Analysis **Project name: Drought Relief through Stormwater Diversion for Water Supply**	
Question 1	Types of benefits provided as shown in Table 5:
	1. Water Available for Reuse from South Salinas Urban and Industrial Runoff 2. South Salinas Dry Weather Runoff Pollution Reduction to Salinas River 3. South Salinas Shoulder Month Pollution Reduction to Salinas River 4. South Salinas First Flush Pollution Reduction to Salinas River
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified? No**
	If no, Why? Alternative methods have been considered. Since this project utilizes a great deal of existing infrastructure and facilities, it would not be possible to achieve the same benefits with any less cost. Any other method of capture would require the construction of new facilities including a detention basin, pipeline, and pumping station. Since these facilities currently exist, are currently underutilized and only require reconfiguration, this project offers the most cost-effective approach.
	If yes, list the methods (including the proposed project) and estimated costs.
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods**
	N/A
Comments:	

3.2 LAKE EL ESTERO DIVERSION

3.2.1 Project Description

Project Name: Lake El Estero Diversion

Implementing Agency/Organization(s): City of Monterey

Project Description: Stormwater and dry weather runoff captured in Lake El Estero will be conveyed to the MRWPCA treatment plant for use in the Groundwater Replenishment Project.

Project Discussion: The City of Monterey's urban stormwater and dry weather runoff that flows into Lake El Estero is currently stored in the lake and then pumped by the City, or allowed to flow by gravity, through storm drain pipelines to Del Monte Beach for release to Monterey Bay.

This project redirects this water to the Monterey Regional Water Pollution Control Agency's (MRWPCA) Regional Treatment Plant for treatment and use by the Groundwater Replenishment (GWR) Project. This rerouting of water will be accomplished largely through reliance on existing facilities. The portion of the Lake El Estero water that is now pumped or flows onto Del Monte Beach and into Monterey Bay would, instead, be diverted via a short new pipeline, using a new pump at the existing lake pump station inlet, into the municipal wastewater system at a sanitary sewer manhole immediately adjacent to the existing Lake El Estero pump station. To increase the water supply yield, the project would also reconnect an existing storm drain to the lake at the intersection of Figueroa and Pearl Street.

3.2.2 Project Map

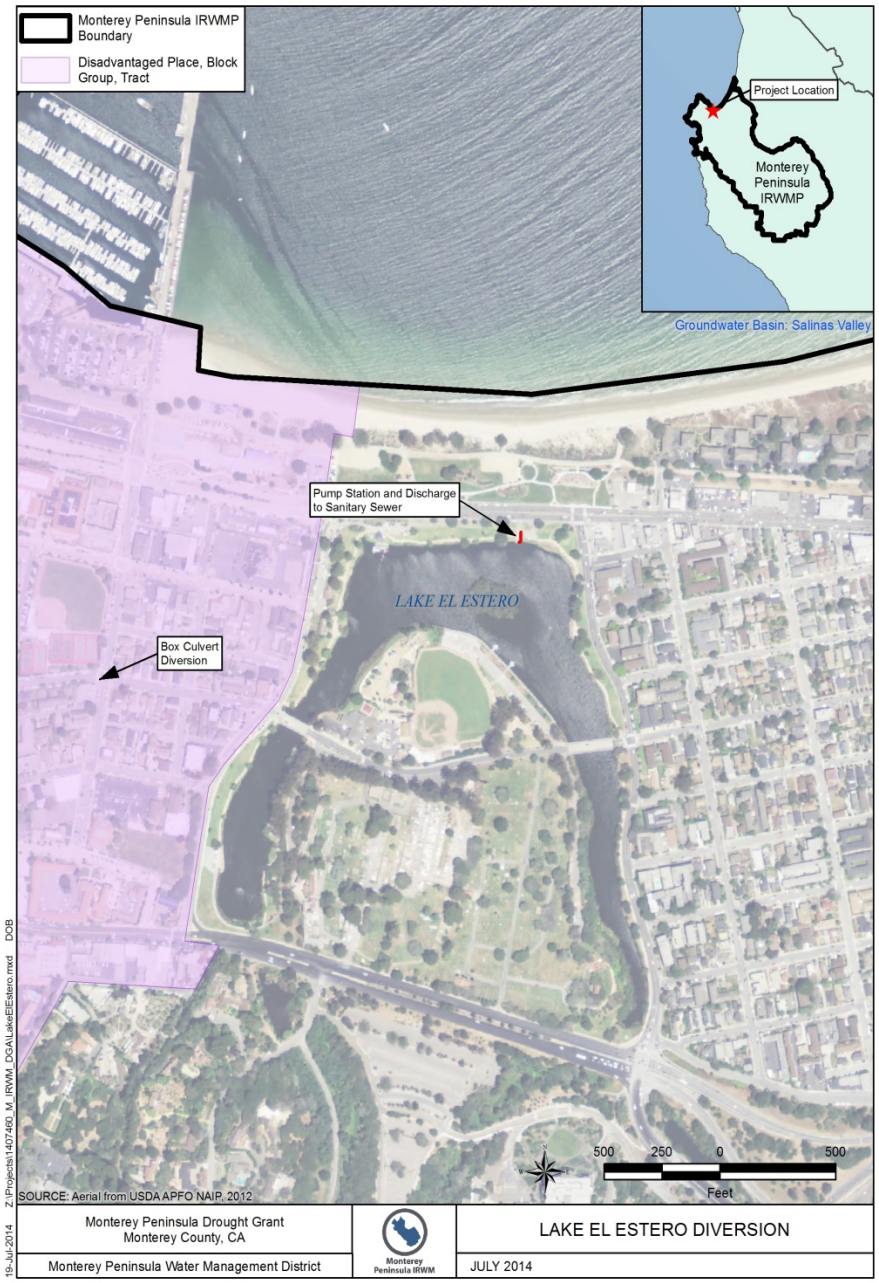


Figure 3.2-1 Project Map for Lake El Estero Diversion

3.2.3 Project Physical Benefits

Table 3-1. Physical Benefit Number 1

Table 5 – Annual Project Physical Benefits **Project Name:** Lake El Estero Diversion Project **Type of Benefit Claimed:** Recycling of Waste Water **Units of the Benefit Claimed :** 136 AFY **Additional Information About this Benefit:** The water conveyed from Lake El Estero will be conveyed to the RTP for treatment and use by the GWR to supplement the supply of potable water in the region.			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
2014	0	0	0
2015	0	136	136
2016	0	136	136
Last Year of Project Life -2045	0	136	136
Comments: Approximately 4,080 AF of water will be kept from flowing untreated into the Monterey Bay and instead, will be treated and used as groundwater recharge in the Seaside Basin.			

Table 3-2. Physical Benefit Number 2

Table 5 – Annual Project Physical Benefits **Project Name: Lake El Estero Diversion Project** **Type of Benefit Claimed: Environmental** **Units of the Benefit Claimed : 136 AFY** **Additional Information About this Benefit: The project will divert 136 AFY of untreated runoff that now flows into the Monterey Bay. This water will be recycled and used in the GWR to augment potable water supply.**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
2014	0	0	0
2015	0	136	136
2016	0	136	136
Last Year of Project Life -2045	0	136	136
Comments: Stormwater runoff can carry pollutants such as oils, sediments and metals into the Monterey Bay, which is a National Marine Sanctuary. The project will treat 136 AFY of water to be used by the GWR that would otherwise flow untreated into the Monterey Bay. Over the life of the project, about 4,080 AF of untreated runoff will be kept out of the Monterey Bay.			

3.2.4 Technical Analysis of Physical Benefits Claimed

3.2.4.1 Technical Basis of the Project

The main project component will be installation of a pump station and force main to divert flow directly to the MRWPCA Monterey Pump Station (MPS), which is approximately 0.75 miles from Lake El Estero. The MPS has a rated maximum day capacity of 20 MGD, but is currently using only 8 MGD on peak days, leaving an excess of 12 MGD, or 30 acre-feet/day. Calculating the daily runoff capture using the same 5 AF/day minimum limit and increasing the maximum capture to 30 AF/day, the estimated annual capture volume is 140 AFY, with a range from 14 AFY (minimum) to 390 AFY (maximum). A model of the two drainage basins, Lake El Estero Basin and Figueroa Basin, was created which indicated that the average annual inflow to the Lake increased to 495 AFY, and the yield from the combined flows was 136 AFY, an increase of 49 AFY over the flow to the Lake alone[1]. To achieve the additional capture, an abandoned stormdrain connection along Pearl Street will be reestablished.

