PROJECT OVERVIEW

General Project Information

Project Title:	Harkins Slough Facility Optimization Project
Project Location:	San Andreas Terrace in southern Santa Cruz County, adjacent to Monterey Bay
Estimated Cost:	$2,450,000

Brief Project Description (1 to 2 sentences):

The Harkins Slough Optimization Project includes both an optimization study and facility improvements necessary to maximize the capacity of PVWMA's Harkins Slough Recharge Facility in terms of recharge and recovery. The study will allow a better understanding of the hydrualic properties within the shallow aquifer underlying the recharge basin. An improved understanding of the hydraulic properites would lead to the construction of new extraction wells designed to efficiently recover recharged water and upgrades to the pump station and filters at the slough diversion to improve system operation and recharge percolation rates. The recovered groundwater will be blended with recycled water from the Watsonville Recycled Water Treatment Facility.

Project Proponent Information

Contact Name:	Mary Bannister, General Manager
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Other participating agencies/organizations (if applicable):

The project would involve the participation of Santa Cruz County, the agency responsible for the operation of the pump facilities, City of Watsonville the agency responsible for operation of the recycled water treatment facility, and the USDA Natural Resources Conservation Service, the agency responsible for construction of the wetland.

DETAILED PROJECT INFORMATION

Description

Please provide a description of your project (including the location) and its purpose, what will be constructed and/or implemented, how the project will function, the area(s) and/or entities that will be affected by or will benefit from the project, and any potential obstacles to implementation.

The Managed Aquifer Recharge & Recovery Study is intended to maximize PVWMA's Harkins Slough Project Recharge Facility capacity in terms of recharge and recovery. The proposed study works toward that goal by installing monitoring wells that will be used to conduct aquifer tests to determine the hydraulic properties of the shallow aquifer in three locations around the recharge basin. Understanding of these properties and their spatial variations will help determine the most effective way to further develop infrastructure at the facility to assist with the Agency's mission of stopping groundwater overdraft and seawater intrusion. In addition, managed aquifer recharge and recovery is considered such a valuable project in the valley that development of a second facility is being evaluated by a Basin Management Planning Committee, formed by the Board of

Directors. Improving our understanding of how to maximize the capacity of the Harkins Slough Facility now, will help PVWMA design the project optimizations.The project optimization will include installation of new shallow extraction wells at the recharge basin and upgrading the pump station and filters at the slough diversion to improve system operation and recharge percolation rates. In 2011, PVWMA removed the invasive vegetation and accumulated mud that had prohibited the pump station from operating at full capacity. This project includes replacing the pumps to allow the PVWMA to better control the amount of flow sent to the pressure filters, and improvements to the filters media to reduce the amount of solids sent to the recharge basin. The pump station upgrades may also include upgrades to the pump house, controls, and intake to improve facility reliability and minimize future clogging issues. Additionally, the USDA Natural Resources Conservation Service (NRCS) is planning to construct a wetland on land between Harkins Slough and Watsonville Slough to divert water from the sloughs into it. This may improve the water quality diverted to the recharge basin. The proposed diversion is upstream of theHarkins Slough Pump Station. The PVWMA will coordinate the Harkins Slough Recharge Project Upgrades with the NRCS project. New extraction wells will be built sequentially so that each well location and screened depth can be based on information from the previous wells. The number of wells needed will depend on the yields of individual wells.The goal of the upgrades is to increase the project's yield approximately 1,000 AFY on average, in addition to the current yield of approximately 200 AFY. Diversions from Harkins Slough are permitted to occur from November through May, to capture and manage flows that have historically flooded the adjacent agricultural lands. In practice, diversions occur no earlier than January, when the quality of slough water is acceptable for recharge. Diversions occur when the turbidity level is less than 50 NTU so that the filters do not get clogged. Chloride concentration, which is not usually an issue, tends to be less than 50 mg/L. The quality of water diverted to the recharge basin must be better than the quality of groundwater into which it infiltrates. The facility then works to improve the quality of the water in the surficial aquifer as well as to provide a reliable supply of high quality water for blending with recycled water in the CDS. The planned wetland construction by the NRCS could increase the water quality at the diversion point by (1) bringing higher quality water from the Watsonville Slough to Harkins Slough and by (2) reducing turbidity by settling solids in the wetland.

Technical Feasibility

Discuss the technical feasibility of the project. If possible, cite references that contain information about the proposed project and detail the technical feasibility of the project.