[1] Groundwater Replenishment Project Urban Runoff Capture at Lake El Estero, Revised Draft, Prepared by Schaaf & Wheeler, April 2014.

3.2.4.2 Documented Benefits of Agency Collaboration

The City of Monterey will collaborate with the MRWPCA to transfer the flows to the treatment plant. Once interties are created with the GWR project, the treated water will be stored in the Seaside Basin.

3.2.4.3 Estimates of Without-Project Conditions

Without the project, the 136 AFY will not be conveyed to the MRWPCA treatment plant and will not be available as a benefit to the GWR. The water will continue to be discharged into Monterey Bay.

3.2.4.4 Description of methods used to estimate physical benefits

Diverting stormwater flows into the sanitary sewer system as a source of supply for the proposed project was analyzed. Annual runoff into the Lake was estimated to average 268 acre-feet per year. Of that, an average of 87 acre-feet per year may be diverted to the proposed project using the existing capacity in the City's wastewater collection system. Stormwater not captured for the proposed project would remain in the Lake or continue to be discharged to the ocean. The drainage basin immediately to the west of the Lake drained into Lake El Estero until 1941, when a new storm sewer was installed in Figueroa Street which redirected those flows to Del Monte Beach. This basin is approximately 1.85 square-miles, and produces an estimated average runoff of 227 AFY. If this drainage basin were reconnected to the Lake, the average Proposed Project yield would increase to 136 acre-feet per year.

The City of Monterey and MRWPCA staff conducted a two-day shunt test from February 24 through February 26, 2014, to assess the effects of adding water from Lake El Estero to the municipal wastewater collection and treatment systems. A temporary pump was installed at the stromwater pump station for this test and was operated at approximately 1,500 gpm for a period of 50 hours, transferring 4.5 million gallons. The inflow ws reported to have caused minor surcharging at the receiving manhole due to the configuration of the temporary piping. Spills or surcharging were not reported for the limiting pipeline segment downstream.

The Monterey Harbor and the Monterey Bay South Coastline are not classified as estuaries, so seasonal freshwater inflows are not required to maintain aquatic habitat. The Monterey Bay National Marine Sanctuary Final Management Plan has been reviewed and no requirements for freshwater inflows to this portion of the Bay were identified. Therefore, the reduction of urban stormwater inflows would be considered a marine water quality benefit because these flows currently carry pollutants into the Sanctuary.

The City maintains the Lake El Estero water level for aesthetic and recreational use. The proposed project should not reduce the water levels below those currently maintained by the City. It should only reduce the volume of stormwater being discharged to the Bay.

3.2.4.5 Identification of new facilities, policies and actions require to obtain physical benefits

Several new pipeline connections will be constructed to obtain the physical benefits described for this project. A column-type pump will need to be added in the existing pump station wet well and a 12-inch

gravity pipeline connecting to a SSMH D05-052, a flow meter, a motorized control valve, and a check valve.

The drainage basin adjacent to Lake El Estero will need to be connected through the Pearl Street Box culvert. Safeguard actions that should be performed include, inspecting the sewer pipeline and manholes for cracks and leaking joints to make sure overflows do not occur when the pipeline from Lake El Estero and the MRWPCA interceptor are flowing at maximum capacity. A second safeguard should be the installation of pressure sensor installation in one or more manholes to identify backwater effects in the system. If the combined storm and sewer flow exceeds the gravity capacity of the sewer main, the stormwater system can shut off to prevent the sanitary flows from spilling.

3.2.4.6 Description of any potential adverse physical effects from the project

Adding stormwater to the sanitary sewer system increases the risk of sanitary sewer overflows, which can convey bacterial pollutants into the Bay. The safeguards described in the above section, which include pressure sensors and a shutoff system to prevent the sanitary flows from spilling should mitigate the potential adverse effects of an overflow.

3.2.5 Cost Effectiveness Analysis

Table 6 – Cost Effective Analysis **Project name: Recycled Water Onsite Retrofits**	
Question 1	**Types of benefits provided as shown in Table 5** Recycled Water Benefit: 136 AFY of stormwater runoff will be diverted from Lake El Estero to the MRWPCA treatment plant and used conveyed to the GWR project to replenish the Seaside Basin and will reduce the need of water from the Carmel River Basin for the GWR project. Environmental Benefit: The project will keep 136 AFY of untreated stormwater from entering the Monterey Bay. Stormwater runoff can carry pollutants such as oils, sediments and metals into the Monterey Bay, which is a National Marine Sanctuary.
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified? Yes**
	If no, Why?
	If yes, list the methods (including the proposed project) and estimated costs. The total project cost for the proposed project is $595,500. The other alternative studied was a gravity flow system with an annualized capital and operating cost about two-thirds the cost of the proposed project.
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods**. The gravity option yielded only approximately 60 AFY, so the option presented in this proposal is the most cost effective. In addition, the proposed project takes better advantage of the available treatment capacity at the RTP.
Comments:	

3.3 ADVANCED WATER PURIFICATION DEMONSTRATION FACILITY

3.3.1 Project Description

Project Name: Advanced Water Purification Demonstration

Implementing Agency/Organization(s): Monterey Regional Water Pollution Control Agency

Project Description: Perform testing and public outreach to demonstrate the advanced water treatment processes that will be used to produce recycled water to improve long-term drought preparedness.

Project Discussion: The Monterey Peninsula Groundwater Replenishment Project (GWR) would increase

the local supply of potable water by taking highly-treated water from a new advanced water treatment plant (AWTP) and injecting it into the Seaside Groundwater Basin (SGB) using a series of shallow and deep injection wells. The primary purpose of the GWR is to provide 3,500 AFY of high quality replenishment water to the SGB to allow California-American Water Company (Cal-Am) to replace water now pumped from the Carmel River Basin (CRB) with water banked in the SGB. This substitution would enhance the region's drought preparedness by enabling Cal-Am to cease over-pumping of the Carmel River Basin by January 2017 while storing water in the larger SGB.

As discussed in Attachment 2 – Drought Impacts, the Monterey Peninsula has a critical need for potable water due to its lack of access to water from the State Water Project or the Central Valley Project, lack of local surface water storage, and restricted access to groundwater. Cumulative precipitation for water year 2014 is in the critically dry range and barely exceeds the lowest rainfall total on record. Water management agencies on the Monterey Peninsula have been proactive in reducing their water consumption in previous years as a part of the conservation efforts needed to preserve access to a limited resource. One metric for tracking the reduction of water use is to compare inflows to the regional treatment plant (RTP). From March 2010 through February 2014 inflows to the plant have been steadily declining from about 20.5 MGD in March 2010 to under 17 MGD in February 2014.

The demonstration treatment facility is a key component of the testing and public outreach program needed to refine appropriate treatment processes and to educate Monterey Peninsula residents about the safety and reliability of recycled water as a source of water to replace potable supplies that are being constrained both by drought and by regulatory actions. Funding from the IRWM program is being requested for the purchase and installation of advanced water purification technology to provide an immediate means to carry out the testing and public outreach that will enable water produced by an AWTP to become an important element of the Peninsula's portfolio of potable water supply and drought preparedness assets. Purchase of a demonstration-scale ATWP will enable the MRWPCA to build upon experience gained through operation of a smaller, leased facility and will take advantage of infrastructure already constructed and tested during operation of the leased equipment.

Due to the nature of reverse osmosis treatment systems, the proposed project requires more raw, or source, water than the amount of water to be produced. The MRWPCA estimates that the demonstration plant will operate at an 81% product water recovery rate, providing about 22 AFY. The AWTP treatment process facilities include: prescreening, ozonation, biologically active filtration (optional), membrane filtration treatment, booster pumping of the membrane filtration filtrate (potentially with intermediate storage), cartridge filtration (optional), chemical addition, reverse osmosis membrane treatment, advanced oxidation using ultraviolet light and hydrogen peroxide (advanced oxidation), decarbonation (potentially), and product-water stabilization with calcium, alkalinity and pH adjustment.

3.3.2 Project Map

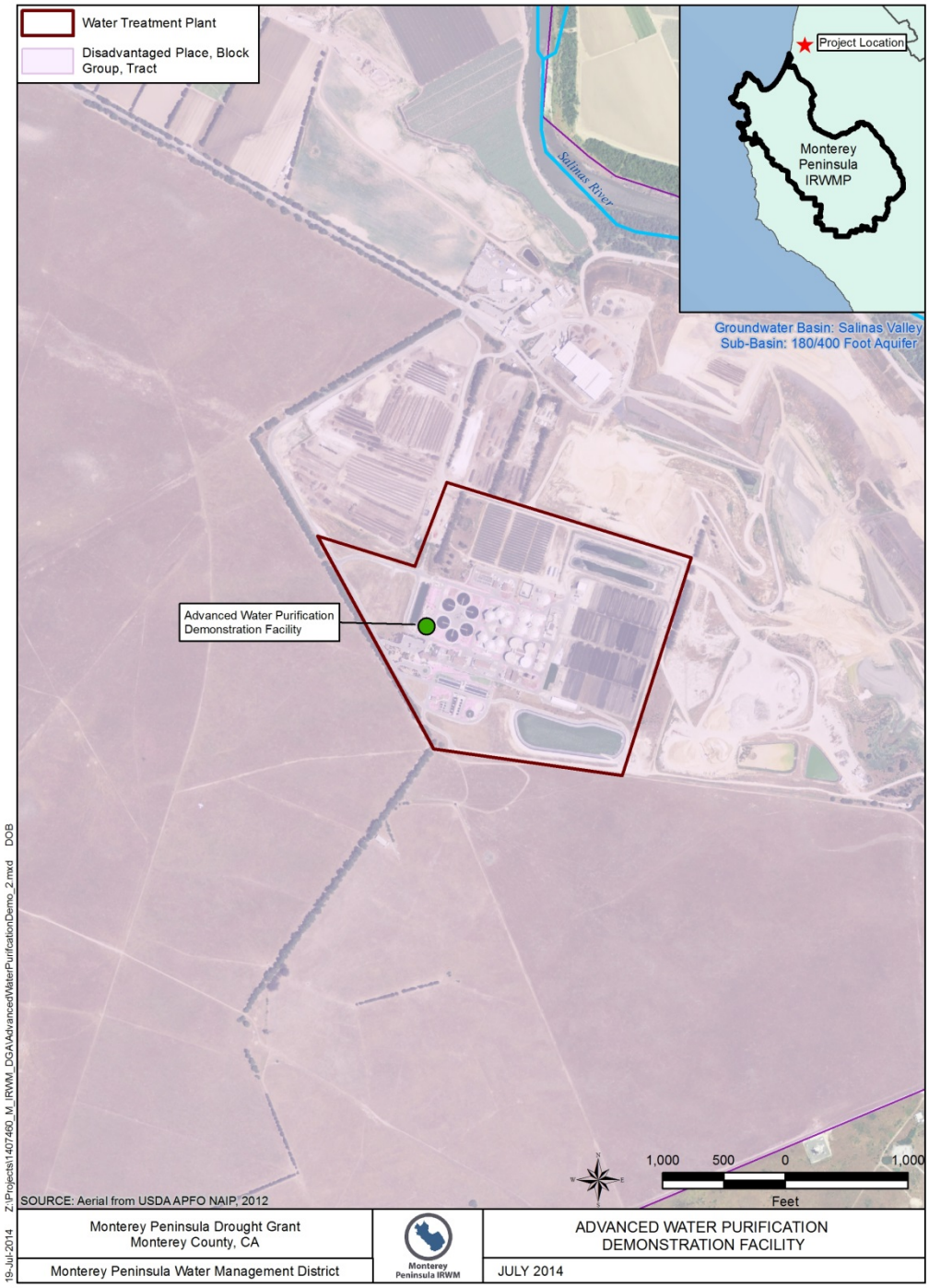


Figure 3.3-1 Project Map for Advanced Water Purification Demonstration Facility

3.3.3 Project Physical Benefits

The proposed demonstration facility would process about 22 AFY of highly purified recycled water. The purpose of the facility is to highlight to the public how safe and reliable the treatment technology has become and how these processes can convert water that was once deemed a waste into a valuable resource.

The leased equipment noted above was used by the MRWPCA for the primary purpose of collecting data to be used in the Environmental Impact Report. The information generated from the pilot facility was successful in obtaining a letter of support from the California Department of Public Health. The letter outlines the Department's approval of the GWR concept provided a number of additional steps are followed prior to implementation.

The GWR project is in the final stages of producing a robust EIR. The document is being released for public comment in September 2014 along with feasibility reports and facility planning reports developed to support the EIR. Upon release of the EIR, all of the technical reports and related documents providing details on the GWR and describing how various sources of water will be collected, treated and re-used will become available to DWR as technical references.

Although reports presenting details of the GWR are now confidential because of the status of the CEQA process, the purpose of the GWR is to collect wastewater from a variety of sources in order to treat those waters for beneficial uses. Several of the potential water sources are viewed as impaired waters. Collecting and treating these waters improves water quality by helping to reduce the pollutant loading into natural aquatic environments. Portions of a draft technical memo on the reduction in pollution to be achieved by the GWR on waters of the Reclamation Ditch, Tembladero Slough and Blanco Drain is attached for background[1].

Although not quantified in this attachment, using advanced water treatment on domestic wastewater sources requires more energy than traditional wastewater treatment. However, when comparing the amount of energy required for advanced water treatment technologies versus the energy required to desalinate ocean water, the savings are more than significant.

The amount of water flowing to MRWPCA's Regional Treatment Plant has been in a steady decline over the past 10 years. With tiered water rate pricing, incentives to replace heavy water use appliances and fixtures plus water conservation outreach programs, the flow reduction to the treatment plant has been very evident over the past 3 years (Figure 3-1).

As described in Attachment 2, per capita water use on the Monterey Peninsula is already one of the lowest in the state. If the GWR project does not move forward, then the Monterey Peninsula area will be required to ration water. If rationing were to be implemented, the area would see a steep decline in economic activity to the area as well as possible loss of jobs for individuals in the service industry.
The proposed demonstration facility would be installed within the existing facilities at MRWPCA's RTP. There would be no new policies or actions required by MRWPCA to implement the new treatment

[1] Schaaf & Wheeler, Technical Memorandum, July 18, 2014: Runoff Estimation for Salinas River Watershed Portion of the City of Salinas.

equipment.

No adverse physical effects are expected with this implementation of the demonstration facility.

For each project, the applicant must provide a narrative description of the primary and secondary expected physical benefits, which must address the following items:

Table 3-1. Physical Benefit Number 1

Table 5 – Annual Project Physical Benefits			
Project Name: Advanced Water Purification Demonstration **Type of Benefit Claimed:** Increase Local Water Supply and Delivery of Safe Drinking Water **Units of the Benefit Claimed:** acre-feet/year (AFY) **Additional Information About this Benefit:** Approximately 22 AFY of recycled water will be conveyed to the SGB and injected as part of the Groundwater Replenishment (GWR) project.			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
2014	0	0	0
2015	0	22	22
Future Years	0	22	22
Comments: Prior to implementation of the GWR, water from the demonstration facility would be blended into the stream of recycled water delivered to Castroville Seawater Intrusion Project (CSIP).			

Table 3-2. Physical Benefit Number 2

Table 5 – Annual Project Physical Benefits			
Project Name: Advanced Water Purification Demonstration **Type of Benefit Claimed:** Endangered Species Benefitted **Units of the Benefit Claimed:** Types and Number of Endangered Steelhead Trout and Red Legged Frogs Rescued **Additional Information About this Benefit:** Reduced Withdrawals From Carmel River Reduces Mitigation			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
Annually Through 2019	0	76 rescues	59 Steelhead Trout & 17 Red Legged Frogs; 380 life cycle rescues
Comments: District and other parties perform major mitigation activities on Carmel River, including the rescue and rearing of Steelhead Trout and Red Legged Frog. Total unlawful withdrawals (2013) which are being mitigated is 5,979 AFY. This project reduces unlawful withdrawals by 33 AFY or 0.55%. Average annual steelhead rescues = 16,000; Average annual frog rescues = 4,500; Mitigation activities expected to continue through 2019. Effects are cumulative.			