For the study element, techniques proposed are standard for this type of work. Quality control for the well drilling sample collection, hydrologic parameters estimation, groundwater quality sampling and laboratory handling will all be overseen by a licensed professional geologist. In this case, two licensed professional geologists will be working on this study and as such one shall provide quality control for the other. Results of aquifer tests shall be reviewed by both professional geologists. Water quality samples shall be sent to an ELAP certified laboratory with full documentation of their own QA/QC procedures. Chains of custody will be used to ensure data integrity. The facility improvements will be based on the study results.

Pajaro River Watershed IRWM Regional Goals & Objectives

Put an X next to any goal that the proposed project will achieve.

Water Supply

x	1. Meet 100% of M&I and agriculture demands (both current and future conditions) in wet to dry years including the first year of a drought.

	2. Meet 85% M&I and 75% agriculture demands (both current and future conditions) in second and subsequent years of a drought.
x	3. Identify and address water supply needs of disadvantaged communities in the Pajaro River Watershed.
	4. Implement water conservation programs to reduce M&I and agricultural water use consistent with SBx7-7 and CVPIA.
0	5. Maximize the use of recycled water during the irrigation season and expand other uses of recycled water.
x	6. Optimize the use of groundwater and aquifer storage.
x	7. Maximize conjunctive use opportunities including interagency conjunctive use.
	8. Optimize and sustain the use of existing import surface water entitlements from the San Felipe Unit.
x	9. Maximize the beneficial use of existing local water supplies while protecting existing surface water rights.
	Water Quality
x	1. Meet or exceed all applicable groundwater, surface water, wastewater, and recycled water quality regulatory standards.
	2. Identify and address the drinking water quality of disadvantaged communities in the Pajaro River Watershed.
x	3. Protect groundwater resources from contamination including salts and nutrients.
x	4. Address impacts from surface water runoff through implementation of Best Management Practices or other surface water management strategies.
x	5. Meet or exceed delivered water quality targets established by recycled water users.

Flood Protection

x	1. Implement flood management strategies throughout the watershed that provide multiple benefits.
	2. Reach consensus on the Pajaro River Risk Reduction Project necessary to protect existing urban areas and infrastructure from flooding and erosion from the 100-year event
	3. Work with stakeholders to preserve existing flood attenuation by implementing land management and conservation strategies throughout the watershed.
x	4. Develop approaches for adaptive management to minimize maintenance requirements and protect quality and availability of water while preserving ecologic and stream functions.
X	5. Provide community benefits beyond flood protection such as public access, open space, recreation, agriculture preservation and economic development.

Environmental Protection and Enhancement

x	1. Address opportunities to enhance the local environment and protect and/or restore natural resources, in cooperation with landowners, when developing water management
	2. Improve biological and cultural resources, including riparian habitats, habitats supporting sensitive plant or animal species and archaeological/historic sites when
X	3. Address opportunities to protect, enhance, or restore habitat to support Monterey Bay National Marine Sanctuary marine life in conjunction with water supply management
	4. Address opportunities for open spaces, trails, parks along creeks and other recreational projects in the watershed that can be incorporated with water management

Integration and Coordination

Put an X next to any Resource Management Strategies (RMS) that the proposed project will address.

Reduce Water Demand	Agricultural Water Use Efficiency	
	Urban Water Use Efficiency	
Improve Operational Efficiency and Transfers	Conveyance - Delta	
	Conveyance - Regional/local	
	System Reoperation	
	Water Transfers	
Increase Water Supply	Conjunctive Management & Groundwater Storage	x
	Desalination	
	Precipitation Enhancement	
	Recycled Municipal Water	
	Surface Storage - CALFED	
	Surface Storage - Regional/local	
Improve Water Quality	Drinking Water Treatment & Distribution	
	Groundwater Remediation /Aquifer Remediation	
	Matching Quality to Use	x

	Pollution Prevention	
	Salt & Salinity Management	x
	Urban Runoff Management	
Improve Flood Management	Flood Risk Management	x
Practice Resources Stewardship	Agricultural Lands Stewardship	~~0~~
	Economic Incentives (Loans, Grants, & Water Pricing)	
	Ecosystem Restoration	X
	Forest Management	
	Recharge Area Protection	
	Water-Dependent Recreation	
	Watershed Management	X
Other Strategies	Crop Idling for Water Transfers	
	Dewvaporation or Atmospheric Pressure Desalination	
	Fog Collection	
	Irrigated Land Retirement	
	Rainfed Agriculture	
	Waterbag Transport/Storage Technology	

Please describe:	This project will improve existing groundwater recharge and recovery, which will improve water quality in the surficial aquifer, reduce potential for flooding, act as a source of blend water (blended with recycled water), and to guide development of additional production well installations.