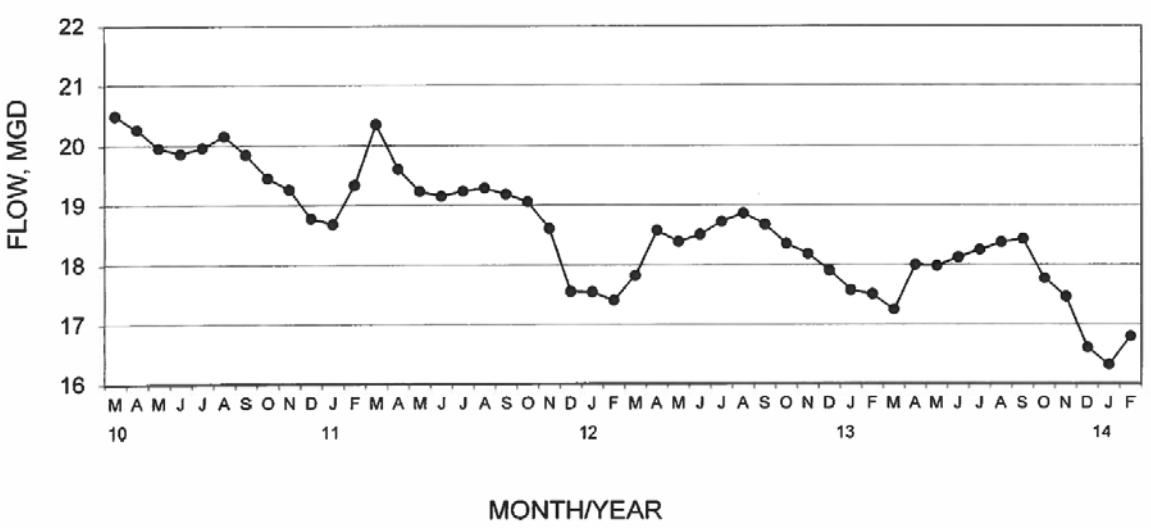


Figure 3- 1 Treatment Plant Inflow[2]

3.3.4 Technical Analysis of Physical Benefits Claimed

3.3.4.1 Technical Basis of the Project

Based on cost estimates for obtaining the leased pilot equipment, the estimates we have obtained for purchasing the demonstration equipment presented in Attachment 5 are appropriate and reasonable. As shown in Attachment 5, the MRWPCA and other partners have contributed considerable funds and effort to design and construct facilities needed to safely operate the demonstration AWTP, and have gained experience through operation of the leased facility needed to prepare a well-defined bid package for procurement of the demonstration-scale plant.

3.3.4.2 Documented Benefits of Agency Collaboration

A full-scale AWTP would be a joint project between the MRWPCA and the MPWMD. Both agencies will be promoting the benefits of reusing water resources in the local area. Another local agency, Marina Coast Water District, could also benefit from production of potable water.

3.3.4.3 Estimates of Without-Project Conditions

If the GWR does not move forward, then a reduction in wastewater flows will continue until a water supply project is built. If a water supply project is built, the cost or the rates for the new water may be higher than what they currently are now which would continue conservation and reduced flows into the wastewater treatment plant.

Without the Advanced Water Purification Demonstration project, the GWR will need to replace the amount of water generated by this project with potable water supplied by Cal-Am from the Carmel River

[2] Monterey Regional Water Pollution Control Agency waste Discharge Report, RWQCB Order #94-82, March 19, 2014

Basin, which is not the most beneficial use for a potable water supply. The potable water would have a more beneficial use if it were to be used directly by local municipalities. By using the AWTP water as injection water for the GWR instead of Carmel River Basin water, this precious resource will be conserved to be used more efficiently.

3.3.4.4 Description of methods used to estimate physical benefits

Physical benefits are based on the premise that the AWTP will provide about 22 AFY of highly treated water to be used by the GWR project. This volume is quantified by using the capacity of the designed AWTP and the expected operating efficiency of 81%.

3.3.4.5 Identification of new facilities, policies and actions require to obtain physical benefits

No new facilities are required. There would be new equipment but no new buildings.

3.3.4.6 Description of any potential adverse physical effects from the project

No adverse effects are expected.

3.3.5 Cost Effectiveness Analysis

Table 6 – Cost Effective Analysis **Project name: Advanced Water Purification Demonstration**	
Question 1	**Types of benefits provided as shown in Table 5** The advanced water purification demonstration facility will show how using other water sources can be beneficial in providing a treatment option to help produce more water supplies from previously wasted water. The water that is generated from the project will ultimately improve the water that resides in the Seaside Groundwater Basin. The energy savings as well as the benefits to the environment from the reuse of water is another bonus for this project.
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?** YES
	If no, why?
	Alternative methods have been considered from the GWR by replenishing water into the SGB from CRB during wet years but not year round or ever year. Desalination is also being considered as an alternative for a possible water source from the GW project.
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.** A full-scale project is estimated to cost $80 Million and will not be online for at least 2 years. This project could be implemented in a matter of months and for a fraction of the cost and would be equally effective for public outreach as a full-scale facility. As discussed above, using the demonstration facility as a key public outreach tool will be of tremendous value in strengthening local support for the project. Based on the feedback from the visitors to the leased pilot facility, seeing the equipment in action and how the treatment process operates makes a big difference in the acceptance of the project.
Comments:	

3.4 Recycled Water Onsite Retrofits

3.4.1 Project Description

Project Name: Recycled Water Onsite Retrofits

Implementing Agency/Organization(s): City of Pacific Grove

Project Description: Project consists of two major elements: (1) Irrigation application efficiency improvements; (2) Readiness to use recycled water from the City's Planned Local Water Project (LWP).

Project Discussion:

1. Irrigation Improvements. Aging infrastructure at the Pacific Grove Municipal Golf Links and the El Carmelo Cemetery results in an estimated annual loss and overuse from inefficiencies of approximately 25 AFY. This project element would improve irrigation application efficiency at the Golf Links and El Carmelo Cemetery by the following measures: Leak detection, repair and replacement program, irrigation nozzle and rotor upgrade program, and system optimization program to relocate and adjust sprinkler heads and pipelines. Modern irrigation controllers have been installed at both the Cemetery and the Golf Links as part of a previous irrigation modernization program.

2. Recycled Water Retrofits: The California State Water Resources Control Board (SWRCB) is processing an application from the City for a low-interest State Revolving Fund (SRF) construction loan for the LWP. The LWP will produce 125 AFY of recycled water. Initial site conversions from potable water to recycled water will be the Golf Links and El Carmelo Cemetery and toilet and urinal flushing for local public restrooms. This initial work can be completed to speed overall project implementation in parallel with the irrigation improvement elements described above. The work of this element consists of the following activities: pilot testing for operator optimization of the treatment facility and public acceptance and education; placement of new signage and information on recycled water to the golf scorecards, installation of the recycled water pipeline from the proposed recycling plant, separation of an existing potable connection in the cemetery maintenance building, and coordination with the SWRCB and state Department of Public Health.

Conservation improvements and conversion to recycled water improves reliability of potable water supplies. Conservation and reclamation add additional sources to the water supply palette and directly provide additional water supplies. Demand is reduced through conservation improvements. Habitat protection results from the reduction of demand for potable water from existing and planned sources.

Although not quantified for this project, future production of green house gases will be reduced by water conservation. Production of recycled water for use in Pacific Grove via Membrane Bio-Reactor (MBR) at the Satellite Recycled Water Treatment Plant will further reduce energy requirements and GHG emissions when compared to planned supplies that originate at locations distant from Pacific Grove such as the Groundwater Replenishment (GWR) project and Monterey Peninsula Water Supply Project (MPWSP) which will rely on desalination of seawater.

The project is technologically feasible. The City prepared a Facilities Plan Report for the SWRCB that focused specifically on project feasibility[3]. Results of that study are that recycled water would be produced for the Golf Links and El Carmelo Cemetery at a cost of under $4,000/AF. This is less than the current cost of irrigation water to the City provided by Cal-Am at a cost of over $6,000/AF. The Conservation elements of this grant application would produce 25 AFY at a cost of less than $350/AF.

[3] Malcolm Pernie, Inc., 2009 Stormwater Recycling Facility – Basis of Design Report.

3.4.2 Project Map

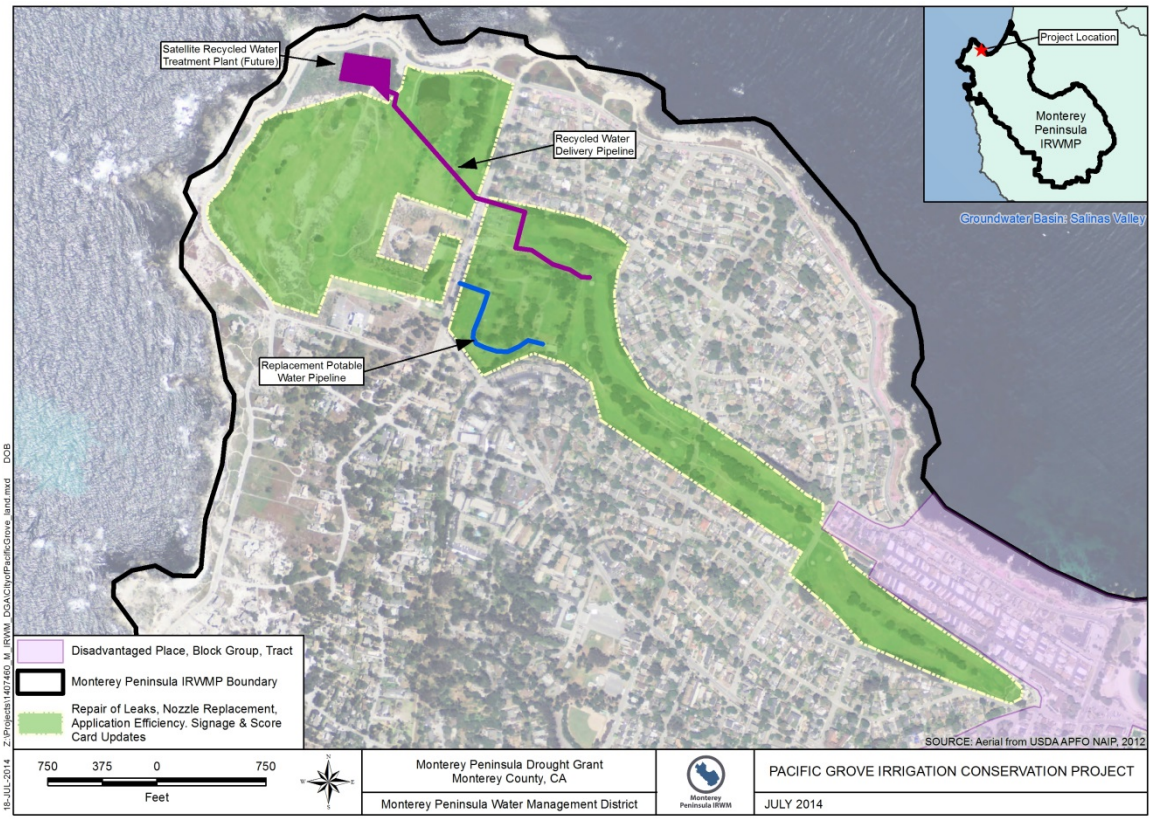


Figure 3.4-1 Project Map for Recycled Water Onsite Retrofits

3.4.3 Project Physical Benefits

Project benefits will be the immediate conservation of approximately 25 AFY of potable water. Implementation of the LWP will produce an additional 125 AFY of potable water savings.

The proposed project would result in immediate drought preparedness. An estimated 25 AFY of water savings will result from the replacement and repair of the leaking irrigation system equipment and the improvement of the irrigation application efficiency from nozzle repair, movement of sprinkler heads, and valve improvements. Additionally, by retrofitting to Title 22 compliant equipment, this project facilitates the conversion from potable water supplies to recycled water resulting in annual potable water savings of 125 AFY.

Because the City of Pacific Grove relies on potable water for irrigation, the elimination of irrigation system leaks will increase the local water supply reliability. Additionally, converting to recycled water for the municipal golf course and cemetery will reduce the City's reliance on potable water and thereby increase local water supply reliability by reducing demand for potable water.

This project will reduce water quality conflicts or ecosystem conflicts created by the drought. Cal-Am obtains its water supplies from the underdrain of the Carmel River and from the adjudicated Seaside Basin. Cal-Am's extractions therefore directly impact the critical habitat for steelhead (*Oncorhynchus*

mykiss) on the Carmel River, made worse during the ongoing drought. Reducing water loss and conversion to recycled water will reduce these impacts immediately and for the long-term future.

Table 3-1. Physical Benefit Number 1

Table 5 – Annual Project Physical Benefits **Project Name:** **Recycled Water Onsite Retrofits** **Type of Benefit Claimed:** **Potable water savings** **Units of the Benefit Claimed :** **AFY** **Additional Information About this Benefit :** **Reduction in potable water demand through conservation and use of recycled water**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project |(b) – (c)|**
2014	0	0	0
2015	0	25	25
Future Years	0	150	150
Comments: **Benefits from irrigation improvements of 25 AFY beginning in 2015; Benefits from recycled water conversion of 125 AFY beginning in 2016.**			

Table 3-2. Physical Benefit Number 2

Table 5 – Annual Project Physical Benefits			
Project Name: Recycled Water Onsite Retrofits			
Type of Benefit Claimed: Endangered Species Benefitted			
Units of the Benefit Claimed : Types and Number of Endangered Steelhead and Red Legged Frogs Rescued			
Additional Information About this Benefit : Reduced Withdrawls from Carmel River Reduces Mitigation			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2014	0	0	0
2015	0	86	67 Steelhead Trout & 19 Red Legged Frogs
2016	0	514	401 Steelhead Trout & 113 Red Legged Frogs
2017	0	514	401 Steelhead Trout & 113 Red Legged Frogs
2018	0	514	401 Steelhead Trout & 113 Red Legged Frogs
2019	0	514	401 Steelhead Trout & 113 Red Legged Frogs
Total	0	2,142	1,671 Steelhead Trout & 471 Red Legged Frog rescues during lifecycle
Comments: MPWMD and other parties perform major mitigation activities on the Carmel River, including the rescue and rearing of Steelhead Trout and Red Legged Frog. Total unlawful withdrawals (2013) which are being mitigated are 5,979 AFY. The Pacific Grove project reduces unlawful withdrawals by 25 AF in 2015 or 0.4% and by 150 AF in later years or 2.5%. Average annual steelhead rescues number 16,000. Average annual frog rescues number 4,500. Mitigation activities are expected to continue through 2019. Effects are cumulative.			

3.4.4 Technical Analysis of Physical Benefits Claimed

3.4.4.1 Technical Basis of the Project

The LWP has prepared a Facility Plan Report through the Water Recycling Funding Program.[4] Additionally, the City is underway with the preparation of an Environmental Impact Report (EIR) pursuant to the agreement between the SWRCB and the USEPA for CEQA-Plus documentation. The Draft EIR is planned to circulate to the public and responsible agencies in September, 2014.

3.4.4.2 Documented Benefits of Agency Collaboration

The City of Pacific Grove has collaborated throughout the development of the LWP with the MRWPCA, the City of Monterey, the Pebble Beach Community Services District (PBCSD), and Cal-Am. The agencies and the benefits that they may receive are tabulated in Table 3.4.

[4] City of Pacific Grove Local Water Project Facility Plan Report WRFP No. 3316-010, Brezack & Associates Planning, LLLC, June 23, 2014.