List the projects that were integrated to develop a single proposed project, if applicable.

The Harkins Slough project has been integrated with the NRCS wetland project.

List the agencies and organization that are working together to implement the project.

PVWMA, Santa Cruz County, City of Watsonville and NRCS

Climate Change Mitigation and Adaptation

Put an X next to any climate change adaptation or mitigation strategy the proposed project will contribute to.

Adaption Strategies

x	Improve water supply reliability
x	Expand conjunctive use of multiple water supply sources
x	Increase water use and/or reuse efficiency
x	Provide additional water supply
	Promote water quality protection
	Reduce water demand
x	Advance / expand recycled water use
	Promote urban runoff reuse
	Address sea level rise
	Address other anticipated climate change impacts
x	Improve flood control
	Promote habitat protection
	Establish migration corridors
	Re-establish river-floodplain hydrologic continuity
	Re-introduce anadromous fish populations to watershed
	Enhance and protect watershed forest and meadow systems

Please describe: Improve ground water recharge, to protect against further salt water intrusion, diverted water acts as flood control, recovered water is blended with recycled water for irrigation supply - increases the use of recycled water

Mitigation Strategies

	Increase water use efficiency or promote energy-efficient water demand reduction
	Improve water system energy efficiency
x	Advance / expand recycled water use
	Promote urban runoff reuse
	Promote use of renewable energy sources
	Contribute to carbon sequestration

Please describe: Mitigate for ground water over- pumping, by recovering more than the current system's 20-25% of the recharge water. Recovered water is blended with recycled water for irrigation supply - increases the use of recycled water

Does the proposed project reduce regional greenhouse gas emissions and/or improve energy efficiency? If so, explain how.

No direct benefits, but improved groundwater recharge recovery will lessen the need to convey water in from elsewhere to meet water needs of areas debilitated by saltwater intrusion, which would require fuel/ GHGE in the process.

Social Benefits and Impacts

Does the project provide specific benefits to disadvantaged communities and/or Native American tribal communities? If so, explain.

This project serves the entire Pajaro Valley Groundwater Basin, including the disadvantaged community of Watsonville and the low-income town of Pajaro. These communities, as well as disadvantaged peoples living in the agricultural areas around them, will benefit from a recharged ground water system and the increased water supply reliability and protection against salt water intrusion it provides.

Does the project address any known environmental justice issues?

In supporting progress toward the benefits described above, this project addresses EJ issues of access to safe, potable water and protection/ enhancement of a safe environment for living and working.

Project Cost

Total Estimated Capital Cost	$2,450,000
Annual Operation & Maintenance (O&M) Cost	$40,000
Cost Basis (Year)	2012
Source(s) of Funding for Capital	PVWMA Groundwater Augmentation and Deliver Water Revenue
Source(s) of Funding for O&M Cost	PVWMA Groundwater Augmentation and Deliver Water Revenue
Project Life (years)	30 years
Provide link to project cost estimate, if available	PVWMA BMP

Economic Feasibility

Has a benefit:cost or cost effectiveness analysis been completed for your project? If so, please cite reference and briefly summarize. If no economic analysis has been completed for the project, the project may receive zero points out of a possible 100 points for the financial considerations criteria unless the project is a DAC project. If the project is not a DAC project but the B:C ratio is expected to be greater than 1, please provide a justification. The lack of an economic analysis may also affect the project's readiness score.

This project will benefit all users of Basin water. This is a DAC project; work will directly serve the grower population, a significant portion of which is economically disadvantaged, and the nearby urban populations (by contributing to a reliable water supply and better water quality, as described above), but no cost/benefit analysis of the study has been undertaken.

If known, please provide the Benefit:Cost Ratio.

Provide a detailed discussion of the benefits the project will provide. To the extent possible, quantify changes and benefits (e.g. water quality and water supply benefits) that will result from project implementation; otherwise, describe benefits qualitatively.

No but the project provides a critical water supply to a DAC and economic analysis indicates a positive B/C ratio.

Project Readiness

Proposed Project Start Date:	Study can begin immediately after securing funding
Anticipated Project Completion Date:	2015

Please Indicate the status (pending, in process, complete) of the following.

Project Element	**Status**	**% Complete**	**Estimated Completion Date**
Feasibility Study	Complete	90	Jun-13
Preliminary design	N/A		
CEQA/NEPA	Ongoing	10	Dec-13
Permit Acquisition	N/A		
Construction Docs	N/A		