Table 3-4. Agency Cooperation

MRWPCA	City of Monterey	Pebble Beach Community Services District	Cal-Am
Potable water conserved in irrigation becomes available to meet interior potable demands. Increased interior uses of potable water provides additional sourcewater to the CSIP project.	Regional water savings increases potable supplies that can become available to residents of the City of Monterey.	Regional water savings increases potable supply availability to the residents in the PBCSD service area. Increased sourcewater to their recycled water facilities results that produce additional non-potable irrigation supplies.	Reduction of 25 AFY of potable water demand immediately reduces Cal AM's pumping from the Carmel River and the Seaside Basin. The LWP expands this benefit to 125 AFY.

3.4.4.3 Estimates of Without-Project Conditions

A. 25 AFY Water Loss Improvement: Without the proposed project, it is estimated that 25 AFY of potable water loss will continue to occur. Project assumptions were made based on close coordination with the City of Pacific Grove and staff including the City's irrigation system operators. These assumptions take into account review of historic records of irrigation system operations and standard estimating procedures for water loss and irrigation application efficiency improvements.

B. 125 AFY Recycled Water Demand: Without the LWP it is estimated than 125 AFY of potable water will continue to be used for non-potable irrigation demands. Project assumptions were made based on the recycled water use market study conducted as a part of the 2014 Facilities Plan Report. That analysis included interviews with potential customers, coordination meetings with local agencies, review of billing records for historic exterior water consumption. Additionally the market demand study made standard estimates for the irrigation requirements of turf grown under local conditions and applying local evapotranspiration rates and the local Maximum Applied Water Allowance (MAWA) requirements.

3.4.4.4 Description of methods used to estimate physical benefits

The physical benefit of the proposed project is the potable water savings that result from the proposed project (25 AFY) and the additional potable water savings that is facilitated by the construction of the LWP (125 AFY). All stated benefits assume existing conditions (2015) and no growth in demands or other system improvement is factored into the quantity calculations of either benefit listed.

For immediate savings of 25 AFY, estimates were made of the existing water loss and inefficient application that currently exists with the irrigation facilities at the Pacific Grove Golf Links and the El Carmelo Cemetery. These estimates take into account the following:

- Re-operating requirements since the implementation of the onsite native dune restoration program at the Golf Links. This has required that existing irrigation equipment be operated to avoid direct and indirect irrigation of the native plants located throughout the Golf Links. This has also produced unintended consequences of application inefficiencies for these locations and the requirement for hand watering of the course.

- The age of the existing irrigation system components leads directly to system leaks, pipeline breaks/failures and leaking joints. Estimates were made to consider continuous, undetected leaks as well as observable system failures. Additionally the failure of worn out rotors and poorly operating spray nozzles all result in less efficient operation and water loss.

- Review of historic records of irrigation system operations has been completed and comparisons made to historic ET irrigation requirements.

- Estimating procedures for water loss as a percentage of recorded water use were applied to system operations at the Golf Links and the cemetery.

- Estimates of existing irrigation application efficiency have been made based on catch can tests.

- The capacity to substitute 125 AFY of recycled water for an equal sum of potable water is based on records of irrigation water usage at the Golf Links and Cemetery, which demonstrate that the full production of recycled water can be used to meet demands at these locations.

3.4.4.5 Identification of new facilities, policies and actions require to obtain physical benefits

New facilities are identified below:

1.0 Irrigation System Improvements

1.1 Fix Existing Leaks
1.2 Nozzle Replacement
1.3 Application Efficiency Improvements (Pipe/Nozzle Relocation)

2.0 Recycled Water Retrofits

2.1 Signage & Scorecard Updates
2.2 2,800' 8-Inch Pipeline
2.7 New Potable PL to Cemetery Maintenance Bldg.
2.9 Pilot Program for RW Test Application

No new policies or actions are required for the implementation of the proposed project.
In order to finance the LWP, the City Council is expected to continue to take the necessary actions required for the approval of the SRF Construction Loan and the adoption of the CEQA-Plus EIR.

3.4.4.6 Description of any potential adverse physical effects from the project

No adverse effects are expected.

3.4.5 Cost Effectiveness Analysis

Table 6 – Cost Effective Analysis **Project name: Recycled Water Onsite Retrofits**	
Question 1	**Types of benefits provided as shown in Table 5:** The proposed project produces the primary physical benefit of 25 AFY of potable water savings. As a secondary benefit, the proposed project will facilitate implementation of the Pacific Grove Local Water Project (PGLWP)[5]. Therefore, another 125 AFY of new non-potable recycled water would become available from the PGLWP that would offset (on a gallon-for-gallon basis) the City's current use of potable water. Additional secondary benefits of the proposed project are: Educational / outreach benefits to the community for the safe and effective use of recycled water; the economical implementation of satellite recycled water facilities; integrated implementation and operation with the Cities of Monterey and Pacific Gove PG-ASBS Stormwater Management Project.
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?** Yes, In its recent analysis, the City of Pacific Grove has considered the use of the PG-ASBS Stormwater Management Project to provide a substitute supply of water for the irrigation of the Golf Links and the El Carmelo Cemetery. However, additional facilities of seasonal storage and additional treatment to make the collected storm water compatible for irrigation reuse would be necessary. Alternatively, stormwater could be sent to the regional treatment plant and then piped back to the City, but the cost of installing all new plumbing for recycled water would be cost prohibitive. For irrigation efficiencies, the City has not yet eliminated water losses from the existing irrigation system because of the up-front costs to do so. Water losses, application efficiency improvements, and pilot testing would be addressed in the construction of the PGLWP.
	If yes, list the methods (including the proposed project) and estimated costs. Construction of required in-system storage capacity (147 MG) to serve as second source of supply with water treatment plan off-line is estimated in this effort to cost over $150M in capital costs, including engineering and construction. Additional water treatment capacity for the three sponsoring agencies was also considered as a means to increase reliability, but dismissed because the system would not meet above stated DPH requirements. The $1.4M cost for the Intertie Project is much lower in cost than any comparable alternative.
	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods. The proposed project has been identified as the least cost project alternative. The costs for the proposed project have been previously estimated in the PGLWP. The IRWM Grant would allow the City to more quickly implement the water loss and efficiency improvements, and conduct the education / outreach and pilot testing that would facilitate in the overall implementation of the PGLWP.

Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.** The proposed project has been identified as the least cost project alternative. The costs for the proposed project have been previously estimated in the PGLWP. The IRWM Grant would allow the City to more quickly implement the water loss and efficiency improvements, and conduct the education / outreach and pilot testing that would facilitate in the overall implementation of the PGLWP.
Comments:	

3.5 HEART PILOT PROGRAM

3.5.1 Project Description

Project Name: High Efficiency Applied Retrofit Targets ("HEART") Pilot Program

Implementing Agency/Organization(s): Monterey Peninsula Water Management District

Project Description: Immediate impact program consisting of (i) washing machine replacement program in multi-family property common-area laundry rooms, and (ii) water efficiency retrofits for low-income customer properties.

Discussion: The proposed High Efficiency Applied Retrofits ("HEART") Pilot Program will result in immediate, measurable, and significant water savings that will reduce impacts of the drought on the potable water supply. It is designed as a pilot program to test the immediate effectiveness of direct or applied retrofits administered by the District rather than the customer in underserved and disadvantaged properties. If successful, the District will consider scaling-up the program in future budgets, rate cases, and grant applications.

The project **will provide immediate regional drought preparedness** by promoting and achieving water conservation and also result in long-term reductions in water use. The project will also **increase local water supply reliability and the delivery of safe drinking water** by reducing the amount of potable water required for household purposes including laundry, toilets, and showers, while at the same time relaxing pressure on existing supplies to create drought reserves or relief. Secondary benefits include, environmental improvements resulting in improved riparian habitat and reduced rescues of endangered species. Additionally, there will be reduced carbon emissions due to improvements in energy efficiency. Lastly, the project will assist water suppliers in the region to implement conservation programs and measures that are not locally cost-effective by enabling the purchase and installation of water efficient appliances for direct installation at customers who would otherwise not make the purchase due to economic disadvantage.

As discussed in Attachment 2 – Drought Impacts, the Monterey Peninsula has a critical need for potable water supply due to its lack of access to water from legally authorized local supplies, and no ability to rely on the State Water Project or the Central Valley Project. The region also lacks sufficient surface water

storage and must, therefore, rely solely on the Carmel River and groundwater both of which are managed to comply with severe regulatory restrictions. As a result, new supplies are being developed, but are not expected to be available until 2019. Because of the limitations on water supply available to the region, immediate response to the effects of the drought will result largely from implementation of quickly instituted water conservation measures, particularly measures targeted at portions of the region's population who are most vulnerable to the drought, yet least capable of investing in measures that could remediate their economic exposure to high water bills. The proposed HEART Pilot Program will provide this immediate, targeted drought response by saving significant and measurable potable water within 120 days of funding.

This project requests DWR support for the installation and purchase of Energy Star commercial-grade high efficiency clothes washers to replace high use machines at multi-family housing and dormitories, providing estimated savings of 27 to 33 gallons per load. The Project is also requesting funding for purchase and installation of water-efficient fixtures and appliances throughout the entire homes of qualified low-income water utility customers.

3.5.2 Project Map

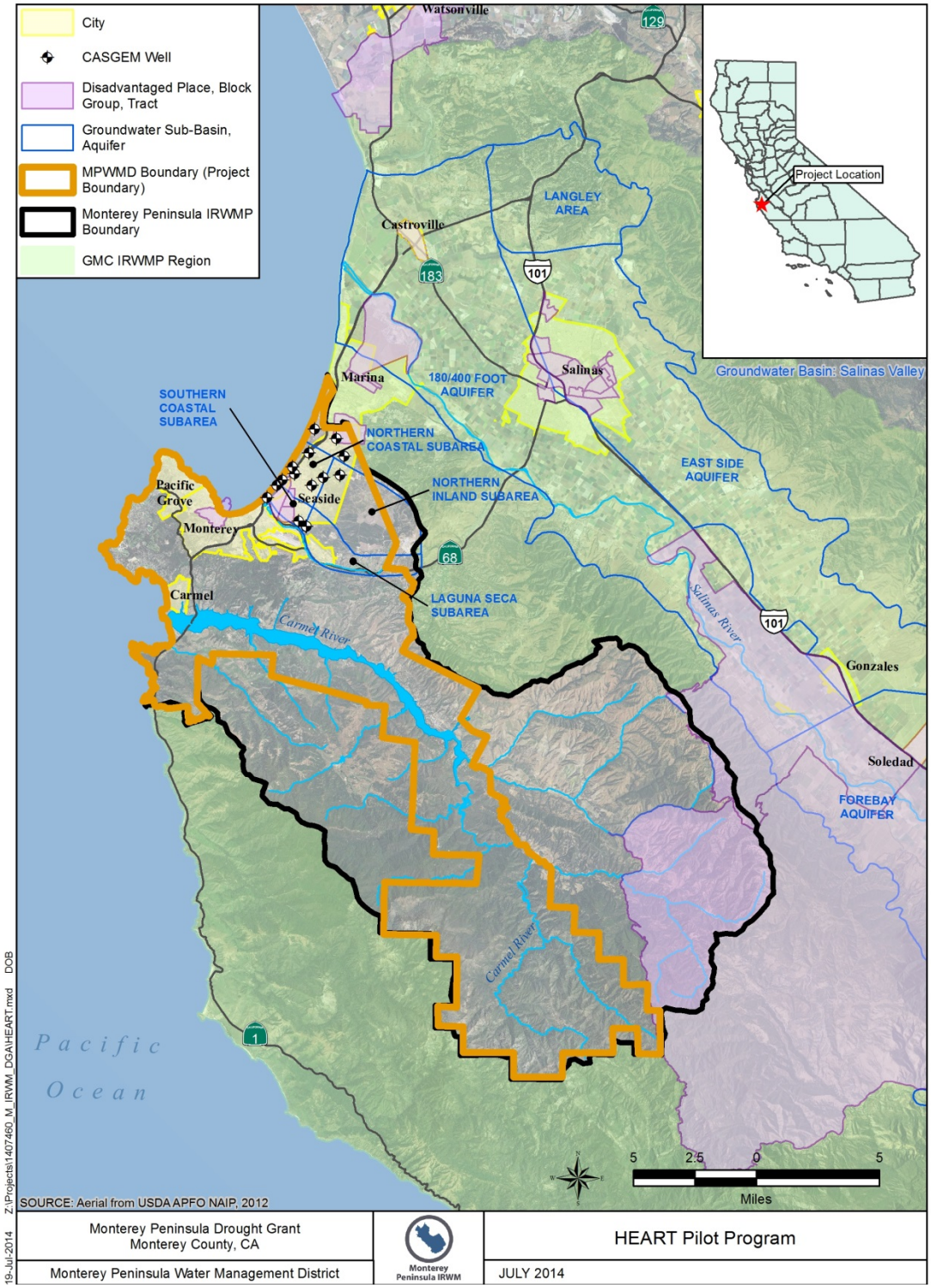


Figure 3.5-1 Project Map for HEART Pilot Program

3.5.3 Project Physical Benefits

The HEART Pilot Program can achieve multiple quantifiable physical benefits with the primary benefit being immediate conservation of potable water of 33 AFY and 462 AF over the lifecycle, but also having secondary benefits including environmental mitigation and reduced greenhouse gas emissions through reduced energy usage:

1. The multi-family common-area laundry high efficiency clothes washer component of this project provides financial incentives or direct replacement of inefficient commercial clothes washers in multi-family settings. Older clothes washers use approximately 40 gallons per load, while high efficiency clothes washers use 10 to 16 gallons. They also extract more moisture from clothes during the spin cycle, thus reducing drying time (and wear and tear on the clothing). Savings of up to 60 percent per replacement washer can be expected. The California Urban Water Conservation Council reports factors that assume 0.024 AFY savings per residential user, and the Consortium for Energy Efficiency reports savings of 0.09 AFY (or greater) per commercial washer, which could be construed to reflect 3.75 users per commercial washer. There are approximately 10,500 multi-family dwelling units in the project area, as determined by MPWMD in consultation with the California American Water Company and the Seaside Municipal Water District. Assuming 50% of these units are served by common-area laundries, the overall market potential for water savings in this area are anticipated to exceed 126 AFY. The proposed program is designed to initially penetrate 21% of this market on a trial basis, or 26 AFY with the installation of 290 commercial-grade machines.

2. The comprehensive water efficiency retrofits component of the Project is comprised of the purchase and installation of water efficient fixtures and appliances (toilets, showerheads, aerators and other water-saving devices, high efficiency clothes washers and water efficient dishwashers) throughout the homes of qualified low-income water utility customers. Water savings of about 40 percent per dwelling unit are expected. At an average consumption of 75 gpcd with approximately two residents per dwelling (0.168 AGA), the anticipated water savings per participant/customer is 0.067 AFY. Program wide savings at a 50 percent participation level (using an estimated 4,000 low-income customers) would achieve savings of approximately 134 AFY. The proposed program is designed to initially penetrate 5% of this market on a trial basis, or 7 AFY with the implementation of 180 full retrofits.

Additionally, The Project can be implemented immediately upon funding. Within 120 days of funding, measurable reductions in water consumption will begin to occur. The Project will reduce potable water consumption from over-drafted supply sources, eliminate water leaks and efficiencies in existing uses, and will reduce greenhouse gasses by increasing the efficiency of the household appliances being used. Used equipment will be provided to a recycling center for reuse. The project provides water/energy efficient (i.e., “green”) appliances that would not be economically available to these individuals. The use of high efficiency clothes washers reduces fabric wear and extends the length of time between the need for replacement.

Table 3-1. Physical Benefit Number 1

Table 5 – Annual Project Physical Benefits **Project Name: HEART Pilot Program** **Type of Benefit Claimed: Amount of Water Supply Produced through Conservation Savings** **Units of the Benefit Claimed : AFY of Alternative Water Supply Project Constructed** **Additional Information About this Benefit: Anticipated Life Cycle is 14 Years**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project** **|(b) – (c)|**
Annually Through 2028	0	33 AFY	Reduces annual supply by 33 AFY; 462 AF lifecycle savings
Comments: Region is under State Water Resource Control Board Order to build replacement water supply; Proposed project will reduce need for higher cost new supply and/or allow new supply to increase portion allocable to drought reserve.			

Table 3-2. Physical Benefit Number 2

Table 5 – Annual Project Physical Benefits **Project Name: HEART Pilot Program** **Type of Benefit Claimed: Endangered Species Benefitted** **Units of the Benefit Claimed: Types and Number of Endangered Steelhead Trout and Red Legged Frogs Rescued** **Additional Information About this Benefit: Reduced Withdrawals From Carmel River Reduces Mitigation**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project** **|(b) – (c)|**
Annually Through 2028	0	163,850 kWh	Reduces annual electricity by 163,850 kWh; 2.3 gWh lifecycle savings
Comments: 290 commercial-grade machines multiplied by 565 kWh per year[19]			

[19] Cluett, Rachel and Jennifer Amann, 2013 Saving Energy and Water through State Programs for Clothes Washer Replacement in the Great Lakes Region

Table 3-3. Physical Benefit Number 3

Table 5 – Annual Project Physical Benefits **Project Name: HEART Pilot Program** **Type of Benefit Claimed: Endangered Species Benefitted** **Units of the Benefit Claimed : Types and Number of Endangered Steelhead Trout and Red Legged Frogs Rescued** **Additional Information About this Benefit: Reduced Withdrawals From Carmel River Reduces Mitigation**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project** **|(b) – (c)|**
Annually Through 2019	0	123 rescues	96 Steelhead Trout & 27 Red Legged Frogs; 738 lifecycle rescues
Comments: District and other parties perform major mitigation activities on Carmel River, including the rescue and rearing of Steelhead Trout and Red Legged Frog. Total unlawful withdrawals (2013) which are being mitigated is 5,979 AFY. This project reduces unlawful withdrawals by 33 AFY or 0.55%. Average annual steelhead rescues = 16,000; Average annual frog rescues = 4,500; Mitigation activities expected to continue through 2019. Effects are cumulative.			

Table 3-4. Physical Benefit Number 4

Table 5 – Annual Project Physical Benefits **Project Name: HEART Pilot Program** **Type of Benefit Claimed: Riparian Habitat Benefitted** **Units of the Benefit Claimed : Types and Number of Endangered Steelhead Trout and Red Legged Frogs Benefitted** **Additional Information About this Benefit: Reduced Withdrawals From Carmel River Reduces Mitigation**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project** **|(b) – (c)|**
Annually Through 2019	0	.1 miles/0.13 acre	.1 miles riparian vegetation management; 0.13 acres habitat restoration
Comments: District performs major mitigation activities on Carmel River, including 16 miles of riparian vegetation management and 21 acres of habitat restoration. Total unlawful withdrawals (2013) which are being mitigated is 5,979 AFY. This project reduces unlawful withdrawals by 33 AF or 0.6%. Mitigation activities expected to continue through 2019.			

3.5.4 Technical Analysis of Physical Benefits Claimed

3.5.4.1 Technical Basis of the Project

Projects similar to the HEART Pilot Program that have involved direct installs have been undertaken in areas around the country with great success. For example, programs to retrofit multi-family housing and low income units have been undertaken by the U.S. Department of Housing and Urban Development, the Energy Savers Program in Illinois, Los Angeles Department of Water and Power's *A Better Idea Program*, San Francisco Public Utilities Commission's Community Assistance Program, East Bay Municipal Utility District, and many others. However, a project of this magnitude has not been undertaken on the Monterey Peninsula due to the cost of implementing a direct install program.

3.5.4.2 Documented Benefits of Agency Collaboration

It is expected that the HEART Pilot Program will be coordinated with, and benefit the constituents of, the Monterey County Department of Social Services Community Benefits Branch and the Housing Authority of Monterey County, as they administer California Department of Social Services and Federal HUD programs. There will also be rebate opportunities under the Housing Choice Voucher retrofit program under the Housing Authority, as well as Pacific Gas and Electric.

3.5.4.3 Estimates of Without-Project Conditions

The District has determined that multi-family property owners have been slow to install high efficiency washing machines in common-area laundries for several reasons: (i) most are older machines the cost of which has been fully amortized, yet provide a cash (coin) revenue stream, so there is no financial incentive to replace, (ii) many are operated by out-of-area third party vendors such as WEB Services Company and WASH Multifamily Laundry Systems who are not attuned to local area water conservation demands, (iii) many are master-metered and the cost is hidden in annual association fees so the building association does not focus on retrofit opportunities, and (iv) even with rebate incentives, many property owners simply are not positioned to expend $1,300 to $2,000 and wait 3-4 months for a rebate. Hence, it is assumed the "Without-Project" is failure to retrofit.

Similarly, the District's experience has been that low-income residents do not initiate retrofits or take advantage of rebates. The reasons are primarily (i) renters will not expend money on capital purchases, (ii) income constrains large capital purchases even if lifecycle savings are available, and (iii) even with rebate incentives, most low-income residents simply are not positioned to expend upfront monies and wait 3-4 months for a rebate. Hence, it is assumed the "Without-Project" is failure to retrofit.

3.5.4.4 Description of methods used to estimate physical benefits

Based on the method described in Section 3.3 above, 33 acre-feet per year of water savings were computed. Quantity of 290 commercial-grade machines is based up $405,000 available and approximately $1,400 per machine based upon volume purchase of a proxy machine Huebsch Model HFNBCFSP112TW01 Series (oral communication with Alco Services Inc.). Quantity of 180 low-income full retrofits derived from $450,000 available and approximately $2,500 per retrofit. See budget discussion in Attachment 5.

Electrical energy savings are computed based upon 290 commercial-grade machines multiplied by 565 kWh per year savings.

Secondary environmental benefits were calculated as follows: District and other parties perform major annual mitigation activities on the Carmel River, including the rescue and rearing of Steelhead Trout and Red Legged Frog. Total unlawful withdrawals in 2013 which are being mitigated are 5,979 AFY. This project reduces unlawful withdrawals by 33 AF or 0.6%. Average annual steelhead rescues are 16,000 and average annual frog rescues are 4,500. The percentage of water savings is applied to the mitigation activity. Species rescue activities are expected to continue through 2019. Effects are cumulative.

The District also performs riparian vegetation management along 16 miles of the river and 21 acres of habitat restoration. The percentage of water savings is applied to the mitigation activity. Habitat activities are expected to continue through 2019. Effects are annual, not cumulative.

3.5.4.5 Identification of new facilities, policies and actions require to obtain physical benefits

No new facilities are required for this Project. The HEART Pilot Program will only require District Board approval, staff management, and third-party vendor implementation.

3.5.4.6 Description of any potential adverse physical effects from the project

Retrofit programs result in disposal of appliances and fixtures. Local distributors of High Efficiency Clothes Washers and appliances have recycling programs in place and offer to remove the old appliance. In most cases, the old appliance is shipped to a regional processing center to be dismantled and parted out according to type of metal and use involved. For example, Sears ships old appliances to its Northern California Regional Distribution Center and from there machines are sent to the appropriate metal recycling center. Similarly, Orchard Supply Hardware also offers to remove the old appliance when a new one is purchased. They also ship the old appliance to the recycling center in Milpitas, California, and from there to metal recovery and recycling businesses. The Monterey Regional Waste Management District accepts appliances and processes them. Recycling of old fixtures and appliances will be a requirement in the scope of services for the procurement phase.

3.5.5 Cost Effectiveness Analysis

Table 6 – Cost Effective Analysis **Project name: Highly Effective Urgent Water-Savings Retrofits Project**	
Question 1	**Types of benefits provided as shown in Table 5** This project provides water savings, reduces greenhouse gas emissions through reduced electricity use, and has secondary benefits to endangered species and riparian habitat.
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?** The project is designed to provide savings of potable water within the Monterey Peninsula and is being proposed because it will also reduce the volume (and, hence the cost) of residential water use by low-income households. Therefore, consideration was given both to the cost of achieving project benefits, and to the community who would benefit from lower costs for water. Substituting construction of new physical water supply was not considered because of its high cost and it fails to address the demand-side goal of conservation.
	If no, why? Other conservation programs were considered, but are not being proposed as they do not target low-income water users.
	If yes, list the methods (including the proposed project) and estimated costs.
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods**. As noted above, the proposed project generates substantial water savings at a reasonable cost and also, benefits households particularly vulnerable to the high cost of water in the steeply-tiered water rate structure in place on the Peninsula.
Comments:	